Health Surveillance in Europe

European Global Oral Health Indicators Development Project

SPC 2002472

Final Report

2003-2005
Acknowledgement

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For further information about the European Oral Health Global Indicators Development Project, please contact:
Professor Denis Bourgeois
EU Project Leader
Department of Public Health
Dental Faculty
University Lyon I
Rue G. Paradin
F. 69372 Lyon cedex 08
Tel: +33 4 78 77 86 81
Fax: +33 4 78 77 86 89
E-mail: denis.bourgeois@adm.univ-lyon1.fr
Health Surveillance in Europe
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Final Report
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Report prepared by

Professor Denis M. Bourgeois
Project Leader
Department of Public Health
Dental Faculty
University of Lyon, France

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Health Surveillance in Europe

European Global Oral Health Indicators Development Project

2003 Report Proceedings

Report prepared by

Professor Denis M. Bourgeois
Department of Public Health, Dental Faculty, University of Lyon, France

Juan Carlos Llodra
Department of Preventive Dentistry, Dental Faculty, University of Granada, Spain

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Health and Consumer Protection Directorate-General
Health Surveillance in Europe

European Global Oral Health Indicators Development Project

2003 Report Proceedings

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Introduction

Numerous projects have been proposed by different teams from European countries within the framework of the Community action programme in the area of health surveillance. The community programme of health surveillance was launched in 1997 by the European Community as part of its duty with respect to public health. The major objective of this programme was to contribute to establish a community system for health surveillance. It embodied three specific objectives: (i) to develop community health indicators through a critical review of existing data and indicators; (ii) to enable the realisation of a reliable communication system for data and health indicators transfer and sharing; (iii) to define the necessary methods and instruments for analysis activities and the production of reports on health status, trends, and policies’ impact on health. All the results of the various projects sponsored by the Programme of Community Action in the field of public health (1997-2002) are accessible on the Website of the European Commission.

The project titled “European Global Oral Health Indicators Development” (EGO-HIDP) has been developed under the auspices of this Programme. It is one of the latest pathfinder projects financed in 2002 within the framework of the Health Surveillance Programme. The first phase of the Project terminated and the final report was produced in February 2004. The second phase is currently ongoing.

The purpose of the European project on Global Oral Health Indicators Development Project (Convention SPC 2002472) is to establish priorities for a specifically European context in coordination with the existing programme and to make new

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1. Project Leader. Faculty of Dentistry, University of Lyon, France.
recommendations for improving health system performance when necessary. The argument in favour of developing a plan linked to oral health indicators within the European Programme of Surveillance is based on an analysis of the current situation and the need to organize oral health system monitoring. There are a number of advantages to oral health indicators.

In the first place, the rationale for a plan connected to oral health indicators is obviously related to the impact of disease upon society. Yet the oral health of European populations is generally satisfactory. At least in countries within the Union, it greatly improved in the recent past. An analysis of the literature on this subject is telling: between 1970 and 2000 improvement among children rose from 50 to 80%. Similarly, most cavities were treated. These are predominantly cases of quality dental care, meaning more fillings and fewer extractions.

Even more remarkable is the fact that the state of dental health among European populations, including adults, appears to have been “internationalised”. Thus the index of serious tooth decay (DMFT) is generally the same for all Europe, as are its components D, M, F, although countries such as Spain and Greece noticeably deviate on this point.

The variability of the extent of tooth decay observed in the 1970s has greatly declined. All the countries within the Union are currently converging on a serious decay threshold at age 12, varying around 1-1.5 DMFT. Only adults aged 65-74 present significant differences regarding the rate of tooth loss in Europe. These differences are related to sanitary conditions and historical cultural customs, but should rapidly disappear in future generations. This analysis also covers periodontal disease. In its severe form, periodontal disease could affect 10% of all European adults in a few places. It might therefore seem obsolete to recommend promoting national monitoring systems to evaluate health results based on the severity of the incidence of tooth decay, given that all the clinical indicators traditionally utilised are improving so significantly that they are heading towards a zone of “good dental health,” as it might appear frivolous in light of the “globalisation” of dental health in Europe.

Especially since it is obvious that we are forever past the dramatic dental health situation of the 1970s, even if the literature were to contain warning signs of a possible decline in the dental health of European children. Actions undertaken to control and prevent tooth decay have had a considerable effect on current generations. The probability of a significant overall decline in the medium term is slight and without a major impact on the health system, even if we are unprotected from minor recurrences in various places.

Secondly, the monitoring system for tooth decay via the WHO data bank has existed since 1969. Data on periodontal disease was added in 1985 via the CPITN index. In 1995 the data bank was even relayed to the WHOCC of Malmö University website¹, which produced a national synthesis of actualised oral health data for the Internet. Syntheses of epidemiological information thus have been produced regularly.
Health goals for the year 2000 were evaluated on the basis of these syntheses, as were recommendations to the year 2015 – in short, most policy directives concerning oral health promoted by the WHO.

Nevertheless, despite the great achievements of oral health in European countries in the last 20 yrs, an unsolved and ongoing problem still remains. The indicator of the incidence of serious tooth decay (DMFT) is the international reference in the area of oral health. Its 40-year history is an undeniable asset in evaluating past and future trends. Yet, developing an up-to-date representative epidemiological study utilizing the methodology of oral health monitoring in most cases invariably leads to similar results among low-risk or even slight-risk categories. Therefore, only limited information gains, without any real operational implications, are derived from a significant investment. The problem is not so much the usefulness of the CAOD index, but its capacity to translate the short-term health changes and perceptions within oral health systems. The practice of dentistry has undergone several major changes over the last thirty years. Disease prevention, identification of risk and preventive factors, evaluation of health initiatives, and quality treatments have been required and progressively replaced by the concept of restorative dentistry (care). As in other health areas, the question is whether or not clinical data, with all the logistical and economic implications that it poses, should remain the cornerstone of the dental monitoring system. It is not a question of replacing the DMFT; at issue is its position and prominence in relation to other more responsive indicators, for example questionnaire-based indicators.

Minorities and deprived groups in many European countries have a high level and/or untreated diseases. Oral health is characterized by social inequalities in the face of disease and patient management. In France, 40% of 12-year olds have no DMF tooth; most other children fall in the range of 1 to 4 DMFT teeth. In contrast, 10.8% of all children have a DMF greater than 4 teeth. In the trend observed in European countries with good demography, 1/3 of the children have about 80% of DMF teeth, and 1/4 of the children have about 65% of DMF teeth. And 10% of the children have about 40% of DMF teeth. Therefore, the “traditional” preventive methods evidenced in most cases exhibit limitations among population groups with a high risk of tooth decay groups moreover poorly identified on the epidemiological level. These populations at high risk for tooth decay – perhaps not their only risk factor – remain on dental health charts recorded in the years 1965, the same populations for whom treatment is apparently difficult to come by.

The failure of prevention is also the failure of the dental health care system. It is therefore necessary to identify alternative approaches if we wish to make progress. Getting rid of inequalities should be the primary purpose of the health system, whence the suggestion of innovative, integrated approaches. Serious thought must be given to the type of indicators for this programme, its strategies, and intended results.

Increasing cost which represents 4-8% of the total expenses in health. The oral health care system in Europe has economic significance, thus the industrialized countries’ clear policy, despite the disparities observed in health care expenses. Data for the OECD is explicit.
Dental expenditures represent 3.8 to 8% of all health care expenditures. For the eight OECD countries used in this example, average expenditures for dental care per individual increased by 1.5 between 1990 and 2000, with variable differences according to the country.

In 2000, expenditures for dental care represented an average of 0.5% of the GDP, or approximately 1/17th of overall health care expenditures. Germany spent proportionally the most for its oral health: 0.8% of the GDP. France falls in the middle with 9.3% of the GDP devoted to health care and 0.5% reserved for dental care. Finland (0.4%) and the Netherlands (0.3%) have the smallest expenditures. A comparative
analysis of European oral health care systems therefore seems of the utmost importance. The operational goal via the implementation of a regional monitoring system based on economic-type health indicators would increase their effectiveness, their performances, and improve cost/efficiency.

A professional demography in transition. 245 169 dentists, 13 295 dental hygienists work in 1998 the European Union and EEA. The dental profession has an impact on employment in advanced health care. The majority of European countries question policy choices on dentistry programmes because the profession is sensitive to the economic and health environment. Many issues give rise to questions. The most important questions for planning are: what type of oral health professionals for what type of practice; what type of dentist for what type of practice; and how many dentists per capita in the medium term. These questions are principally related to the items in the following list – which is not exhaustive: (1) the observed change in the state of dental health among populations; (2) the evolution of techniques; (3) the development of behaviours and expectations among populations regarding the dental health care system; (4) the announced coordination of European studies for the Licence Master Doctorate; (5) the spread of dental hygienists; (6) the demographic balance linked to retirement; (7) the economic impact of health insurance reforms; (8) health care as a service; (9) the expansion of the Union, etc.

Add to that the problem of declining quality of care, a hypothesis advanced in certain countries, and related, among other things, to (1) the growth of increasingly open professional competition within a free market; (2) the trend of growing operating costs becoming more and more significant and hurting the practitioners’ profitability; (3) the impending deregulation of social welfare systems; (4) access to private dental training leading to non-controlled professional demographic, etc.

In the interest of the populations and society at large, which is entitled to a quality undertaking of responsibility, the area of professional demographic control represents an important European issue. The first stage of this approach is a proper qualitative and quantitative assessment of the practices – which is presently lacking –, an assessment that should encourage aid in the decision for planning services. That being said, “Quality of the information in oral health is affected by the insufficient use of available data for planning, implementation, service management and evaluation and the inadequate quality of data produced”.

The insufficient available data and the significant decrease in representative studies

The international epidemiological monitoring of oral health is a relatively recent initiative. The Epidemiological and Informative System (EIS) of the WHO Oral Health Programme started in 1969 with the establishment of the Global Oral Data Bank. As a general rule, evaluation of oral health currently relies on the analysis of a large number of studies. A total of 1,890 scientifically validated studies in 2000 was contained in the WHO data base but the fact that these surveys have more local or regional rather than national representativeness somewhat limits their impact.

In Europe, the small amount of representative data on the status of oral health among populations is targeted, when it
exists, on DMFT indicators and 12-year olds. Data has significantly declined the past 10 years. Only rarely is data part of a health monitoring methodology. Few countries in Western Europe have established a data collection system at the national level: only Great Britain has secular epidemiological data on the prevalence of caries in young adults. Sweden and the other Scandinavian countries used country council reports to the National Board of Health and Welfare through the public dental service. No representative data on the status of the population’s oral health existed in France before 1987 in which year the first two national epidemiological studies were conducted to assess the oral health of children of six, nine and twelve years of age.

The WHO data bank is based on specific methods that are recommended in oral health epidemiology, themselves resulting from basic epidemiological methods. Its methodological specificity is mainly related to the definition of the population that should be studied, sampling methods, indicators and monitoring index of decay, standardization of findings presentation. It seems that synthesis international articles are the main sources used to proceed to a state analysis of trends; they can be found in the WHO Data Bank.

A critical analysis of the methodological criteria used in “Materials, Methods, and Results”, rubrics of the international scientific literature on cross-section studies by country at equal age, published for the oral health period 1986-1996 has underlined. New and complementary trends should be recommended so as to improve the production of higher quality information in oral health epidemiology. Standardized procedures should be developed and used. The expansion of oral epidemiology during the 1970s overcame the obvious shortcomings in terms of knowledge about the oral health status of populations even though developed actions mainly targeted school children. Collected data favoured cross-section studies with no repetitive character since their aim was not to target the cohorts.

At this stage of the produced information analysis, research and development perspectives should focus on the setting up of a health monitoring and recording system and furthermore, on respecting the rules of results dissemination that should lie within a benchmark methodological framework. The analysis of the publications showed weaknesses in the evaluation of oral health trends: weaknesses in terms of methodology, quality control, and presentation of results. The interpretation and conclusions in public oral health are therefore limited. New or complementary measures should be taken in order to improve the quality of medical information in oral health epidemiology.

The profusion of internationally indicators complicates the national selection of indicators and may lead to costly and unnecessary monitoring efforts. Analysis of the literature highlights the profusion of recently available Indicators. These indicators stem from research developed in the health field, within the framework of international oral health programmes (ICSII, Biomed, Oratel, etc.) and national and even local studies with very limited impact. “Improvements” are regularly suggested to improve epidemiological knowledge about the state of dental and periodontal health among the populations. But these new types of indicators have generally dealt with quality of life, deter-
minants that include preventive factors, risk factors, and socio-demographic factors. Curiously, the indicators targeting health services and the health economy are underrepresented.

The many studies and publications available in this area create confusion about the selection and hierarchy of public health indicators. Boundaries are vague between the presentation and utilisation of clinical research indicators, foundational research indicators, and public health indicators, which are related to timely research projects without real operational development and without concrete application to coordinate European monitoring.

Therefore the disparity between the quality and the quantity of available indicators must be emphasized. Oral health has traditionally been defined in terms of disease. The complexity of the indicators required to characterize oral health is undoubtedly influenced by the complexity of this discipline. Oral health is strongly age related and there is often an increase in severity and prevalence with increased age and leads no doubt to an oral health spread of indicators. Yet the priorities given to clinical indicators do not currently rank among the most important recommendations advocated for development by European and/or international authorities in the area of monitoring non-contagious diseases. To this end, a new type of indicators will facilitate further promotion of oral health and non communicable disease surveillance in Europe to collect information, to monitor changes, to assess the effectiveness of the service and to plan oral health services.

In this context, the scopes and purpose of the European Global Oral Health Indicators Development Project for 2003-2004 are to support the exchange of expectations and experiences among experts of oral health statistics and their audience, policy makers in particular. It is also to conduct a systematic review and to outline a process for identifying a set of core indicators for oral health that will help professionals to promote and improve the global oral health promotion, quality of care and surveillance of people in Europe.

Overall objective were listed i.e. to support European Member States in their efforts to reduce the toll of morbidity, disability related to oral health diseases and especially:

- To strengthen the ability at the local, national, regional levels to measure, compare and determine the effects of oral health services and use of resources on oral health;
- To identify indicators of oral health (problems, determinant and risk factors related to lifestyle) of critical oral health care, its quality of care and of essential health resources;
- To identify the types of data generation and management problems within the health information system.

Beyond the actual scientific aspects of the research itself, such European projects are to develop collaborative work among the European country teams to set up networking processes, habits and culture. In addition, the project is an integration and further development of a large number of ongoing oral health projects in different fields in Europe and at WHO. In particular in Europe, it will use the development of set of specific and generic cost and health indi-
icators, i.e. the “Oral health project” (DG XIII, 1993/95; DG XIII 1997/98), the “Biomed Programme” (DG XII 1994/1998); just as the “Oratel Telematic Systems for Quality Insurance in Oral Health Care” (CEC Project A 2029), WHO Regional Office for Europe (1992). In the same way, we can advance the “Quality of Care Development Programme in Oral Health”, WHO Regional Office for Europe (1999). The organization of the project is organised around a steering committee group, representative of the 15 countries of the European Union and working in collaboration with specific partners (Table 1). Agenda, methods and work plan proposed in the two years processes were outlined. The objective of the 2003 year, first period of activity of the project was through a European consultation and an EU/Workshop on Oral Health Statistics to conduct a systematic review and to outline a process for identifying a set of core indicators for oral health that will help professionals

Table 3. The European Global Oral Health Indicators Development Project Organization

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<td><strong>Austria:</strong> University of Graz (Dr G. Wimmer)</td>
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<td><strong>France:</strong> University of Lyon (Pr. D. Bourgeois)</td>
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<td><strong>Germany:</strong> University of Dresden (Pr. T Hoffmann)</td>
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<td><strong>Greece:</strong> Technology Institute, Athens</td>
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<td><strong>Spain:</strong> University of Grenade (Pr. Loddra Calvo)</td>
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<td><strong>Sweden:</strong> Ministry of Health (Dr C. Källestål)</td>
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to promote and improve the global oral health promotion, quality of care and surveillance of people in Europe.

The also goal of this first year of the European Global Oral Health Indicators Development Project is to initiate at the conclusion of the first meeting, Lyon September, the long list of indicators, background document for the establishment of the major indicators.

The expected results, at the end of the two years process should be:

- To promote of systematic identification and technical specifications of oral health indicators through the use of an oral health outcome framework including information on the level of development of existing indicators and issues where indicators are lacking and require research
- To facilitate comparisons of indicator data by promoting standardization of indicators;
- To improve the capacity of area health services to monitor their oral health improvement activities in a standardized manner in the longer term
- To facilitate, in the longer term, service specifications across area health services with a view to maintaining and improving performance;
- To enhance the capacity to analyse the social, economic, behavioural and political determinants with particular reference to poor and disadvantaged populations.

The object of this current document set relates more specifically to the first domain of the project.

Documents of reference

- Programme of Community action in the field of public health (1998-2002).
  https://europa.eu.int/comm./health/ph_projects/monitoring_projects_en.htm
  https://europa.eu.int/comm./health/ph_projects/monitoring_projects_full_listing_en.htm

- Summary record of meeting of health monitoring project co-ordinators held in Luxembourg on 18-20 March 2003.
  https://europa.eu.int/comm/health/ph_overview/previous_programme/previous_programme_en.htm

- Draft Mandate – Network of competent authorities in the Members States responsible for health information and knowledge
  https://europa.eu.int/comm/health/ph_overview/previous_programme/previous_programme_en.htm

Conceptual Positioning within International Experience

Indicators in health: The WHO Stepwise approach, a framework for surveillance
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Indicators in Health.
The WHO Stepwise approach – a framework for surveillance

Ruth Bonita

Introduction

Good quality health information is essential for planning and implementing health policy in all countries. Surveillance provides ongoing (continuous or periodic) collection, analysis and interpretation of population health data and the timely dissemination of this data to users. Properly conducted, surveillance ensures that countries have the information that they need to fight an epidemic now or plan strategies to prevent disease and adverse health events in the future. A systematic approach to data collection helps countries to monitor and evaluate emerging disease patterns and trends. The goal is to assist governments and health professionals to formulate policies and programmes to prevent disease and to measure the progress, impact, and efficacy of efforts to control diseases that are already effecting their populations.

Surveillance strategies

Surveillance of noncommunicable (chronic) diseases (NCD) such as cancer and heart disease, and for the purposes of this meeting, oral health status, usually requires a sustained effort over a long period of time. The policy implications of such information means that, in comparison to communicable diseases, which require a response in real time, a planned response is possible. The link between the data and action (health policies and programs) is key (Figure 1).

Figure 1. Characteristics of a Surveillance system

However, gathering data on morbidity of specific conditions and health states, including oral health, offers particular challenges. The oral health sector has been well served by standardised surveys for Adults and Children over the past few decades using specific age groups with the storage of that data in a databank facilitating comparisons between countries and trends within countries.

The attempt by the members of meeting to revisit the Oral Health Indicators for surveillance within the European setting is an admirable one. It is similar to the process recently undertaken at the World Health Organisation (WHO) for obtaining population level data in risk factors for NCDs, including oral health. The many and varied surveys and methodologies available have left countries in a quandary as to how best to establish methods to ensure that reliable and valid results would be achieved in measuring some of the major diseases and some of their associated risk factors.

The WHO surveillance program was charged with developing an approach to NCD surveillance which was globally relevant, locally useful, and sufficiently flexible to allow countries to contribute at a minimum level by the inclusion of a few key, standardised indicators. Reaching a consensus on what this “minimum level” or “core” level, is, in itself, is an important exercise.

Rationale for Surveillance of NCD risk factors

Surveillance of NCD has been neglected in modern public health. The population distribution of the major common risk factors for chronic diseases is the key information required by countries for planning primary prevention programmes. Because of the relatively long time frame between exposure to a causal agent and disease, monitoring and surveillance of chronic diseases can be a costly exercise involving disease registers and legislation to ensure disease reporting. For this reason, most of the focus for surveillance of chronic disease involves surveillance of modifiable risk factors for disease.

The priority for surveillance of noncommunicable disease risk factors are those which have the highest avoidable burden of disease, can be changed through primary prevention, and are easily measured in populations. This common risk factor approach is a rational basis for promoting oral health as well.

Surveillance of risk factors

Surveillance of noncommunicable disease risk factors is becoming increasingly important to many countries as they try to control rising health care costs for an ageing population. The need for reliable, country-level information on the prevalence of risk factors for chronic disease is obvious if we are to avoid the predicted high burden of these diseases through timely population-level interventions. Unfortunately, country-level data on common, measurable chronic disease risk factors are sparse. This deficit seriously hinders efforts to combat the emerging epidemics of noncommunicable diseases especially in low and middle income countries.
Addressing data gaps and deficiencies

There are limitations to current existing NCD risk factor data collections. It is difficult to compare survey data across countries. Even within a country, where trend data are available, this data may not be comparable. Part of the problem is the use of different survey instruments, different measurement methods and different criteria for a clinical outcome. These problems can be solved by agreeing to standardised survey instruments and agreed upon indicators, definitions, methods, and sample size.

Surveillance underpins public health action and health promotion activities.

The WHO NCD global surveillance strategy includes several components:
- Identification and description of the common NCD risk factors, using recommended WHO definitions;
- A coordinated approach to conducting surveillance of risk factors that upholds scientific principles and that is sufficiently flexible to meet local and regional needs;
- Technical materials and tools, including training, to support the implementation of surveillance;
- Effective communication strategies for providing data to those involved in the design of policies and intervention programmes, potential funders, and the general public.

Two new WHO surveillance tools

WHO has developed two major new tools for NVD surveillance: the STEPwise approach to Surveillance (STEPS) and the WHO Global NCD InfoBase. Both have relevance to oral health data already collected as well as the potential for obtaining new data on core oral health indicators by adding onto ongoing country level surveys or by their inclusion in surveys such as the World Health Survey.

The WHO STEPwise approach to Surveillance¹

The STEPwise approach, allows for the development of an increasingly comprehensive surveillance system, depending on local needs and resources. By using the same standardized questions and protocols, all countries can use the information not only for monitoring within-country trends, but also for between-country comparisons. The questionnaires and methods recommended must therefore be relatively simple.

The assessment methods selected for STEPS for risk factors associated with NCD were chosen on the basis of their ability to provide trends in summary measures of population health. Hence they may not necessarily give a complete picture of each risk factor. Each country needs to determine which additional modules at the population level are appropriate and what can be accomplished in the context of an ongoing surveillance system.

For surveillance to be sustainable, the STEPwise approach advocates that small amounts of good quality data are more valuable than large amounts of poor quality data, or no data at all.

¹ See http://www.who.int/ncd_surveillance
The conceptual framework underlying STEPS is shown figure 2.
The key feature is the distinction between the different levels of risk-factor assessment:
• information by questionnaire (Step 1),
• physical measurements (Step 2), or
• blood samples for biochemical analyses (Step 3);
and the three modules involved in describing each risk factor:
• core
• expanded core, and
• optional.

<table>
<thead>
<tr>
<th>Modules</th>
<th>Step 1: Questionnaire-based</th>
<th>Step 2: Physical measurements</th>
<th>Step 3: Biochemical analyses</th>
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<td>Core</td>
<td>Socio-economic and demographic variables, tobacco, alcohol, physical nutrition</td>
<td>Measured weight and height, waist girth, blood pressure, inactivity,</td>
<td>Fasting blood sugar, total cholesterol pressure, triglycerides,</td>
</tr>
<tr>
<td>Expanded core</td>
<td>Dietary patterns, education, household indicators</td>
<td>Hip girth</td>
<td></td>
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<tr>
<td>Optional (examples)</td>
<td>Other health-related behaviours, oral health, disability, injury etc.</td>
<td>Timed walk, pedometer, skinfold pulse rate</td>
<td>Oral glucose tolerance test, urine examination thickness,</td>
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Table 1. STEPS approach to risk factor assessment
Step 1 – Questionnaire-based assessment

A Step 1 study is based on self-reported information. The core module of Step 1 contains as markers of current and future health status socio-economic data, data on tobacco and alcohol use, some measurements of nutritional status and physical inactivity. Standard WHO definitions for measuring the prevalence of tobacco use and alcohol consumption (9) and internationally devised measures of physical activity are recommended. Oral health indicators lend themselves to inclusion at Step 1 as an optional module.

Step 2 – Questionnaires and physical measurements

A Step 2 study includes as a minimum the Step 1 core module and adds simple physical measurements such as blood pressure, height, weight and waist circumference. Step 1 and Step 2 are desirable and appropriate for most countries.

Step 3 – Questionnaires, physical measurements and biochemical assessment

A Step 3 study incorporates as a minimum the core modules from Steps 1 and 2 and adds measurements obtained from blood samples. While most countries can manage Step 1 and 2 in a field setting, the additional information at Step 3 is of a biochemical nature and is therefore not recommended by WHO in less well-resourced settings unless low-cost technology is used.

Tailoring STEPS to suit local needs

One of the greatest challenges in developing WHO STEPS has been to achieve a balance between ensuring standardized tools and methods, and flexibility for use in a variety of country situations and settings. STEPS allows all countries to contribute to improving global information about trends in key measures of health. Expansion of the basic core questions is possible in settings where resources and local surveillance needs allow a more comprehensive assessment of these key risk factors. For both modules, core and expanded core, assessment guidelines and standard questionnaires are provided. Optional modules can also be added at Step 1 to include additional data on risk and protective behaviours, for example information on oral health status and health services use. The key recommendation is a limited set of key indicators for surveillance. Within the selected core variables, choices must be made which distinguish between surveillance purposes and research purposes. For surveillance to be sustainable, the cost of collection of data as well as its analysis, interpretation and use must be kept in mind when planning the implementation of STEPS.

Tailoring STEPS to include optional modules: oral health

The STEPS framework allows for the addition of add-on modules – intentional injury, unintentional injury, mental health, and oral health are all good examples. While most of these are Step 1 variables (by questionnaire), oral health lends itself to Step 2 (physical examination of the oral cavity) as well. In order for coun-
tries to ensure that the additional modules are not burdensome, the challenge is to identify – and agree upon – four or five key indicators for oral health. The World Health Survey conducted in 72 countries during 2003 offers a set of standard questions from which a number of key indicators can be derived.

Expanded indicators within the STEPwise framework are also possible and could, for example, refer to use of dental services, or a measure of the impact of a preventive health program.

The WHO Global NCD InfoBase

The second major surveillance tool is the WHO Global NCD InfoBase[1]. In order to predict the future burden of chronic disease in populations and also for identifying potential interventions to reduce the future burden, data collection and reporting standards are needed to ensure that NCD data can be used effectively to inform prevention and control activities for health. This new WHO tool is now being used to help set data standards for NCDs and their risk factors.

Much time and effort has gone into deciding which type of information is most useful for surveillance of noncommunicable disease risk factors. Collection and storage of data has been limited to that which is strictly relevant to outcomes. The indicators chosen must reflect those that cause a large burden in the population, can be changed through primary intervention, and are easily measured in populations. The starting point was the collation and display of data on the major NCD risk factors which have been identified by the World Health Report 2002 and which are being collected as part of the STEPS approach mentioned above. The data entered comes from a range of sources including published reports or ministry of health reports or unpublished reports or wherever. The vision was to bring together in one relational data base, existing country level data stratified by age and sex, with complete source and survey information and each record linked back to its source, a necessity when the collection of such data involves so many different protocols and definitions.

The first report, for example, the SURF 1 Report - presents the most recent nation-

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1. The data entry tool in a standard format and search and display functions are now on-line at www.who.int/ncd_surveillance/infobase/en.

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### Oral Health Care Questions from the World Health Survey

1. *During the last 12 months, did you have any problems with your mouth and/or teeth?*

2. *During the last 12 months, did you receive any medical care or treatment from a dentist or other oral health specialist for this problem with your mouth and/or teeth?*

3. *What types of care or treatment did you receive for this problem with your mouth and/or teeth?*  
   - Medication  
   - Dental work/oral surgery  
   - Dentures or bridges  
   - Information or counselling on dental care/oral hygiene  
   - Other oral treatment

4. *Have you lost all of your natural teeth?*

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a. http://www.who.int/whs/P/instrumentandrel_8293.html
ally representative data for 8 risk factors. It displays the prevalence, and/or the mean values by age and sex, and a measure of the uncertainty of the estimates. An accompanying CD ROM contains data for 170 countries, 50 000 data points, about 2 000 sources. In this sense it is a rich source of currently available information for many countries. Identifying country-level data and assessing its validity is the first step in developing better quality NCD data collections. The second step is the harmonisation of existing data by developing models to derive best estimates for any given risk factor or health state for each country, based on the amalgamation of the existing data. The InfoBase demonstrates how to use the assembled data to produce comparable, country estimates for NCD risk factors and diseases. For example, the Oral Health Indicators chosen, in consultation with the Oral Health program within the Noncommunicable Disease and Mental Health cluster, include the following:

- Decayed, missing and filled teeth;
- Edentualism, and
- Periodontal disease.

Disease specific modules are currently being added to the Global NCD InfoBase. It also has an Oral Health component which helps to identify a country’s strengths in oral health data collection and also its gaps and deficiencies. Ultimately, the aim is to drive the sustainable collection of good quality risk factor data and promote the establishment of surveillance systems as an alternative to costly ad hoc “one time only” surveys which are often designed without consideration to the sample size required to provide robust estimates by age groups and sex.

**Partnerships for the future**

The SANCO Monitoring Programme faces a major challenge in streamlining complex and overlapping monitoring systems in the implementation of European Oral Health Indicators. The WHO offers two tools to encourage the collection of standardised data and the collation and display of this data in a manner which will allow measures of the changing oral health status in populations. There is widespread recognition of the need for oral health programmes to be developed and integrated with other population based health programs. A core set of Oral Health Indicators for use in a wide range of countries is best suited in the context of the surveillance of other population markers of risk, especially those common risk factors which impinge on oral health. In reaching consensus and through offering technical support and leadership, the solution will suffice not only for European countries, but also for developing countries who face enormous challenges in maintaining sustainable surveillance systems.

Above all, oral health professionals have a key role in forging partnerships with a wide range of agencies and professionals to ensure that improvements in oral health are achieved in the context of policies and programs which are directed at an integrated approach. The same benefits can be achieved by the integration of oral health indicators in new efforts to secure reliable and comparable data for measuring trends in population health status. This meeting to develop a set of Oral Health Indicators for the European region is an important step in the right direction.
The broadening of oral health epidemiology

A major contribution, if not “the” major contribution of the ICS to oral public health is to have rootened a holistic approach to oral health in the field of international research. It is with the first ICS study in the 70s, that the traditional model of oral epidemiology restricted to clinical observation, expanded dramatically to include sociological studies and consideration of the entire oral health and health care systems. When ICS commenced in the mid to late 1970s, it was unique in relating oral health clinical and sociological data within and across cultures. Very few general health studies had been performed cross-nationally and none had made the clinical link at individual level. In an effort to better capture oral health determinants, the social interviews and the clinical examinations were conducted on the same persons in each of the age groups of the study samples. This is another specific feature of the ICS approach which, to our knowledge, has not been replicated since in any other Oral Health Survey of that dimension. Even by the commencement of ICSII -around 1990-, few cross-national oral health or general health studies had been conducted, thus leaving wide and theoretical gaps. The wide-ranging social, political, economic and oral health care systems from ICSII study sites provided an excellent opportunity for each country to learn from other countries (a practical goal of the study), and for researchers to find ways to generalize the findings of single country studies to other countries (the theoretical goal).

Main descriptive aspects of the ICS series

The studies were initiated and conducted by the World Health Organisation in collaboration with the Public Health Service of the United States (USPHS) and the National Institute of Dental Research (NIDR, now renamed NIDCR). ICS I took place from 1973 to 1981, in 10 different sites in 9 countries spread over 4

1. EGOHID Coordinator, University of Lyon, France. Former WHO-ICSII Programme manager.
Cross-country applicability of social survey indicators

continents: the USA, Canada, Australia, New-Zealand, Japan, Norway, Ireland, Poland and the Federal Republic of Germany. The ICS I report was published in 1985.

About 10 years later, some countries facing dramatic changes in their economic, political and health situation were willing to replicate the study in order to better adjust their Oral Health Care system and health-related legislation. As part of its mission, WHO has major interest in documenting epidemiological trends and further explore oral health determinants, two key research dimensions of the ICSs. In the ICS II WHO had the same scientific US partners and this time, the Centre for Health and Administration Studies of the University of Chicago (CHAS) as part of the coordinating team and to whom the social surveys were subcontracted.

ICSII was launched in an international meeting held at WHO in 1988 with participating countries representatives. Countries involved were: Poland, Germany, France and Latvia and outside the European continent: Japan, New-Zealand and three sites in the USA. It is interesting to note that more than half of the countries were in Europe and that a broad sample of health care systems ranging from entirely private to entirely public was offered for study comparisons.

Research objectives

ICSII established three major research goals. The first was to describe each of the study sites according to (1) oral health outcomes: oral health behaviour, oral health status and oral quality of life, (2) social group differences in oral health outcomes, and differences between individuals in each of the oral health outcomes. For all of these dimensions, the sites were compared to gain a better understanding of the status of each site. The second goal was to investigate how the socio-environmental and oral health care system characteristics of the various sites were related to (1) differences in the status of their oral health outcomes (2) differences in the magnitude of gaps between social groups in these outcomes and (3) differences in the explanatory factors. The final goal was to test whether certain explanations for the three sets of oral health outcomes derived from previous single country studies could be generalized to all sites in the study. In practical terms ICSII was aiming at describing the oral care system and the oral health outcomes in each country, analysing the adequacy of the care system to respond to needs and demand of the population, providing cross-country comparisons so that public health decision makers and politicians could benefit from other countries experiences.

The ICS II theoretical model

A theoretical model was developed. It was used as a conceptual and practical tool in the research design, the development of the survey instruments, and the analytical process. Although several theoretical models had been developed to explain determinants of oral health behaviour and oral health status, at the time of ICS II, they did not incorporate all three oral health outcomes. The factors affecting the oral health of a person can be found at individual level and at system level. The model postulates that individual oral health behaviour (including oral hygiene practices and oral
health service utilization) as the intermediate outcome variables is affected by his or her predisposing and enabling characteristics. In other words, characteristics such as sex, education, occupation, health beliefs predispose an individual to engage or not, in certain oral health behaviour, while enabling variables such as income, residence, having or not having a usual source of oral health care, represent conditions that might facilitate or impede the individual practice of such behaviours. These personal characteristics are influenced by the system as a whole. The model also postulates that an individual’s characteristics and oral health behaviour affect his or her oral health status, as measured mainly by dентition and periodontal status. As the model indicates, both personal characteristics and oral health behaviour operate under the influence of the system-level factors. Finally the model postulates that an individual’s quality of life is determined directly or indirectly by his or her personal characteristics, oral health behaviour and oral health status, all of which are influenced by the system-level factors.

The impact of the system-and individual-level factors on an individual’s oral health behaviour, oral health status and quality of life has been tested in all sites as part of the study hypotheses.

**Major methodological and conceptual outcomes**

Twenty-five years of ICS studies have highlighted many important findings which have had implication in the reorganization of oral health care systems. Especially relevant to the reflexion on the standardisation of oral health research in Europe are some aspects of the methodological developments provided by ICS. ICS II has provided the research community with a set of data collection instruments on system characteristics, on oral health status, on social surveys including health beliefs, behaviour, and quality of life in relation to oral health. All of them have been designed, tested, used in various settings, practical conditions, cultural and political context. Methods for calibration of examiners, adjustment of instruments to local constraints, translation while keeping the conceptual content in different cultures, ensuring cross-country comparability and its limits, all these have been developed, used, tested.

A major result relates to the validation of quality of life as the ultimate outcome of any oral health care system. “...dental research has been dominated by the measurement and study of two diseases which have coloured public health perception for the past 100 years. The quality of life dimension indicates that the scope of oral health is much broader and thus, it is imperative that oral health research should expand its spectrum to include that dimension in its mainstream, with important effects on approaches to oral health” (Chen et al. 1997). This recommendation quoted from the conclusive chapter of the ICS II report is fully relevant six years later and oral health related quality of life is now widely accepted as an essential component of oral health research. Recalling some major ICS II findings, imposes to mention the relationship between oral health and general health which states that “perceived general health is strongly correlated with oral health.” Not to remain at the conceptual level, this finding leads to a strategic orientation for...
the dental profession with a strong focus on high-risk groups and a broader role of the dental manpower as stated by Barmes in 1997 “It is probable that a successful search for the fundamental factors that must be remedied would resolve not only many oral health problems, but also a broad spectrum of health and welfare defects. At the same time, a broader role for the profession as a strategic entry point may be found to intensify the cost-effective promotion of health. Only then would the phrase “general health and oral health are inseparable have a real and operational meaning.”

Further research developments

The issue of data comparability is a major challenge of multi-country research. In the clinical field researchers are dealing with observation of the physical body made by trained professionals. Methods for calibration of examiners and calculation of variability have been developed, tested, applied for many decades; it is usually accepted that for epidemiological purposes the WHO pathfinder methodology should be recommended. However, the problem is far more complex when dealing with socio-cultural variables. Researchers are then manipulating concepts, translated into words, expressed in various languages. They are no longer dealing with observation of clinical conditions, questions are asked and answers recorded.

A series of techniques and methods have been developed in ICSII in an effort to maximise the accuracy and comparability of the information collected. For example, the original questionnaires in English have been translated into the site language, then back into English, Inter cultural adjustment of the survey instruments have been made to ensure the conceptual equivalence and to give space to cultural specificity while keeping meaning consistency, coding system for each item to categorize the information “universal” or “country-specific” have been used. However, neither the measurement properties- i.e. validity and reliability- of the questionnaires, nor their international applicability had been scientifically evaluated.

Further research has been developed since, which partly fills in the gap of the methodological evaluation of the ICSII social survey instruments. In 2002 in a thesis presented at the University of Nancy, France, several domains of the ICSII questionnaires have been analysed for their psychometric properties: oral-health related beliefs, behaviours and quality of life as well as all the questions relating to patient satisfaction with oral health care (Tapsoba et al. 2000).

All the above-mentioned domains were analysed using similar statistical methods and provided similar results, therefore this paper will restrict their description to the analysis of the questionnaire on oral health related quality of life (ORHQOL).

The main dimensions of Oral Health related Quality of Life

Over recent years the concept of Oral health related quality of life has been introduced extending the assessment of oral health to include the social and psychological impact of oral diseases on individuals. Oral health related quality of life has been defined as a multidimensional concept including the following domains: sur-
vival of the individual (i.e. absence of oral cancer), absence of impairment, disease or symptoms, appropriate physical functioning associated with chewing and swallowing, and absence of pain or discomfort; emotional functioning associated with smiling; social functioning associated with performance of normal roles; perceptions of excellent oral health; satisfaction with oral health; and no social or cultural disadvantage due to oral health status. It has also been described as including self-perceived oral health status and treatment needs; assessment of oral pain or discomfort; the impact of disease on the mechanical functioning of the oral cavity (such as speaking or opening and closing the mouth); ability to perform self care (for example brushing and flossing); psychological issues (such as social discomfort in conversation or concerns about appearance); and limitations on activities related to role (such as the ability to perform work or other duties).

As mentioned earlier, the development of the ICSII – ORQOL was based on the three main dimensions of health-related quality of life: physical symptoms, perception of well-being and functional capacity. Self-reported oral disease symptoms, perception of oral well-being, and social and physical functioning were the dimensions adopted for use in the ICSII questionnaires at international level.

International validity and reliability of ICSII questionnaires

The first priority when developing a questionnaire to assess quality of life across nations is to determine the extent to which the concepts and dimensions hypothesized are universal. A minimum requirement for international validity and reliability is a clear factor structure replicated across countries with the same items and comparable variance. The factorial structure of the questionnaires was analysed using the information collected on adults (35-44) and children (12-13) in three ICSII sites: New-Zealand, Poland and Germany.

The ORHQOL questionnaire for children was self-administered at school. It comprised 14 items categorized in three dimensions: self-reported oral disease symptoms; perceived oral well-being and social and physical functioning. Eight dichotomously scored items were designed to measure self-reported oral disease symptoms experienced in the year prior to the interview: broken tooth, painful or bleeding gums when brushing or flossing, tooth pain when eating or drinking sweets, bad taste or bad breath. Two items measured perceived oral well-being: perceived oral health rated on a five-point scale (excellent, very good, good, poor, very poor) and satisfaction with the appearance of the teeth on a similar scale. Four dichotomous items explored social functioning (avoiding meeting others, experiencing jokes being made about one’s teeth, avoiding laughing or smiling because of unattractive teeth or gums) and physical functioning (missing school because of oral health problems).

Three dimensions of ORHQOL were also explored in the questionnaire for adults. The perceived oral well-being dimension include two items: perceived oral health rated on a five-point scale (excellent, very good, good, fair, poor, very poor) and satisfaction with the appearance of the teeth (very much, quite a bit, they look ok, not much, not at all). The self-reported
oral disease symptoms dimension included the same eight dichotomously scored items as for children. However, the social and physical functioning dimensions differed. The physical component included two dichotomous items (usual activities limited because of oral pain or discomfort, and inability to chew hard food) and one item (trouble sleeping because of oral pain or discomfort) with four possible answers (very often, fairly often, sometimes, never). The social component comprised two items assessed using a 4-point Lickert scale, avoid laughing or smiling because of unattractive teeth or gums and avoid conversation because of unattractive teeth and gums or bad breath. Additional items for edentulous adults were satisfaction with the appearance of false teeth/dentures (a 5-point scale ranging from very much to not at all) and four dichotomous items related to problems with wearing dentures (talking clearly, eating, soreness and fit).

A detailed description of the statistical analysis can be found in the article referenced below. In summary, the factor structure was examined using principal component analysis, the reliability was assessed using Cronbach’s alpha coefficient for measuring internal consistency and the Cattell’s salient index was used to assess the factor structure similarities across countries.

The inter factorial similarity was demonstrated in all three countries, the reliability of the questionnaires ranged from moderate to excellent depending on the dimension and the country considered and a preliminary evidence of the cross-cultural stability of the ORHQOL questionnaires has been established.

Building upon international experience

As mentioned previously, similar work has been carried out on the other dimensions of QOL in relation to oral health status, with similar results. Further research might be encouraged in this direction to sustain researchers confidence in the ICS II methodological heritage.

Whereas ICS was carried out as a considerable human, practical and economical investment, a similar challenge could be taken up in Europe at a much lower cost in time, energy and consequently in financial terms. One way of reaching this objective is obviously to dramatically reduce the survey instruments and to identify a set of minimal essential and universal indicators. The ICSII questionnaires for adults and children are provided in “Comparing Oral Health Care Systems: a second international collaborative study” (Chen et al.1997). The core questionnaire for adults is attached, appendix 1. They were designed for international research purposes in an attempt to fill in mainly theoretical gaps and to provide further research directions. In this respect, the instruments have demonstrated their adequacy and their limitations. One reasonable way in considering the questionnaires for their reduction might be to identify the most cross-sites robust variables as indicated in the findings of the ICSII analysis (and similarly the least robust variables internationally). ICSII results demonstrated some strong and systematic associations. These relationships observed repeatedly at ICSII sites with a wide – spectrum of oral care systems were found “conclusive enough for identifying target populations, designing new programmes or redesigning old-programmes”. Special consideration
might be given to the following findings: females brush and floss more than males, residents of urban or more affluent communities brush and floss more than others, adults with higher education and income brush and floss more than others, those with a usual source of care visit oral health providers more than others, adults with a usual source of care have lower decayed to total teeth ratios, higher D components of DMFT are correlated with higher number of symptoms reported and with poor perceived oral health, prevalence of fluorides in a community predicts lower DMFT scores, perceived general health is strongly correlated with oral health.

Clearly, the issue of the standardisation of oral health information to be collected throughout the European Community calls for the identification of a minimum set of robust, replicable indicators. Important criteria for the methods to be used are their feasibility and cost-effectiveness. Extensive research has been developed in the European region in the last decades of the past Century, which added to the ICS series, form the scientific experience on which new developments should be based. The always present temptation to reinvent the wheels should be avoided. Whether we refer to ICS, ORATEL, BIOMED, many international research projects have been carried out offering their results, methods and past experience as a compendium of knowledge which has enriched the community of oral public health. Much can and should be learned from what has been done in the past years. Building upon international experience is the most reasonable, cost-effective and ethical way to develop and implement new oral health research projects in the European Community.

References


International Collaborative Study of Oral Health Outcomes

WORLD HEALTH ORGANIZATION

Core Questionnaire for adults
Developed by the Center for Health and Administration Studies
The University of Chicago – USA –

ORAL HEALTH STATUS AND HYGIENE

1. Would you describe your oral health as excellent, very good, fair, poor or very poor? 
2. How would you describe the health of your teeth and gums? Is it excellent, very good, fair, poor or very poor? 
3. During the past twelve months, did your teeth or gums cause any pain or discomfort? (yes, no, don’t know, no answer) 
4. During the past twelve months, has the pain or discomfort of dental problems caused you to limit any of your usual activities? (yes, no, don’t know, no answer) 
5. How many days during the past twelve months, have you had to limit your usual activities because of the pain or discomfort from dental problems? (enter number...) 
6. How often do you have trouble sleeping because of pain or discomfort from dental problems? (very often, fairly often, sometimes, never) 
7. How often do you avoid laughing or smiling because of unattractive teeth or gums? (very often, fairly often, sometimes, never) 
8. How often do you avoid conversation because of unattractive teeth or gums or bad breath? (very often, often, sometimes, never) 
9. Are you able to chew hard things, such as hard bread or apples? (yes, no) 

Please tell me if you have had any of the following problems during the last twelve months: (answer modalities are “yes” “no” from 10 to 18)

10. A broken or chipped tooth? 
11. Gums that hurt or bleed? 
12. Sores on your tongue or on the inside or your mouth or cheeks? 
13. A bad taste in your mouth or bad breath? 
14. Do you have any natural teeth at all? 
15. Gums that frequently bled when brushed or flossed? 
16. Teeth that hurt when you ate or drank hot or cold liquids or foods? 
17. Teeth that ached or throbbed? 
18. Teeth that hurt when you ate or drank sweet things? 
19. How much do you like the way your teeth look? (very much, quite a bit, they look ok, not much, not at all) 
20. You need to brush your teeth better (yes, no) 
21. You need to have your teeth cleaned (yes, no) 
22. You need fillings (y, n) 
23. You need to have a tooth pulled (y, n) 
24. You need fillings (y, n) 
25. You need to have your teeth straightened (y, n) 
26. Your teeth are good, nothing is wrong (y, n) 
27. How do you usually brush your teeth? (5 modalities for frequency) 
28. Do you use toothpaste containing fluoride? (y, n, don’t use toothpaste, don’t know what fluoride is) 
29. Do you have any physical problems that make it difficult for you to brush your teeth such as opening your mouth or moving your hand? (y, n)
30. Apart from fluoride in toothpaste or in the water supply, do you use fluoride in any other way, that is in tablets or in a mouth wash? (y, n)
31. Do you use dental floss on your teeth? (y, n, don’t know what that is, no answer)
32. How often do you use dental floss on your teeth? (six modalities for frequency)
33. Do you have any physical problems that make it difficult for you to use dental floss such as opening your mouth or moving your hand? (y, n)
34. Do you use any of the following to clean the spaces between your teeth:
   34.A. Wooden toothpick? (y, n)
   34.B. " " ? (y, n)
   34.C. " " ? (y, n)
35. How often do you eat something in between your main meals? (five modalities for frequency)
36. Yesterday, did you eat any of the following foods: (y, n)
   36.A. Bread?
   36.B. Sugar-coated cereal?
   36.C. Fresh fruits (apples, oranges)?
   36.D. Pastry, such as biscuits, cakes, pie, doughnuts?
   36.E. Soft drinks, cola drinks, soda flow (excluding diet cola)?
   36.F. Nuts, cheese?
   36.G. Jams or honey?
   36.H. Dried fruits such as raisins, figs, prunes?
   36.I. Chewing gum containing sugar?
   36.J. Candy?
37. Do you smoke cigarettes?
38. Do you use the following type of tobacco: (y, n)
   38.A. Cigars?
   38.B. Pipes?
   38.C. Snuff?
39. Now, I'd like to know how you feel about taking care of your teeth. Do you “strongly agree”, “agree”, “disagree” or “strongly disagree” with the following statements?
40. Brushing teeth helps prevent tooth decay.
41. Using dental floss does not help prevent gum problems.
42. Eating sweet foods does not cause tooth decay.
43. Drinking fluoridated water helps prevent tooth decay.
44. Using fluoride is a harmless way of preventing tooth decay.
45. Going to the dentist will keep me from having trouble with my teeth, gums or dentures.

**DENTURES/FAKE TEETH**

46. Do you have any false teeth or dentures which you can remove? (y, n)
47. A partial denture? (y, n)
48. A full upper denture? (y, n)
49. Where did you get your last false teeth/dentures? (five answer modalities for place)
50. How many years ago did you get your last false teeth/dentures? (number of years…)
51. When you wear your false teeth/dentures, do you have any problem: (y, n)
   51.A. Talking clearly?
   51.B. Eating?
   51.C. The way the false teeth/dentures fit?
   51.D. Soreness?
52. How much do you like the way the false teeth/dentures look?: (very much, quite a bit, OK, not much, not at all).
53. Do you strongly agree, agree, disagree, or strongly disagree, with each of the following statements?
   53.A. Tooth decay can make people look bad
   53.B. Dental problems can be serious.
   53.C. Poor teeth will affect people’s work or other aspects of their everyday life.
   53.D. Dental disease is less important than other health problems.
   53.E. I place great value on my dental health.
   53.F. It is not important to keep natural teeth.
   53.G. Having dental problems can cause other health problems.
AIDS

78. Have you ever heard of AIDS: Acquired Immunodeficiency Syndrome? (y, n, don’t know, no answer).

Tell me if you think that the following statement is true or false: (t, f).

79. AIDS is a disease. (t, f).

80. AIDS can cripple the body’s natural protection against disease. (t, f).

81. AIDS can be transmitted through blood transfusion. (t, f).

82. AIDS can be passed from person to person through body fluids. (t, f).

Do you “strongly agree”, “agree”, “disagree” or strongly disagree” with each of the following statements?

83. Dentists are a good source of information about AIDS.

84. Dentists have a moral responsibility to treat AIDS patients.

85. Patients with AIDS should be given the same dental treatment as everyone else.

86. I would not mind if my dentist treated AIDS patients in his office.

87. There are safety measures dentists can use to prevent the spread of AIDS.

How much have you learned about AIDS from each of the following source: (a lot, some, a little, or none):

88. Radio/TV: (a lot, some, a little, or none)

89. Newspapers/magazines: (a lot, some, a little, or none)

90. Your doctor: (a lot, some, a little, or none)

91. Your dentist: (a lot, some, a little, or none)

92. Your friends/colleagues: (a lot, some, a little, or none)

93. Your church/religious leaders: (a lot, some, a little, or none)

94. Your family: (a lot, some, a little, or none)

95. National government agencies/authorities: (a lot, some, a little, or none)

96. Public health campaigns organized by the local health authorities: (a lot, some, a little, or none)

97. Other (specify)

DENTAL CARE

98. Is there a dentist’s office or clinic that you usually go to for dental care? (y, n, don’t know, no answer).

99. How long have you gone to that dentist’s office or clinic for dental care? (seven answer modalities)

100. If you need dental care, do you know a dentist’s office or clinic you would go? (y, n, don’t know, no answer).

101. What is the name of the office or clinic where you usually go/would go to?

102. Do you see a particular dentist when you go there? (y, n)

103. What is the dentist’s name?

104. What is the street address of the dentist’s office or clinic?

105. Which of the following best describes… (name of the person/office in Q. 101) (six answer modalities)

106. How did you first find out about (Q. 101) (thirteen answer modalities)

107. What is the main reason that you continue to use… (Q. 101) (fourteen answer modalities: e.g. Care is free, staff is courteous, waiting time is short etc.)

108. Do any of the following sources cover any of your dental costs? (private insurance from employer, private insurance you pay yourself, government, dental clinic provides free care, other)

109. Do you or your family pay anything for the insurance/health plan? (y, n, don’t know, no answer).

110. How often do you pay your dental insurance premium? (six modalities for frequency)

111. How much do you pay for your dental insurance premium each time? Does your insurance cover all, part, or none of the costs of…

112. Examinations and X-rays

113. Cleaning teeth

114. Filling teeth

115. Oral surgery

116. Orthodontics
117. How long ago did you receive your last dental care? (six modalities)
118. What was the main reason you did not visit a dentist in the last two years? (cannot afford costs, don’t want to spend money on dental care, etc… seventeen modalities)
119. At your most recent visit, did you go to the dentist's office or clinic you usually go for dental care? (y, n, no usual source of care)
120. What was the reason you made your most recent visit to a dentist? (four modalities)
At your most recent visit to the dentist, did you receive… (y, n)
121. An examination?
122. Cleaning?
123. Fillings?
124. Crown/cap work?
125. Root canal work?
126. Denture work?
127. Orthodontic work?
128. Instruction in taking care of teeth and gums?
129. X-Rays?
130. Inlay work?
131. Extraction?
132. Bridge work?
133. Periodontal/gum treatment?
134. Fluoride treatment?
135. Any other treatment?
136. In the past twelve months, did you make any other visits to the dentist besides this one? (y, n, don’t know, no answer)
137. How many other visits did you make?
138. Were the additional visits for care? (y, n, no usual source of care)
During these additional visits, did you receive… (y, n)
139. An examination?
140. Cleaning?
141. Fillings?
142. Crown/cap work?
143. Root canal work?
144. Denture work?
145. Orthodontic work?
During these additional visits did you receive…
146. Instruction in taking care of teeth and gums?
147. X-Rays?
148. Inlay work?
149. Extraction?
150. Bridge work?
151. Periodontal/gum treatment?
152. Fluoride treatment?
153. Any other treatment?
154. Did or will dental insurance pay for the cost of the dental visits you made in the last twelve months? (y, n, no dental insurance)
155. Apart from the cost paid by dental insurance, How much did you pay directly for all dental visits you made in the last twelve months?
156. For your last visit to the dentist, did you have to take time off work? (y, n)
157. For your last visit, did you go directly to the dentist from home or work? (y, n)
158. For your last dental visit, how did you travel to the dentist’s office? (nine modalities)
159. The last time you went, how long did it take you to get to the dental office?
160. At your last visit for dental care, how long did you have to wait before you got to sit in the dentist’s chair?
161. During your last visit to the dentist, how long did your treatment take?
162. For your last visit to the dentist, did you (phone for an appointment, have a follow-up appointment… etc.)
163. How many days were there between the day you made the appointment and the day you actually received dental services?
164. Did you have to pay anything directly (that is out-of-pocket costs) for this last visit?
165. Could you have had the same work in another place at a lower out-of-pocket costs to you? (yes, definitely, yes probably, no, don’t know)
166. Why did you choose the extra cost of getting the care where you did? (nine modalities)
for example: emergency, quality care, convenient location etc.)

During your last dental visit, were you “very satisfied”, “satisfied”, “dissatisfied”, “very dissatisfied” with:
167. Getting an appointment when you wanted it?
168. The time it took to get there?
169. The neighbourhood where the dental office is located?
170. The way you were made to feel welcome by the receptionist?
171. The way you were made to feel welcome by the hygienist/dental chairside assistant?
172. The way you were made to feel welcome by the dentist?
173. The information given to you about what was wrong with your teeth?
174. The information given to you about what treatment was provided to you?
175. The quality of care provided?
176. How up to date the dental equipment seems?
177. The amount of time you waited to see the dentist?
178. The cleanliness and neatness of the office?
179. The cost of your last dental visit (your out-of-pocket costs)?
180. In the last two years, was there any dental service recommended to you by a dentist that you were not sure you needed?
181. What was that dental service? (list of fifteen modalities)
182. Did you receive the dental service recommended?
183. What was the main reason you did not get the service recommended to you? (eleven possible reasons)

Now, I’d like to know how you feel about dentists and dental care. Do you “strongly agree”, “agree”, “disagree” or “strongly disagree” with each of the following statements?
184. I will visit the dentist when I have dental problems no matter how busy I am.
185. I am afraid of dental visits because of possible pain.
186. Dentists are not always available when I have dental problems.
187. Public dentists are not always available when I have dental problems.
Now, I’d like to ask your opinion about dentists in the public sector
188. Public dentists explain a patient’s problem to him or her.
189. Public dentists always spend enough time with the patients.
190. Public dentists are very careful to check everything when examining patients.
191. Public dentists prefer to fix up teeth rather than teach their patients to avoid problems.
Now, I’d like to ask your opinion about dentists in the private sector
192. Private dentists explain a patient’s problem to him or her.
193. Private dentists always spend enough time with the patients.
194. Private dentists are very careful to check everything when examining patients.
195. Private dentists prefer to fix up teeth rather than teach their patients to avoid problems.
196. The cost of visiting a private dentist is too expensive for me.
197. In the last twelve months, did you make any visits to some place other than a dentist’s office or clinic for advice on treatment of your teeth and gums? (y, n)
198. What type of person did you visit?
199. How many visits did you make to this type of provider in the past twelve months?
200. What is the main reason you visited (type of provider from Q. 198)? (Relief of pain, control of bleeding, tooth extraction, other)
201. What kind of treatment did you receive? (tooth extraction, medicine prescribed by doctor or nurse, traditional medicine, spiritual assistance or psychological counselling, traditional healing, other)
During your last visit to this provider were you “very satisfied”, “satisfied”, “dissatisfied”, “very dissatisfied” with...
202. The information given to you with what was wrong with your teeth and gums?
203. The information given to you about what treatment was being provided for you?
204. Your out-of-pocket costs?
205. The quality of the dental care provided?
206. The way you were made to feel welcome by the provider?
207. How much did you pay (out-of-pocket) for the treatment given to you?
Finally, we need some background information about you and your family.
208. Which of these best describes your current situation? (married, widowed, divorced, separated, never married, living with partner)
209. How long have you been living at this address?
210. How long have you been living in (DAU)?
211. Which of these groups do you belong to (specify ethnic group)
212. How many years of education did you complete?
213. Which of the following describes best your current employment situation? (thirteen modalities)
214. Did you ever work outside the home for as long as one year?
215. What type of work do (did) you do? Please, briefly describe your job. (ten proposed short description)
216. Are (were) you self-employed or do (did) you work for someone else?
217. Is (was) your main workplace your home or somewhere else?
218. Considering your present income (plus income from others who live in the household) please give me the number of the category that shows the household’s total family income before taxes and deduction- for the last twelve months (seven amounts in US $ ranging from less than 5000 to between 50000 and 74 999).

Remark to the reader: Skip patterns have not been indicated in this version of the adult questionnaire. Similarly, indications provided to the interviewer have been suppressed. The full version is published as an ANNEX to the ICSII complete report published by WHO in 1997.
Basic indicators for development of quality of oral health systems in Europe – the approach of the World Health Organization

Poul Erik Petersen

This paper highlights the main experiences gained from WHO European projects to develop indicators for the quality of oral health systems and for the quality of oral health care, and suggests further initiatives in this direction as seen by WHO. These experiences were culled within the framework of a European project entitled “ORA-TEL” (telematic system for quality assurance in oral health care).

The European Region is however, only one of six WHO Regions which the global oral health programme serves. Therefore, when dealing with indicators for surveillance or for quality of care, WHO as an international (United Nations) organization must take into account the vast variations in systems and conditions across the world, and adapt any wider approach to the definition of health indicators to the given setting.

Figure 1. Oral health information systems

This figure shows what WHO considers important for information systems related to oral health. Several European Member States have already established such systems.

including outcome measures. Others have health information systems which focus only on delivery of care and intervention.

The idea of the ORATEL project was to encourage the Member States of the European region to harmonise their information systems. Many East-European countries for example, traditionally record the number and type of services provided, the number of teeth extracted, the number of dental fillings but not outcomes, i.e. whether intervention contributes to health or not. Some western European countries have established more outcome-oriented information systems but neglect the processes. This WHO European project sought to stimulate the development of more comprehensive data systems. Quality of care development and quality of health systems development projects were implemented by the WHO Regional Office for Europe to develop instruments in accordance with European Health for All targets. Target number 31 - to improve the quality of health care by use of appropriate health care technology and the provision of health information systems that are based on the use of information technology - was the most important policy basis of these projects.

In the late 1990's it was observed that many European countries direly needed to improve cost effectiveness and the quality of their health care. Patients were becoming increasingly aware of the treatment options available and health professionals were increasingly concerned with ethical aspects and provision of the highest possible level of care.

So when the WHO Regional Office for Europe embarked on the development of indicators for quality purposes, it began by mapping the indicators used in European Member States and the philosophies behind them. Many countries have established schemes to monitor what dentists or providers of dentistry are doing by “looking over their shoulders”, while few have established self-evaluation systems. The concept of the projects developed in the European Regional Office was to apply more modern approaches to quality development based on sharing the experience of others and more particularly to integrate these with state-of-the-art information technology.

The idea was to focus on how, by learning from each other, we can move the outcome curve from right to left, towards continuously improved outcomes. The above diagram illustrates this. At a practical level, WHO then developed a number of indicators that related to clinical performance and public health dimensions of providing care for populations. Indicators needed to be developed that addressed practice management and the inter-relationships between patients and providers, incorporating new quality aspects: what do the patients tell us, are they satisfied with their treatment and care, and how could community preventive programmes impact the population in terms of knowledge, attitudes and self-care.

Obviously, the projects had to match the needs of the national oral health system, allowing easy day-to-day management and administration of oral health services. We also sought to achieve consensus on basic minimum datasets or sets of quality indicators. By reducing the number of indicators to a minimum, it would be easier to integrate these indicators into a software information system that could be used by providers of care across national boundaries.
ORATEL had three phases. First we developed a number of indicators and analysed the IT systems then available on the market which were suitable for developing the so-called “quality of care” tools we wanted to design; then, in phase two, we developed these tools; finally, in phase three, a number of countries participated in validating the relevance of the quality indicators developed and the information system itself, to allow an assessment of the practicality of the information gathered. Various reports - available to the current SANCO project - document a number of intercountry comparisons and activities in support of quality of oral health care in Europe (WHO 1992, Petersen 1994).

The most significant milestone in the process was a list of indicators developed at a consensus meeting hosted by WHO in Copenhagen in 1992. The main objective of this meeting was to come up with indicators for proactive decision support and for retrospective evaluation or quality assurance which, in line with a new approach to quality measurement, comprised structure, process and outcome. Especially relevant to the SANCO project are the population related indicators developed for use at clinical level and various administrative levels, i.e. sub-national, national and supranational. In addition, an interactive teachware program was developed. A number of providers of care and health care administrators in the WHO European Member States were invited to work with the data produced at local, regional, national and supranational level in order to assess what indicators were practical for development of quality of oral health systems.

Figure 2. Indicators developed for use at clinical level and various administrative levels

The system was based on information extracted from a specially designed patient record which gives comprehensive information about the status and treatment provided to the patients as well as various follow-up mechanisms established at the clinical provider level. The list of indicators comprised five components: oral status, intervention or treatment procedures/processes, follow-up mechanisms, patient satisfaction and patient administration. A total of 31 indicators for oral status were agreed upon, the philosophy being that oral status indicators would have to measure outcomes (Appendix 1). Other indicators related to process and structure or the organisational setting of care: indicators on intervention; indicators on recall and follow-up; indicators on patient satisfaction; and indicators related to administration and organisation.
The software tool was then designed to compile information selectively, e.g. by year, age or region. A number of indicators from this database could be extracted for a European database. Below is an example (distribution of people by caries, whether they are caries-free or not) of the many indicators extracted and which were available to the individual provider, to health care administrators or authorities at supranational level.

After specifying these indicators, the WHO Regional Office for Europe developed other systems to serve the needs of eastern European countries, whose health systems at that time lacked software and particularly computers. “Paper-based” data submission systems were designed for the so-called Oral Status EURO project (WHO 1996). Indicators were developed for access and equity, acceptability and user choice in health systems, and for best outcomes.

The establishment of surveillance systems is recommended in the World Health Report 2002. Two information systems have already been established in oral health that relate to the Global Databank of the 1960’s and yet another information system, CAPP, is available on the internet. The basic indicators, which are detailed in these databases, relate primarily to the most prevalent of oral diseases and condi-

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**Figure 3. WHO indicators for quality of health care development**

<table>
<thead>
<tr>
<th>WHO: Indicators for quality of health care development</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Structure</strong></td>
</tr>
<tr>
<td>Organizational setting of care</td>
</tr>
<tr>
<td><strong>Process</strong></td>
</tr>
<tr>
<td>Health care intervention</td>
</tr>
<tr>
<td><strong>Outcome</strong></td>
</tr>
<tr>
<td>Effect of care and patient satisfaction</td>
</tr>
</tbody>
</table>

**Figure 4. Oral health quality indicators in the ORATEL system**

<table>
<thead>
<tr>
<th>Oral Health Quality Indicators in the ORATEL system</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population-related indicators</td>
</tr>
<tr>
<td>* Oral status</td>
</tr>
<tr>
<td>A1-A31</td>
</tr>
<tr>
<td>* Treatment procedures/Intervention</td>
</tr>
<tr>
<td>B1-B27</td>
</tr>
<tr>
<td>* Follow-up/Recall visits</td>
</tr>
<tr>
<td>C1-C6</td>
</tr>
<tr>
<td>* Patient satisfaction</td>
</tr>
<tr>
<td>D1-D8</td>
</tr>
<tr>
<td>* Patient administration</td>
</tr>
<tr>
<td>E1-E15</td>
</tr>
</tbody>
</table>
Basic indicators for development of quality of oral health systems in Europe

For all developed or developing countries epidemiological indicators can help us analyse disease trends and identify where intervention is needed. Standard age groups were specified for surveillance at intercountry and country levels, but users of the basic methods manual are encouraged to investigate other age groups relevant to community oral health care. There are very few data on the elderly, a population segment that requires special consideration particularly in a European context.

As one basic indicator it is recommended to record the number of teeth present. It is an open question whether a physical measurement is really necessary, or whether we can rely on valid questionnaire data. With such information it may be more cost-efficient to answer questions posed by public health care administrators or policy makers: Do we strive for better oral health or do we tackle inequity issues? A recent survey in Denmark shows that inequity in health is still prevalent in terms of dentate status.

In the European context, the time has come to consider additional information as part of efforts to improve physical measurements. Risk assessment is one of these, and a model of risk factors in oral health is already detailed by the WHO ORH Programme in the World Oral Health Report 2003 (Petersen 2003). The WHO Oral Health Programme is currently assessing risk factors and linking these with existing data from individual Member States. It would also be of interest to discuss indicators related to impairment of function, oral illness, quality of life and relationships between oral and general health.
In conclusion, ORATEL is more than just another health information system. ORATEL is a “bottom-up” process, starting at the dental unit and ultimately serving as a tool for an international network for quality development in oral health care. It will both support management and administration of dental clinics and be an integrated part of a quality assurance system to promote a standard quality level for oral health care. It’s advanced educational and decision support tools can be used at all professional levels. Once ORATEL is operational, the results from its widespread use should result in: (a) lower incidences of oral diseases; (b) higher standards of public and private oral health care delivery; (c) cost effectiveness of public and private oral health care delivery; (d) equity in oral health care delivery; and (e) self-awareness and improvement of quality in oral health care by the providers. WHO is in the process of providing a data collection tool for countries which includes not only oral but also general health indicators in public health programmes. These efforts will strengthen surveillance instruments in the control of noncommunicable diseases and health promotion. The outcomes of this work will be available to the European project in the near future.

References


### APPENDIX 1

**List of quality of oral health care indicators for use at clinical (a), national/regional (b) and supranational (c) administrative levels**

<table>
<thead>
<tr>
<th>A.</th>
<th>Oral status</th>
<th>a</th>
<th>b</th>
<th>c</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Edentulous persons</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>2.</td>
<td>Teeth present per person</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>3.</td>
<td>Persons with 20 teeth or more</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>4.</td>
<td>Caries free persons</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>5.</td>
<td>DMFT/dmft per person</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>6.</td>
<td>DMFS/dmfs per person</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>7.</td>
<td>Separate components (D, M, F, d, m, f)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>8.</td>
<td>Tooth surfaces affected (mesial, distal etc.)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Teeth with untreated caries</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Percentage of surfaces with secondary caries (recurrent caries)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Tooth surfaces with root caries</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Restorations with marginal defects</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>Root fillings present</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>Insufficient root fillings</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Teeth with pulpal diagnosis</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>Teeth with visible plaque</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>Tooth surfaces/sites with visible plaque</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td>Sextants with gingival bleeding</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>19.</td>
<td>Sextants with calculus (supra and/or sub)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>20.</td>
<td>Sextants with shallow pockets (4-5 mm)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>21.</td>
<td>Sextants with deep pockets (6 mm or more)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>22.</td>
<td>Teeth with loss of attachment (more than 1/3 of root)</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>23.</td>
<td>Persons with functional dentition (natural and/or artificial)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>24.</td>
<td>Type of extracted teeth</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25.</td>
<td>Teeth with occlusal interference</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26.</td>
<td>Persons with full dentures in upper and lower jaw</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>27.</td>
<td>Teeth with fractures (enamel, dentine, pulpal involvement)</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>28.</td>
<td>Teeth with tooth wear into dentine (abrasion, attrition) per person</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>29.</td>
<td>Persons with symptoms from TM-joints and/or muscles (subjective/objective)</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>30.</td>
<td>Persons with malocclusions treated or referred</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>31.</td>
<td>Persons with oral mucosal lesions</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Treatment-procedures/interventions</td>
<td>a</td>
<td>b</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>----------------------------------------------------------------------------------------------------</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>1.</td>
<td>Persons having received professional plaque removal</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Persons having received fluoride application (topical)</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Teeth having received fissure sealing</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Teeth having received restorations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. One surface restoration</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>b. Two/more surface restorations</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>5.</td>
<td>Type and brand materials used</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Teeth with pulp treatment</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Teeth with clinical complications during treatment (perforation, instrument-related overfilling, periapical lesions)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Crown restorations</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Persons having received crown restorations</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Bridge restorations</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Persons having received bridge restorations</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Persons having removable partial dentures</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>Persons having received full dentures</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>14.</td>
<td>Persons treated by implants</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Teeth extracted</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>16.</td>
<td>Persons having received scaling for periodontal treatment</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>Persons having received surgical periodontal treatment</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td>Persons treated by oral surgical intervention (other than B17)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19.</td>
<td>Persons having received medication for therapeutical reasons</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20.</td>
<td>Persons treated for benign oral mucosal lesions (denture stomatitis, candidiasis, aphtae, cheilitis)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21.</td>
<td>Persons with biopsy</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22.</td>
<td>Persons with correction of occlusal disharmonies/interferences (by grinding only)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23.</td>
<td>Persons treated for orthodontic reasons</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>24.</td>
<td>Persons treated by removable orthodontic appliances</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25.</td>
<td>Persons treated by fixed orthodontic appliances</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26.</td>
<td>Persons referred to specialist for premalignant and malignant conditions</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>27.</td>
<td>Minutes per person spent on individual or group-based oral health instruction/education</td>
<td>X</td>
<td>X</td>
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### C. Recall visits/follow-up

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<th>a</th>
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<tr>
<td>1</td>
<td>Persons recalled for control of level of oral hygiene</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>2</td>
<td>Persons recalled for control of periodontal conditions</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>3</td>
<td>Teeth with replacement of restorations</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Persons recalled for control of oral mucosal lesions</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>5</td>
<td>Persons recalled for control of occlusal and functional status</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>6</td>
<td>Persons with denture replacements</td>
<td>X</td>
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### D. Patient satisfaction

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<tr>
<td>1</td>
<td>Persons who felt oral health services accessible</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>2</td>
<td>Persons who experienced no excess waiting time in the dental office</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>3</td>
<td>Persons satisfied with services rendered</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>4</td>
<td>Persons who felt informed about treatment alternatives</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>5</td>
<td>Persons satisfied with physical facilities in dental office</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>6</td>
<td>Persons who felt that the dentist had sufficient time for discussion</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>7</td>
<td>Patients who felt cost of treatment acceptable</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>8</td>
<td>Persons complaining of treatments performed per year</td>
<td>X</td>
<td>X</td>
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#### E. Patient administration

<table>
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<tr>
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<th>a</th>
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<tbody>
<tr>
<td>1</td>
<td>Persons with relevant social/medical history (diseases, medication, background data)</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>2</td>
<td>Persons classified by risk group (caries, periodontal diseases, based on clinical-biological tests)</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>3</td>
<td>Persons classified by social/behavioural risk factors</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>4</td>
<td>Total number of patients per dentist per year</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>5</td>
<td>Number of patients in regular care (at least once a year) per dentist per year</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>6</td>
<td>Number of patients in emergency per dentist per year</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>7</td>
<td>Number of patients in public care programme free of charge per dentist</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>8</td>
<td>Number of patients in public/national health insurance scheme per dentist</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>9</td>
<td>Number of patients in private health insurance scheme per dentist</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>10</td>
<td>Number of patients in mixed health insurance schemes per dentist</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>11</td>
<td>Number of working hours per dentist per year</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>12</td>
<td>Number of working hours per dental hygienist per year</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>13</td>
<td>Number of working hours per chairside assistant per year</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>14</td>
<td>Total number of patient attendances per year</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>15</td>
<td>Total number of new patients per year per dentist</td>
<td>X</td>
<td>X</td>
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*Special recording needed.*
Efficiency in Oral Health Care.
The Evaluation of Oral Health Systems in Europe

Helen Whelton

Introduction

Over the last 30 years interest in the relationship between the system of delivering health care and the health of those eligible for care under the different systems has increased. The late Archie Cochrane was the first to articulate the idea that the effectiveness and efficiency of a health care system was an important area of study and that much effort and resources could be wasted if a system and the procedures within a system were not subject to regular and rigorous study and evaluation (Cochrane 1972). He highlighted the fact that measuring activity alone without measuring the effect of that activity on the health of the population was seriously inadequate.

The concepts of cost effectiveness and cost benefit began to be frequently addressed in the international health services literature. The Archie Cochrane Centres for evidence based health care have been established in the US and UK to honour this great innovator in the field of Health Services Research. In 1972, the World Health Organization in collaboration with the United States Public Health Services initiated a major International Collaborative Study (ICS) on Oral Health Care Systems (WHO 1995). This study, involving ten countries with widely varying oral health care delivery systems, attempted to ascertain whether there was a link between the characteristics of these different delivery systems and the oral health levels of those eligible for care within the different systems. The report of this study generated considerable interest and debate amongst researchers and those responsible for developing policies for oral health care delivery systems. A lively debate followed publication of the results, particularly those from the cities of Yamanashi in Japan and Cantebury in New Zealand. One outcome measure investigated in this ICS project was the level of edentulousness amongst representative samples of those aged 35-45 years of age. In Yamanashi this percentage was 0%, whereas in Cantebury it was 39%.

1. Oral Health Services Research Centre, University Dental School and Hospital, Cork, Ireland.
detailed analysis of the structures and processes of the oral health care delivery systems in these cities revealed major differences not only in the systems themselves but also in the attitudes to tooth loss. It was concluded that cultural factors were as important as the characteristics of the delivery system (e.g. payment methods) in determining oral health care outcomes.

A number of reports in the late 70s highlighted the wide variation in the structure and processes of the different oral health care systems worldwide (Ingle and Blair 1978, Kostlan 1979). In the early 80s major discussions were initiated in the United Kingdom regarding the NHS system of delivering dental care (Dental Strategy Review Group Report 1981) leading to fundamental change in the system in 1984 (Downer et al. 1994). These discussions highlighted the fact that whilst changing systems was both regular and widespread, the basis on which these changes were made often lacked an evidence base.

Health policy in the member states is required to address difficulties in the financing and delivery of health care. Systems design is required to pay particular attention to addressing pressures for rapid increase in expenditure, perceived deficiencies in coverage and access to services, and concerns about the efficiency of delivery. Systems design is also required to pay increasing attention to convergence of health care coverage and financing within the EU in order not to jeopardise the right of free mobility of persons and services between the Member States. Positively, the health care systems of all EU Member States should finally offer equal opportunities with respect to maintenance of health and treatment of illness for every EU Citizen in each EU Member State. The policy problems to be solved for these purposes are heavily influenced by demographic and technological factors. These require that available policy instruments be employed to maximum effect in the interest of improved system performance.

Policy discretion applies principally to the areas of financing, payment and regulation. Considerable effort has therefore been employed by the Member States, within their distinctive national traditions, to improve health care financing and delivery systems. Policy reform has focused on changes in the funding mechanisms and the payment or recoupment arrangements. More recently, reform strategies have extended to a restructuring of the organisation of health care systems to strengthen control and review procedures while stimulating the search for greater productivity.

Within the reform strategies, particular emphasis has been placed on the design of systems for provider payment which reinforce the search for efficiency while achieving cost containment objectives. The effectiveness of alternative strategies in terms of cost containment is reasonably clearly established and has been the subject of an extensive literature. The impact of payment systems on the quality of care as well as on the effective utilisation of services is much more problematic. The measurement of final outcome as the ultimate test of quality is even more difficult both for the health system as a whole and for individual services.

Many fundamental differences exist between the health care delivery system of each EU Member State. It is reasonable to ask if these differences explain some of the
varying levels of health throughout Europe. If it does then it would be sensible to include those factors which promote health and exclude those which are detrimental to health in any policy changes being introduced on a Europe wide basis, for example as part of convergence of health care systems.

Oral health care systems share many of the structural challenges faced by health care in general. They have also been subject to review and redesign in terms of funding and payment policies. Outcome indicators are more accessible, however in the context of oral health care than in health care generally because of the existence of well-established measures of oral health status. These measures represent potential indicators of the impact of the design of an oral health care system on the content and outcome of interventions. They therefore represent an important tool for proceeding beyond process and cost evaluation to the level of the effectiveness of system design. In this sense, oral health care represents a marker for policy development with regard to health care systems as a whole. The fact that in each EU Member there are clearly established oral health care delivery system and the fact that there are now clearly defined measures of oral status makes oral health an ideal example in which to develop methodologies aimed at linking characteristics of a health care system with the health of those eligible for care under that system.

It was against the above background that the Oral Health Services Research Centre, University Dental School and Hospital, Cork, applied for funding in collaboration with six partners in the EU to conduct a project with the following aims:

- To develop a methodology designed to establish links between characteristics of a health care system and health outcome
- To determine the characteristics of oral health care systems which promote oral health and those which are detrimental to oral health

Essentially the project planned to harness information from the natural experiment created by seven different methods of delivering services in Europe, taking account of the background diversity in levels of oral health in the seven different regions.

Methods

The Partners in this project were oral health services research groups from: Denmark, England and Wales, France, Ireland, Netherlands, Spain, Germany. Romania joined the consortium after the first year of the project and participated in some of the discussions and activities. Following a series of meetings of the consortium a detailed protocol, designed to achieve the aims and objectives of the project, were agreed. Initially a situation analysis of the seven participating countries was undertaken. This situation analysis included demographic variables such as population figures, percent of GNP spent on health services and

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on oral health services, number of registered dentists and the dentist population ratios. Data on oral health was also obtained, such as caries levels amongst 5 and 12 year-olds and the number of natural teeth present and levels of edentulousness amongst 35-44 year-olds and 65+ year-olds. These data were collected for 1980 and 1990. The results indicated considerable changes over time and wide variation in most of the parameters investigated. For example the dentist to population ratio varied from 1,353 in Denmark to 3,353 in Spain. Edentulous rates also varied widely, for example from 31% in Spain to 78% in the Netherlands amongst 65+ year-olds. During this initial phase also the demographic data and the data on oral health which was part of the management and administration of the different oral health care systems was assessed. It was found that there was considerable variation in the kind of data collected in the different systems and the method of collection was such it could not be adapted to suit the purposes of the project.

At this early stage of the project also, Dr David Parkin the Health Economist on the team led a subgroup of the consortium whose task was to develop a theoretical model which would dictate the information to be collected in order to achieve the aims of the project. This model is presented in figure 1. The model separates the production of Oral Health Care from the Production of Oral Health. In the upper part of the diagram the level of Professional Oral Health Care is subject to factors which relate to dental practice such as the chair-side time spent by the dentists and auxiliary dental workers, the type of premises, the equipment and the supplies used, as well as the characteristics of the health care systems and the cultural or social environment in which oral health care was delivered. In the lower half of the diagram, there are other factors influencing oral health, such as self care, as well as the environment in which the health care system operates and the cultural and social environment in which the individual lives. Having developed this model the group then set about designing a number of data collection instruments for the many variables likely to impact on the agreed model. The two halves of the model were treated separately even though there is an assumption that any factors which increase the Production of Oral Health Care will have a positive impact on Oral Health itself. In other words, the more efficient the system is in delivering oral health care, the better the oral health of those eligible for care in that system. Data was collected from administrators of the different systems, from dentists practising within the systems (interview and questionnaire) and from patients who were being treated under the system (clinical examination and questionnaire). The data collection instruments were

Figure 1. Model for the production of oral care function and for the production of oral health function
piloted extensively taking account of the fact that the parent language of the participants varied. The questionnaire design team was lead by the Dutch group who had considerable experience in designing questionnaires for both dentists and patients (Eijkman et al. 1984, Hoogstraten & Broers 1987). The data collection instruments are attached, appendix 1.

Results

The results of the project are contained in the Report to the EU Commission (1997). Further details of the project including results have also been recently published (Parkin & Devlin 2002). Convenience samples of dentists and of patients were recruited in the different countries. In total 316 dentists participated in the project and 1,501 patients were clinically examined. In the case of the first part of the model, namely Production of Oral Health Care one dependent variable or outcome measure is selected for illustrative purposes namely average number of patients seen per hour worked in system by each dentist. The independent variables included in the stepwise regression analysis used to test the model are: average age of dentists in system, age of dental unit, average number of hours per week worked by dentists chair side, average numbers of hours per week worked by dentists, administration, number of chairs concurrently operated by dentist, time worked by reception staff, time worked by chair side assistants, time worked by hygienists, time worked by staff conducting health education, time worked on ‘other tasks’, average number of weeks worked per year by each dentist in sample, number of years spent practicing since qualifying by each dentist, number of population per dentist in system, denture fee as multiple of filling fee, whether patient contributed payment to treatment or not, country of origin.

In the case of the second part of the model, namely the Production of Oral Health two dependent variables were considered namely the state of the oral health as perceived by the patients themselves and the number of sound unrestored teeth: Age, attendance pattern, tooth brushing frequency, whether they had a check-up in the last 2 years or not, had subjects consulted a non-dentist, educational level, employment status, satisfaction with service, gender, percentage of fees borne by patients, denture fee as a multiple of filling fee, sugar consumption in country (kg/per person per year), country of origin were included as independent variables.

In this study, the independent variables found to impact on the number of patients seen per hour (production of oral health care) were average age of dentists (positive, the older the dentist the more patients seen per hour by the dentist), dentist chair side hours (negative), dentist administration hours (negative), denture fee as a multiple of filling fee (negative), dentist population ratio (negative), whether patient contributes to treatment. The adjusted R-squared for this analysis was 0.49. The country of origin variable was not significant.

In the case of the production of oral health model, two outcome measures were included in the regression analysis in order to illustrate the potential of the model developed in this project. Namely the oral health status of the patient as assessed by the patient and the mean number of sound
untreated natural teeth as assessed by the dentist during the clinical examination. In the case of the latter, the factors having a significant impact on the factor were age (negative, the older the patient the less natural sound teeth present), attendance frequency (negative), consultancy in non-dentist for advice (negative), educational level (positive), gender (positive, females had more), percentage of fees paid by patient (positive), denture fee as a multiple of filling fee (positive). Country of origin was a significant factor in three samples, Germany (negative), France (negative), Spain (positive). The adjusted R-square for these significant factors was 0.34.

Discussion

One of the main objectives of this project was to establish a methodology for assessing the link between the characteristics of a health care system such as eligibility, methods and levels of payment and the health status of those eligible for care under the system. It was realised from the outset that any linkage between a health care system and the health of those cared for under the system would be complex and difficult to measure. Using oral health as a model, however, it was felt that because of the recent advances in defining oral health outcomes there was a greater likelihood of developing methods for assessing the links between structures and inputs of oral health care systems and outcomes, than for other health care systems in which outcome measures are less easily defined. Again it is important to emphasise that the comments made on the results obtained are purely illustrative of the kind of interpretations that could be produced if fully representative samples of dentists and patients in the different systems were selected to participate in the project.

It was interesting that even though extensive data was routinely collected as part of the administration and management of each of the systems studied, these data were collected in many different formats and for many different reasons and therefore were not comparable between countries at any level and could not be used to achieve the aims of the project. The Oral Health Services Research Centre in Cork is currently engaged in a number of projects, the overall aim of which is to develop criteria for increasing the usefulness of routine data in measuring the efficiency of oral health care delivery systems.

The consortium devoted considerable time in arriving at a consensus on which clinical outcome measures were most suitable for comparing the efficiency of oral health care delivery systems. Whilst there was agreement that the number of natural teeth present was a measure which took into account not only the oral health status of the eligible population but also to some degree the extent to which treatment was impacting on oral health, the need to further consider this matter needs to be emphasised. The current project being undertaken by Professor Bourgeois and his team will hopefully achieve a consensus on this issue.

A method for establishing the possible link between the health characteristics of a care system and the health of those eligible for care under that system is the primary aim of this project. In order to simplify the conceptualisation of the possible link it was decided to consider separately the production of oral health care (sometimes referred to as “productivity”)
and the production of health. In a health care system providers are deployed to carry out tasks such as fillings, crowns, etc, the underlying assumption being that the carrying out of these tasks will result in better oral health. Put in another way it is assumed that the more work a dental provider such as a dentist or hygienist carries out, for a given remuneration the more efficient that system is. The results of the modelling exercise developed in this project clearly show that the approach has considerable merit; from a conceptual point of view results show that considering production of oral health care and production of oral health separately is a useful approach and needs to be developed further.

It should be emphasised however that considering the models separately is one stage towards a more comprehensive view and does not in itself constitute the approach advocated. A further stage of modelling is required, in which the two models are jointly estimated, making explicit the links between them and enabling a proper view of the important relationships between them, of the important relationships between oral health care production, oral health production and factors which influence them. As stated, this additional complexity was not possible within this pilot project, but remains an essential feature of future work.

The decision to select the mean number of patients seen per hour by the dentist as the measure of production of oral health care or ‘productivity’ was an arbitrary one. No doubt other equally appropriate measures for the production of oral health care, e.g. the number of fillings relative to the number of extractions carried out per week, the number of specific items of treatment conducted per hour or week could be assessed. However, the time available to the consortium for this project considerations of all of the various possible measures of ‘productivity’ was not possible. Nevertheless, by using the mean number of patients seen per week as a reasonable measure of ‘productivity’ the results illustrate the usefulness of the methods adopted.

It is interesting that the consortium in their proposal for this project to the Commission hypothesised that one characteristic which might have an effect on the production of oral care and as a result, possibly also on oral health was the system of payments to dentists for work undertaken. The results show that two of the independent variables concerned with payment which were chosen, namely the ratio of denture fee to single surface filling fee and whether or not the patient made a contribution towards payment of treatment, both had significant links with the number of patients seen per hour. In the case of the former it was found that the greater the fee obtained for full upper and lower dentures relative to the fee for a single surface filling the less patients seen per hour by the dentist. From a clinical point of view there is some sense in this relationship in that the higher fee for dentures might encourage more emphasis on work on dentures; perhaps the fitting of dentures might take longer to complete hence the reduced number of patients per hour. Whilst it is tempting to attempt to explain in this fashion the clinical sense of the relationships found between the dependent variable chosen (mean number of patients seen per hour), and the various dependent variables, the methodological nature of the project must again be emphasised. Further detailed work is required to consider further appropriate and relevant
independent and dependant variables for the production of oral health care model. The results presented show that the method chosen has considerable merit and future possibilities.

It was decided to derive two measures of oral health, one based on the patient's opinion of their oral health status and the other based upon the clinical examination conducted by the dentist. The measure of oral health chosen from these two sources is again arbitrary, the choice being simply made to illustrate the method used. Future work in this area will need to focus on, for example, what combination of patient-based and clinician-based measures could be used to give a simple measure of oral health. One approach to this is to consider explicitly the weights to be attached to different aspects of oral health, using some variant of the utility index approach. This could be applied both to patients and to dentists.

As in the case of the production of oral health care model, the model of production of oral health outlined in this report has considerable potential and should be further developed. A particularly fruitful area for further work should be the development of the linkage between factors found to be significant in the production of oral health care with the level of oral health.

In summary a method for measuring the link between system of delivering an aspect of health, namely oral health, with the oral health of those eligible for care under that system has been developed. The background to the development of the proposed model is outlined. The complexity of the links between an oral health care system and the oral health of those eligible for care under the system required that separate models for the production of oral health care and the production of health be developed. For both of these models a number of factors have both positive and negative influences. Further work is required on the data collection to devise appropriate combinations of independent and dependent variables for use in the model of production of health care and production of health. Furthermore, the relationship between factors affecting production of care and production health needs to be considered so that a further model can be developed to quantify the relationship between both.

References


APPENDIX 1

Questionnaire Patients (1)

Questionnaire Patients (2)

16. Why do you normally go to the dental practice?

Tick all that apply:
- For a check-up only every 6–12 months
- For a check-up only every 13–24 months
- When I feel I need treatment
- Only when I have pain
- To have my teeth cleaned

17. Did you expect any particular treatment at your most recent visit?

Yes [ ] No [ ]

18. During the last 12 months have you consulted a person outside of the dental profession for advice on, or treatment of, your teeth or gums?

Yes [ ] No [ ]

19. Who provided your treatment last time you went to the Dental Surgery?

- Dentist
- Hygienist
- Dental Technician
- Dental Specialist
- Other

20. Please rate your level of satisfaction with the following aspects of service.

Tick all that apply:
- Appointment at a suitable time
- Even of getting to the surgery
- Helpfulness of staff
- Dentists attitude
- Information concerning the cost of your treatment
- Information about treatment options
- Quality of treatment
- Standard of dental equipment
- Time spent in the waiting room
- Cleanliness of premises

21. In your own experience to what extent do you feel the following statements are ‘Always’, ‘Sometimes’ or ‘Never’ true for dentists in general?

- Dentists give patients enough opportunities to ask questions on dental matters
- Dentists are more business people than caring
- Dentists treat patients
- Dentists tend to fix up teeth rather than explain how to avoid dental problems

22. Are you satisfied with availability of information on the PRSI scheme or payment system concerning:

Please answer all questions:
- Where to find information on the system other than from the dentist
- How to join the system
- How to remain eligible for treatment
- How your rights are protected within the system
- Where to complain if dissatisfied

23. Now we would like to know whether you are satisfied with the services offered by the PRSI dental system:

- To date were all treatments you required provided under the scheme?
- Are you satisfied with the cost of care you require under the system?

24. As far as you know, does the system provide:

- Silver (amalgam) fillings
- Gold fillings
- Crowns
- Bridges
- Dentures
- Cleaning of the teeth (Scale and Polish)
- Surgery for gum problems
- Instruction in oral health care
- Preventive care (e.g. fluoride application, sealants etc.)

25. Do you feel the PRSI system makes you attend the dentist more frequently than you otherwise would?

Yes [ ] No [ ] Don’t know [ ]

26. Private Insurance

- Do you have a private dental insurance policy?
- Have you claimed under this insurance policy in the past two years?
- To which private dental insurance group do you belong?

27. What is your estimated household income level per year?

This completes our questionnaire. Thank you for answering.
Questionnaire to Dentists
Dental Manpower: Specific situation in Spain

Manuel Bravo¹, Juan Carlos Llodra¹ and Frederico Simón²

The International Programme conducted in 1989 by a Joint Working Group FDI/WHO was to list the factors influencing the balance between care needs and dental workforce needs for optimal oral health (WHO 1989). The objective of the JWG6 was to provide guidelines for planning and monitoring for oral health with a standardised working tool to analyse the situation and develop short, medium and long term planning for the necessary number of dentists sufficient to meet the required needs (Table 1). The philosophy of the Manpower Programme was that (i): many factors and/or indicators need to be taken into consideration to standardise the approach of professional demography; (ii) the optimal number of oral health professionals was not be rigid but will be evolutive in relation to variations of epidemiological, demographic, social and economical factors; (iii) the necessity to consider in manpower the essential notion of the development of oral conditions, the effect of health education and prevention strategies.

Manpower necessity

Historical data for the Dental Workforce in EU countries show an increase in the number of dentists compared to population, particularly for Spain and Portugal. The Figure 1 is derived from OECD data bases (OECD 1996, 1998, 2000), and shows, from 1960 to 1998, the population/dentist ratio in 14 EU countries (Spain and 13 unidentified lines, with Italy excluded because dentists were included in the medical census up to recently). One should highlighted Spain and Portugal, where up to early 80s, the population/dentist ratio was higher than in the rest, but knowadays those countries are within the EU mean.

For example, the thick line representing Spain can be divided into two portions: from 1960 when the population/dentist ratio was 10,970 (30.6 mill. pop./2,788 dentists), to 1980 (ratio = 9,506; 37.5 mill. pop./3,946 dentists). This means an approximate constant ratio two to five

¹. School of Dentistry, University of Granada, Spain.
². Chief Dental Officer, Spain.
times greater than other EU countries (with the exception of Portugal, represented by the line above Spain). In striking contrast, the period from 1980 to 1998 (when the ratio was 2,440; 39.4 mill. pop/16,133 dentists), shows a limited increase in population (4.9%) accompanied by a huge increase in dentists (308%) and a large reduction in the ratio (74.3%) compared to the other EU countries.

There are, of course, two sides to this “growing” problem: the supply side (involving workforce analysis of the number of dentists, trends, etc.) and the utilisation side, which is determinant in measuring its magnitude.

As the market for dental services is modelled as a combination of supply and demand (Furino & Douglass 1990), any rapid increase in the number of dentists should bring about efforts in nationwide

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**Table 1. Planning flow chart (WHO, 1989)**

<table>
<thead>
<tr>
<th>Data needed for calculations</th>
<th>Calculations</th>
<th>Data needed for modifying factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral health status</td>
<td>Average time needed per person per year for preventive and treatment services at the start and end of planning period for each 4 cohorts</td>
<td></td>
</tr>
<tr>
<td>• Disease levels, profiles and trends</td>
<td></td>
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<tr>
<td>• Preventive services and treatment needs estimates</td>
<td></td>
<td></td>
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<tr>
<td>Proposed goals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population estimates for planning period by age cohort Demand for services estimates</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average time which can actually be delivered per person per year for preventive and treatment services at each end of planning period,</td>
<td></td>
<td></td>
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<tr>
<td>Decisions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agreed goals Types of services and organization Personnel types, skills and numbers Appropriate personnel production policies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social/political policies for health</td>
<td></td>
<td></td>
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<tr>
<td>• Care organization and approaches</td>
<td></td>
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<tr>
<td>• Funding parameters and policies</td>
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<tr>
<td>Care facilities</td>
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<tr>
<td>• Care profiles and procedures</td>
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<tr>
<td>• Personnel types and skills</td>
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<tr>
<td>• Training facilities and output</td>
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<tr>
<td>Population parameters</td>
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<tr>
<td>• Urban/rural distribution and trends</td>
<td></td>
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<tr>
<td>• Ecology-based factors affecting demand</td>
<td></td>
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</tr>
<tr>
<td>To Maximise oral health and achieve agreed goals</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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co-ordination and monitoring of supply issues as well as certain workforce variables (workloads, practice management, productivity) (Brown 2001, Chisick 2001, Brennan & Spencer 2002, Brown et al. 2002, Higgs & Richards 2002, Brennan & Spencer 2003). It is also necessary to analyse information on population factors tied to oral health care, such as standard of living, dental needs, demand of services, percentage of population that is edentulous or elderly, impact of insurance plans, etc. In the United States and some EU countries an excess of dentists in the 1970s and 1980s led to the closure of dental schools (Committee on the Future of Dental Education 1995). There should be a movement from the emphasis in population/dentist to offer and demand issues. In this sense, a study of the European dental workforce in 1996 reported a mean ratio of 1,634 inhabitants per dentist for the EU overall, and underlining that Spain showed the highest ratio in the continent (Anderson et al. 1998), should be interpreted with care.

To analyze the interactions between demand and offer (supply) is a complicated issue, and different authors deal by different ways with this problem [for a review, see ref. (DeFriese & Barker 1982, Goodman & Weyant 1990, Bartholomew et al. 1991, Capilouto et al. 1995, Beazoglou et al. 2002)]. If no control is implemented, some effects would occur, according to Llodra et al.:

- Unemployment
- Subcontratations: a dentist is contracted to work as a hygienist
- Reduction in the number of hours worked per week, over treatment, reduction in quality, etc.

Since there are methods for quantify the dentists needed, it should be considered that, both, the excess and the insufficient number of dentist, is inadequate, producing costs that are assumed by the society.
Demand and supply

Since the concepts of workload and dentist – the two main concepts behind – are essential, some limitations are expressed below:

The most commonly applied measures of dentist workload are the number of visits provided, hours worked and income (Gift 1984, Petersen & Holst 1995). It has been suggested that “visit” be used where dentists are modelled as units with a capacity to supply a level of patient visits per year (Shuman & Loupe 1994). Yet other authors argue that the dental visit value does not reflect the number and complexity of services per visit (Committee on the Future of Dental Education 1995), and that different dental procedures should be attributed different values (Council on Dental Health 1968). In Australia, between 1983 and 1993, it has been reported a 18% reduction in the number of dentist attended per private dentist, but maintaining the number of worked hours, which indicates an increase in the time per visit (Brennan et al. 1996), and a slight change in the services provided (Brennan et al. 1998).

Although the dentist is usually considered the unit of analysis from the supply side, the characteristics of the clinical setting (general or specialised practice, rural or city location, employment of dental hygienists) (Brown et al. 1994; Brennan et al.1998; Grembowski & Milgrom 1990) may have a substantial impact on the actual service supplied. Some studies have associated personal characteristics such as age, sex, or having young children with the hours per year worked (Boyle 1986, Spencer & Lewis 1988, Brennan et al. 1992, Murray 2002).

Manpower application in Spain.

The increase of dentists in Spain has received the attention from different perspectives:

• Studies evaluating the increase of dentists:
  Different studies, from the early 90s, have studied the number and distribution of Spanish dentists and point to a possible excess of supply, aggravated by the low mean age of the practitioners, which could lead to unemployment in the future (.Noguerol Rodríguez et al. 1990, Cordero Bulnes et al. 1993, Foliana et al. 1994, Noguerol et al. 1999). These studies have not considered the dental needs in the population nor the dental demand

• Evaluation of the needed dentists. It is possibly, the only approximation that derived from the FDI/WHO methodology.

Using the normative dental needs and the FDI/WHO JWG6 computer program (a needs-based, demand-weighted method of workforce prediction applied in other countries as well), an optimal population/dentist ratio for Spain has been estimated at 2,350 to 2,800 inhabitants per dentist in 1993, and between 2,700-3,200 in 2000 (Llodra Calvo et al. 2002), figure already suppered, particularly in big cities. Yet if the current trend continues, the number of dentists will be far in excess of this optimal proportion.

• Evaluation of future trends.

A 1996 Delphi prospective study conducted by the Spanish Dental Association (Ilustre Consejo General de Odontólogos y Estomatólogos de España) gathered opinions from 82 experts in different areas regarding the
future scenario of Spanish Dentistry up to the year 2005. A great increase in the number of dentists was foreseen, implying increased economic pressure for the private dental clinics (Libro Blanco 1996). It should be noted that while medical problems are treated mainly within Spain’s national public health system, most people tend to resort to the private sector for dental care, where the fee-per-service or fee-per-item method of payment prevails.

- Analysis of workload per dentist. From 1987 to 1997, it has been estimated a 42% reduction in the number of private visits per dentist attended in Spain (Bravo 2002), as a proxy variable of workload per dentist.

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Dental Manpower: Specific situation in Spain


Oral Health Indicators: Major issues

Factors Influencing Demand and the Perceptions of Individuals, Dental Professionals and the Funders of and Legislators for Oral Health Care in Europe
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Factors Influencing Demand and the Perceptions of Individuals, Dental Professionals and the Funders of and Legislators for Oral Health Care in Europe

Kenneth A. Eaton

Introduction

Bradshaw (1972) considered that demand was synonymous with expressed need. However, individuals may express need(s) and seek, but not receive, help. When demand results in utilisation of services, it can be described as effective demand. A number of factors influence the three stages during which individuals become aware that they have a need for oral health care, whether or not they seek such care and then, whether or not they obtain it (becoming patients in the process). Individuals, those who provide oral health care (the dental professionals) and those who fund and legislate all influence the process of converting need into effective demand. The majority of the factors influencing the first two stages relate to the individuals (potential or actual patients). The influence of dental professionals, funders and legislators is more apparent at stage three. This paper will review the factors influencing demand and how demand for oral health care is influenced by the perceptions of individuals, dental professionals and funders and legislators.

Influences on and Perceptions of Individuals

The Andersen-Nyman Model

Several theories or models have been used to explain why individuals use health and oral health care services. The social-psychological model proposed by Andersen and Nyman (1973) has been used widely in hospital services and to some extent in dentistry (Suominen-Taipale 2000). In the model, three major groups of factors (predisposing, enabling and need-related) are suggested. These are then sub-divided into smaller groups. The model has been criticised on the grounds that it does not clearly differentiate between predisposing and enabling factors, puts too much

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1. Adviser to the Council of European Chief Dental Officers, Ashford Kent. United Kingdom.

emphasis on the use of formal health care and neglects informal health care and social support and that it only considers use or non-use rather than extent of use (Pescosolido 1991). Notwithstanding these criticisms, the model can be considered as a useful template for consideration of the factors concerned as they affect individuals. It is used in this section together with a consideration of the influences of social and psychological factors on individuals’ perceptions of need for oral health care.

**Predisposing Factors**

These may be sub-divided into those relating to demographics and social structure (such as age, gender and marital status) and health beliefs/attitudes.

**Demographics and Social Structure**

Age, gender, marital status, ethnicity, educational level, occupation and social class have all been reported as influencing attendance patterns for oral health care. However, it is probably misleading to claim that any one of these factors in isolation consistently has an effect on attendance patterns. Historically, in the UK, it appears that older people visited a dentist less frequently than the young or middle-aged (Todd et al.1982, Todd and Lader 1991, Dental Practice Board 1992). This may well be the case in other countries (Suominen-Taipale 2000). However, the UK Adult Dental Health Surveys indicate a dramatic change in self-reported attendance patterns amongst those aged over 55 years during the 20 year period between 1978 and 1998. In 1978, there was a 32% self-reported attendance rate in those over 55 years of age, the lowest for any age group. By 1998, the 66% self-reported attendance rate for those aged over 55 years had become the highest for any age group (Nuttall et al. 2001). During the same period the UK Adult Dental Health Surveys indicated that the percentage of over 55 year-olds without teeth halved for those aged between 55 and 74 years and fell by a third for those over 75 years (Kelly et al. 2000). Suominen-Taipale et al. (2001) reported that in two groups of Finns, aged between 65 and 74 years, number of teeth and income were the principal determinants for dental visits. The perceived treatment needs and attendance patterns of older adults have received some attention in the UK in the last decade. Tickle and Worthington (1997) studied two groups of 60-65 year olds, one of which lived in an affluent area and the other in a socially deprived area. Both showed similar perceived need for treatment or advice but those from the affluent area were significantly more likely to attend the dentist on a regular basis. The edentulous from both groups were less likely to attend regularly or to perceive a need for advice or treatment. Lester et al. (1998) studied a group of housebound adults aged 60 years or more and found that 93% attended for oral health care only when they had problems. A number of studies have indicated that females are more likely to be regular attendees for oral health care than males (Schwarz & Hansen 1976, Murtoamaa 1983, Payne and Locker 1996, Kelly et al 2000) as are married people or those living together (Dolan et al. 1988, Österberg et al.1998). Ethnicity, ability to speak the language of the country of domicile and socio-economic deprivation can all influence perceptions of need and attendance for oral health care.
Factors Influencing Demand and the Perceptions of Individuals

care (Widström & Nilsson 1984, Manski & Magder 1998, Kwan & Bedi 2000). Although social disadvantage is often associated with ethnicity (UK Census 1991) and poor oral health (Beal & James 1970, Bedi et al. 1991). Mandall et al. (1998) found that amongst a group of socially deprived teenagers oral health treatment need had a far greater effect on their oral self perceptions than ethnicity. Furthermore, Corrigan et al. (2001) have implied that, if educational level and ability to speak and understand the language of the country of domicile are discounted, concepts of oral health amongst those from ethnic minorities may not differ from those with similar levels of education and social status.

Health Beliefs/Attitudes

People need to believe that care personnel can help them to achieve health (Kegeles 1961). Without this belief they are less likely to seek help and, assuming that the help is available, change perceived need into effective demand. Ettinger (1992) has suggested that the development of attitudes to oral health can be influenced by economics, education and the environment in which the individual lives. A wide range of factors have been reported as influencing attitudes. Negative factors include: fear (Schwarz & Hansen 1976, Cohen 1987, Finch 1988, Davidson et al. 1999), lack of perception of need (Cohen 1987, Finch 1988, Davidson et al. 1999), laziness (Schwarz & Hansen 1976, Syrjälä et al. 1992) and frustration with past care (Gilbert et al. 1998). Positive factors include: putting a value on dental care (Petersen and Pedersen 1984), awareness of the positive effect of oral hygiene instruction (Schwarz 1996) and a healthy life style (Payne & Locker 1996). It is also interesting to note that one study has suggested that people who attended for regular oral health examinations also demonstrate higher rates of other positive health activities such as attending for regular routine medical examinations (Hayward et al. 1989). The 1998 Adult Dental Health Survey included face to face interviews with participants to determine the oral health attitudes and behaviours (Kelly et al. 2000). Reviewing the results of these interviews, Bradnock et al. (2001) concluded that, in the UK, over the previous three decades there had been a steadily improving approach toward more positive dental health attitudes. However, they also expressed an underlying concern that those who had the greatest oral health needs and those from more deprived households still lagged behind in terms of their oral health attitudes.

Enabling Factors

Cost

A variety of factors relating to cost have been reported as influencing demand. The systems used to finance oral health care appear to play a significant role. When dental insurance is available and the costs of oral health care are paid for by a third party demand appears to be higher and those insured visit dentists more frequently (Locker & Leake 1993, Brodeur et al. 1996, Manski & Magder 1998). However, the extension of dental insurance in Finland and Norway did not increase utilisation of services by young adults in Finland (Arinen 1992) or Norway (Grytten et al. 1996). Cost factors may well have a greater influence on the utilisation of services by older people. A number of studies have indicated
that those without insurance visit a dentist less frequently (Dolan et al. 1988, Locker et al. 1991, Gift and Newman 1993, Gilbert et al. 1998). However, costs may be imagined rather than true costs (Clerugh 1986). Furthermore, Lester et al. (1998) found that a group of functionally dependent older adults, who were likely to be exempt from costs, perceived costs to be a major barrier to seeking oral health care. A recent market research survey in England found that lack of clarity about costs, due to poor communication by dentists, was seen by some as a deterrent to seeking oral health care (Land 2000). There have been conflicting findings concerning the influence of travel costs on demand for oral health care in that Conrad et al. (1987) and Mueller & Monheit (1988) reported that they had an adverse effect, whereas Kirkegaard et al. (1987) and Grytten et al. (1993) found no such effect.

Supply of Services

It is unclear whether or not an increase in the number of dentists, in an area or country, is in itself a factor for increasing the probability of visiting a dentist. In Sweden, Olsson (1999) reported that an increase in the number of private practitioners increased the probability of visiting a dentist and also the number of visits. However, Sintonen & Maljanen (1995) could detect no such effect in Finland in the 1980s. Further studies in Scandinavia have indicated that the practice of dentists sending recall appointments to their patients can stimulate (or maintain) utilisation of services (Tuominen 1987, Sintonen & Maljanen 1995). Seeking care from one (the same) dentist over a number of years also appears to increase utilisation of services (Chen et al. 1997, Davidson et al. 1999).

In general, dentists work in towns and cities and availability of oral care can be a problem in rural areas. It is perhaps therefore unsurprising that a number of studies from various countries have indicated that people living in urban areas visit dentists more frequently than those living in rural areas (Schwarz & Hansen 1976, Petersen 1983, Gift & Newman 1993, Gilbert et al. 1998). Andersen et al. (1995) have suggested that a number of primary determinants of oral health lead to oral health behaviour such as effective demand (use) of available services. The system used to provide oral health care in a country is one such primary determinant. Others include cultural characteristics of the population and factors in the external environment, such as water fluoridation and relative wealth. Previously, Andersen et al. (1970) had suggested that health service systems (including oral health service systems) consisted of three elements: policy (including financing mechanisms and screening programmes), resources (including personnel and facilities) and organisation (including co-ordination and control, regulations and legislation). All three elements are invariably controlled by Governments or their agencies and/or third parties, such as private or state insurance organisations.

There have been few multi-national studies to compare the effects of systems for oral health care provision on oral health behaviour and effective demand. Reporting on the First International Collaborative Study of Oral Health Care Systems (ICS 1), which was carried out in the mid 1970s, Arnljot et al. (1985) noted wide variations in the systems. Sheiham (1995) commented that ICS1 showed that utilisation of dental services did not reduce dental
Factors Influencing Demand and the Perceptions of Individuals

disease and that the availability and accessibility of even the best system did not ensure good utilisation by the public. A second ICS was performed in the early 1990s. The results indicated that, in the countries concerned, the uptake of oral health care was related to the organisation and delivery of the local oral health care system (Chen et al. 1997).

Need-Related Factors

A number of studies have shown that the number of teeth in an individual’s mouth can be one of the major factors influencing demand. The edentulous or those with few teeth visit a dentist less frequently than the dentate (Schwarz & Hansen 1976, Petersen 1983, Gilbert et al. 1990, Giff & Newman 1993, Joshi et al. 1996). Similarly, edentulousness appears to reduce the perception of need for care and so decreases demand (Gilbert et al. 1990, Schwarz 1996, Österberg et al. 1998). Tickle and Worthington (1997) reported that in a group of elderly people perceived need was influenced most by being edentulous.

A number of studies have reported that individuals who perceive a high need for oral health care contact a dentist more frequently (Gilmore & Kiyak 1985, Gilbert et al. 1990, Tennestedt et al. 1994).

The Influence of Social and Psychological Factors on Individuals’ Perceptions of Need for Oral Health Care

Traditionally, normative need for oral health care has been assessed in terms of disease-based measures of oral health in an approach derived from the medical model, in which health is equated with absence of disease (Sheiham et al. 1982). This approach has been challenged and a number of workers consider that a far broader approach which takes into account an individual’s functional, social and psychological well-being should also be considered along with the pathological processes of oral disease (Cohen & Jago 1976, Sheiham & Croog 1981, Reisine 1985). An assessment of these factors can help to explain why individuals’ demands for oral health care, based on their perceptions of need, differ from normative need. A number of studies have aimed to assess the impact of oral disease on daily life and have developed indicators. These include the socio-dental indicator – the Dental Impact of Daily Living (Leao & Sheiham 1995) and the Subjective Oral Health Status Indicator (Locker and Miller 1994). Mandall et al. (2000) have suggested that the concept of consumer-based measures for assessing oral health need may be particularly relevant to aspects of oral health care involving aesthetics such as orthodontics. Locker and Miller (1994) have considered that such measures also have a role in targeting oral health care resources, so that they can be allocated to services likely to produce the most health gain in groups “disadvantaged with respect to oral health”. Apart from factors relating to individuals’ perceptions of the impact of oral disease on daily life, others such as fashion, media reporting and an increasing awareness of the importance of disease prevention may well influence individuals’ perceptions of oral health care need.

Influences on and Perceptions of Dental Professionals

Cohen (1987) concluded that the factors associated with dental health profession-
als, in the FDI’s classification of barriers to dental attendance, had to be considered if dentists were to provide accessible oral health care for patients. These barriers were:

- Inappropriate manpower resources
- Uneven geographical distribution
- Training inappropriate to changing needs and demands
- Insufficient sensitivity to patients’ attitudes and needs

Freeman (1999) has suggested that for general practice these barriers must be considered in the same category headings as those suggested by the FDI for individuals (actual and potential patients). Thus “inappropriate manpower resources” and “uneven geographical distribution” equate with “lack of access” in the list of barriers to individuals. “Training inappropriate to changing needs and demands” equates to “lack of perceived need” and “insufficient sensitivity to patients’ attitudes and needs” to the influence of the psycho-social factors for individuals of “anxiety and fear and financial considerations”. All of these barriers influence effective demand for oral health care.

There have been a number of surveys of the public’s perception of dental professionals. It seems that some of these perceptions cause patients to change dentists and may deter some individuals from seeking oral health care. Newsome and Wright (1999) classified patients’ comments under five headings:- technical competence, interpersonal factors, convenience, cost and facilities.

**Technical Competence**

Newsome and Wright (1999) concluded that this was seen as a key determinant of patient satisfaction in many studies. However, although this may be the perception of dentists, people find it hard to assess the technical quality of services with any accuracy (Zeithaml & Bittner 1996). A study in which the quality of restorations was assessed by dentists and patients concluded that simply practicing dentistry with a high degree of expertise did not necessarily convince patients that they had received high quality dental care (Abrams et al. 1996).

**Interpersonal Factors**

Communication skills, “caring” and information provision, including fully explaining procedures and costs, were the factors most commonly identified as being important to patients. In a recent survey in the UK, 90% of patients who responded, rated “care and attention” as very important, while the three other related factors of “pain control”, “dentist puts you at ease” and “safety conscious” were rated as very important by 73% or more of respondents (Holt & McHugh 1997). In two large UK studies, poor communication was a common criticism by patients. This included a lack of clarity about whether patients were being treated under NHS or private contract and no publicised scale of charges in some practices (Finch 1988, Land 2000).

**Convenience**

A number of studies have investigated convenience (Handelman et al. 1990, 1996, Janda et al. 1996, Holt & McHugh 1997). Factors assessed included after hours clinics and nearness to shops and health centres. In general, this group of factors was not weighted as highly as
interpersonal skills. Janda et al. (1996) concluded that dentists should not emphasize location and convenient parking but should focus on professional competence, personality and attitude.

**Costs**

This topic has already been reviewed.

**Facilities**

In many studies this factor was not viewed by patients as very important. For example, “practice décor” was rated as the least important factor by respondents (Holt & McHugh 1997). However, in one American study comfort of seating in the waiting area, magazine selection and background music were shown to influence patients (Andrus & Buchheister 1985).

**Influences and Perceptions of Funders and Legislators**

Although patients frequently pay dentists directly for their treatment and as such could be described as funders, in this section the term is used to describe third party funders. In terms of the provision of care, such third party funders include insurance companies (both private and state) and government departments and agencies. However, although there are some totally privately funded dental schools, the education of dentists invariably takes place in institutions which are wholly or partially state funded. Governments also play a role in setting regulations for the practice of dentistry, through policymaking and legislation, even in countries where there is very little publicly funded provision of oral health care. Hence the term “legislators” is included in the title of this paper. The 1985 FDI general assembly considered the problem of converting unmet need for oral health care into demand and used the term “society” to describe funders and legislators. This is understandable as funders and legislators are in effect the representatives of society. Cohen (1987) reported that the FDI general assembly considered that society could create the following barriers to the conversion of unmet need for oral health care into demand:

- Insufficient public support of attitudes conducive to health
- Inadequate oral health care facilities
- Inadequate oral health manpower planning
- Insufficient support for research

The first barrier implies that the leaders of society should promote an improvement in attitudes to health and oral health. The second may well relate to the system for the delivery of oral health care. The third may be a result of poor oral health workforce planning and either training an insufficient number of oral health care workers or training them inappropriately. The fourth did not include education of the oral health care workforce, which is directly related to workforce planning. However, most oral health care research takes place in or is co-ordinated by the staff of dental schools. It can therefore be considered that there is a close relationship between education and research in oral health. In order to address these issues reliable data are necessary. Two questions arise: do these data exist and are they reliable?
It is the role of the funders and legislators to try to minimise the barriers. The task of addressing the first barrier (changing public attitudes to health) inevitably leads to the development and publication of national reports and strategies such as *Oral Health in America: A Report of the Surgeon General* (Department of Health and Human Services, U.S. Public Health Service 2000). This sets out an action plan to change the perceptions of the public, policymakers and health providers regarding oral health and disease so that oral health should become an accepted component of general health.

In some countries pressure to address the consequences of the barriers may come via the parliamentary process. However, oral health care competes for public funds with all other aspects of health and other public services and change may be slow, as may be the publication of the results of oral health surveys in scientific journals. For example, in the UK there were some 564 parliamentary questions on dentistry during the 1994/95 session, of which 307 related to access to oral health care for either individuals or populations (Sarll 2001). A number of studies including Allen et al. (1992) had reported on the perceptions of patients that access to NHS oral health care was poor in some parts of the country. This view was reinforced by a postal survey carried out at the end of 1994 (Falcon & Hurst 1998). A further survey, carried out in the summer of 1999, indicated no improvement (McGrath et al. 2001). An estimated two million people were identified as having unmet demand for primary dental care in 2000 (Department of Health 2000). In response the Government have implemented a plan which incorporates a number of initiatives, including the establishment of dental access centres (Department of Health 2000) and is conducting a review of the oral healthcare workforce.

Although membership of the European Union (EU) does not require states to modify their health care systems, Widström (2000) has suggested that in the long run there will be pressures for social and health policies to be co-ordinated. It is therefore important that dental professionals and planners have a clear understanding of the systems for the provision of oral health care and their relative costs in the different member states of the EU. There is also freedom for EU citizens to work anywhere in the Union suggesting that workforce planning should therefore be conducted at a European as well as a national level. For seven professions this freedom of movement is supposedly “underpinned” by comparable training standards in each member state.

**Conclusions**

A range of factors which have little to do with biology or pathology have influenced the prevention, diagnosis and treatment of oral diseases. They include national and local policies, costs, health beliefs and the attitudes and education of dental professionals and the public. The review set out in this chapter indicates that factors relating to demand for oral health care have been comprehensively studied. There have also been large numbers of epidemiological studies to assess normative need, which have historically been used as a basis for planning oral health care provision. There is now a view that social and psychological factors should also be taken
into consideration when such planning takes place. A number of questions, which effect policy makers and legislators at all levels (local, regional, national and European), should be considered. They relate to the reliability of epidemiological surveys and to the availability and quality of information on the following European issues: the comparison of systems for the provision of oral health care and the cost of this provision, oral health care workforce numbers and the education of members of the dental workforce. The problems relating to these issues are set out in the next section “statement of the problem”.

References


Introduction

In the 1970s, the natural history of periodontal disease involved accumulating dental plaque, causing tartar, leading to the formation of pockets, with bone loss causing loss of teeth. Everyone was deemed to be exposed to periodontitis. Deficient hygiene and age were major risk factors.

Burt (1993) sums up the concept prevailing at the time:

- Gingivitis develops into periodontitis, with associated destruction of bone tissue and possible tooth loss.
- All subjects are exposed to periodontitis, which may develop to the point of affecting the teeth. The severity of periodontitis increases with age.
- Periodontal disease is the main cause of tooth loss after the age of 35.

Our knowledge of periodontal disease has made great progress over the last few years (Baehni & Bourgeois 1998, Hancock & Newell 1993). It has in part been epidemiological data which have opened up new hypotheses regarding etiology, pathogenesis and management (Armitage 1996). New descriptive and analytic epidemiological methods – associated risk factor quantification, in particular – have played a role in improving the model. Microbiology studies have pinpointed the role of certain specific bacterial strains. New explanations have been put forward as to host-response and resistance.

Clinical research has come up with new treatment strategies to slow down disease development and to reconstruct the periodontal structures. Epidemiology has further enabled the distribution of periodontitis in various populations to be measured and certain risk factors to be identified (Beck 1990).

Among such risk factors, we can distinguish the innate and the acquired. Innate risks factors include gender, genetic fac-
tors, congenital immune deficiency, phagocyte dysfunction and syndromes such as Down’s syndrome. Poor hygiene, age (Ajwani & Ainamo 2001), certain medical drugs, smoking (Berstrom et al. 2000, Hashim et al. 2001), acquired immune deficiency, acquired endocrine disorder (Meyle & Gonzales 2000), stress, and nutritional factors figure among the acquired or environmental risk factors. It has recently been suggested that mild untreated periodontitis constitutes a risk for general well-being and health, especially with respect to cardiovascular (Armitage 2000) and respiratory disorder, pre-term birth (Oiffinbacher 1996), and diabetes (Katz 2001). Current epidemiological findings have indeed pointed to a link between such risk factors and periodontal affections, but any causal relation as such still needs to be posited with the greatest caution. 

It is also worth highlighting certain specificities of epidemiological research as compared to clinical studies and case reports:

- it is groups rather than individuals which are focussed on;
- subjects both with and without relevant conditions are included, the study aiming as it does at risk assessment (AAP 1996).

Methodological issues

Classification

Classification of periodontal disease has developed greatly over the last few years (Kinane 2001). The 1993 European Periodontology Symposium deemed the classification unsatisfactory as it then was, especially inasmuch as different pathologies presented important areas of overlap (Armitage 2000). There was also noted to be a lack of precise information on treatment quality, patient acceptance and tissue response – especially as regards treatment-resistant periodontitis (Attström & van der Velden 1994).

Changes in the classification of childhood and teenage periodontitis are typical here. Saxen noted in 1980 that only the form localised in the incisors and first molars represents acute juvenile periodontitis as a clinical entity. It has recently been suggested that the distinction between early and adult-onset periodontitis is mainly epidemiological, based on the observation that periodontitis is less frequent in young children and young adults (Tonetti & Monbelli 1999). And finally, diagnoses of localised juvenile periodontitis, generalised juvenile periodontitis or epithelial attachment loss are now classified as aggressive periodontitis (Najib 1997). The recent 1999 Workshop for a Classification of Periodontal Diseases and Conditions (AAP 1999) altered the previous 1986 American Academy of Periodontology (ADA 1998) classification, which had divided periodontitis between:

- aggressive periodontitis – previously known as early onset periodontitis (EOP).
- necrotizing periodontitis
- periodontitis associated with systemic disease
- adult periodontitis.

Case definition

In theory any epidemiological study should be founded on an updated and standardised definition of the pathology in question. In periodontology, unfortunately, no such definition exists, and the criteria have not been definitively laid
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down. Epidemiological studies have deployed a variety of clinical parameters, such as gingival inflammation signs, pocket depth on probing, measurement of loss of attachment, or bone loss on X-ray. Diagnostic criteria tend to vary from one author to another. And then there is a wide variety of terms used to define a periodontal pocket as “deep” or “pathological” or again to define the “level of clinical attachment”. And finally, there is no agreement on how to define the various categories of periodontitis (e.g., aggressive periodontitis).

Moreover, the number of surfaces which need to be affected for a subject to count as a clinical case – i.e., as suffering from periodontal disease – varies greatly from author to author. Such incoherence obviously vitiates data on the distribution of the disease (Papapanou 1996).

Diagnostic criteria often differ from one author to the next. Examination conditions are variable. There is also a clear confusion in the utilisation of data between the relatively few epidemiological studies in the literature on the one hand and clinical research on the other.

**Recommended case definition**

The various forms of periodontal diseases are of infectious origin. Most present as chronic disease with a slow development which is irreversible in the advanced stages even if the infectious agent has been eliminated. The pathology is further characterised by repeated attacks, often affecting several sites neighbouring one or more teeth. Finally, the developmental pathway of the disease is not currently well established, which leaves many problems in measuring the active phase and in case definition (Beck & Löe 1993).

**Number of sites measured**

The previous concept of universal exposure has given way to one of individual exposure. Since periodontal disease has come to be seen as site-specific, clinicians and researchers have stressed the importance, from the point of view of the natural history of the disease, of monitoring as many different sites as possible so as to optimise the chances of detecting the disease under way. A broader case definition is in terms of one or more sites with at least 2 mm loss of attachment (NIDR 1987).

The most commonly monitored sites are proximo-vestibular, disto-vestibular, medio-vestibular, proximo-lingual, disto-lingual and medio-lingual. Cost, patient impact and intra- and inter-examiner variability, however, need to be taken account of. Priority should be given to directly visible sites, so as better to control for intra- and inter-examiner variability (Kingman 1991). Underestimation of prevalence does not seem to be directly proportional to the insufficiencies of measurement, inasmuch as certain sites are more liable to become sensitive to proximal and distal periodontal pockets and to medial recession than are others.

It is to be borne in mind that linear measurements of specific sites may fail to represent the true extent of the root’s loss of conjunctive attachment. They are at best a record of disease history, and make no distinction between an on-going destructive process and a situation which has stabilised itself (ADA 1998).

The ability of partial recording to reflect the overall mouth situation is to be underlined. The logic of epidemiology calls for simplified partial indices (Barnes 1986). The WHO recommends data recording by sextant. The prevalence of subjects with at
least 4 mm attachment loss is probably underestimated by 13% in general or partial examination. In Diamanti-Kipioti et al.’s study (1993), the partial recording system found a mean 3.2% of deep pockets per subject, and 19.5% of subjects with at least one such pocket, as against 5.0% and 47% respectively per overall recording of all the circumference.

Impact of missing teeth

Tooth-loss may be the terminal result of destructive periodontitis. Teeth lost as a sequela of disease tend not to be recorded as such, which leads to significant underestimation of prevalence and severity. Tooth-loss risk factors fail to be identified, and the role of periodontal disease underlying extraction is not fully acknowledged (Papapanou 1996).

Natural pathology studies

Longitudinal descriptive studies are rare, which – over and above a failure to describe the natural history of periodontal diseases – underscores the difficulty of estimating incidence. Research needs to be supported in view of the current issues concerning such diseases. Beck and Koch (1994) studied the progress of attachment loss over a 3-year period in a sample of elderly persons in North Carolina. 13.2% of sites with deep pockets at the start of the study showed at least 3 mm attachment loss over the observation period, whereas only 4.7% of sites with pockets shallower than 3 mm presented attachment loss. The authors argue for a process of attachment loss by randomised active phase; sites losing 3 mm of attachment or more over the first 18 months of the study were no more liable to lose 3 mm or more over the following 18 months than were sites which had undergone no attachment loss during the first period.

Indices

There is no consensus in the literature as to recommendations for the use of a representative epidemiological index of the periodontal situation (Baehni & Bourgeois 1998). Barnes (1986) listed and categorised the proposed indices under signs, symptoms and associated etiological factors, and concluded that, in 1986, there was no satisfactory public health index able to provide objective information as to distribution, prevalence, incidence and treatment needs in populations. Given the variety of indices used in periodontology over the last 20 years, comparisons between the available data are hard to draw (Skrepcinski & Niendorff 2000).

Present-day epidemiology assesses periodontal disease with periodontal indices measuring pockets and recording bone-loss on X-ray (Gilbert 1994). Pocket measurement provides reproducible quantification of periodontal destruction in international units (mm). Variation due to factors such as type of probe, pressure exerted, stage of pathology, examination site, or inter-examiner error, make standardisation and calibration necessary (ADA 1998).

Use of the Community Periodontal Index of Treatment Needs (CPITN) (Ainamo 1982) to assess prevalence of periodontal disease is controversial and indeed considered inappropriate by the scientific community (Baelum & Papapanou 1996). Such partial recording indices underestimate prevalence and severity (Papapanou 1996). Thus, Locker et al. (1998) excluded...
publications using this index from their 1998 review of epidemiology and periodontal disease in older adults. The main objection is that the CPITN’s partial methodology seriously underestimates the prevalence and severity of periodontal pockets in adults, failing as it does to detect a substantial proportion of affected subjects (Baelum 1996). Likewise, CPITN scores do not correlate strongly with attachment-loss scores, but tend to overestimate prevalence and severity in younger (15-29 year-old) subjects and to underestimate them in the older (over 50) population. Nevertheless, this index presently remains the WHO reference, enjoying its own standardised international data bank since 1982, with 1,000 references (Baehni & Bourgeois 1998).

The clinical attachment level is the vertical distance (in mm) from the enamel-cement junction to the clinical periodontal attachment point. Carlos et al. (1983) propose an Extent and Severity Index (ESI). “Extent” represents the proportion of examined sites presenting a clinical attachment level of a given threshold (classically, 2 mm or more); “severity” represents the mean level of clinical attachment per subject per site presenting this threshold.

Attachment loss represents the difference in clinical attachment measurements at two points in time, indicating the degree of additional loss during that interval.

Bone loss represents the total vertical loss of alveolar bone at the proximal or distal surface of the tooth, expressed in mm or as a percentage of the total root length (Papanou & Tonetti 2000). Like attachment level, attachment loss and bone loss can be expressed in terms of extent and severity.

Attachment loss indices have become popular in periodontal epidemiology; methodological research in 1995 and 1996, however, showed that the extent and severity of attachment loss varied significantly according to the tooth or the site measured, the type of probe used (Papanou et al. 1993, Mayfield 1996), and even the method of analysis. In methods used for national-level screening for pockets and attachment loss, sensitivity varied from 0.24 to 0.87 in high-prevalence populations (Fox 1992).

Inter- and intra-examiner quality and variability, rarely gone into in the literature, doubtless represent the most critical point with respect to this index, especially when used for data collection by site, with a possible $32 \times 6 = 192$ sites. Certainly valid in a context of clinical research, its usefulness – given its reliability and the costs inherent in its deployment – remains to be proved as far as population-based studies are concerned.

Recommended surveillance (WHO)

The reference method uses WHO recommendations with an exploratory-type sampling method. This is a stratified cluster survey technique intended to include the main population sub-groups liable to be affected to one degree or another and to cover a standard number of subjects per age-group, whatever the location. Such exploratory surveys may be classified as national, regional or local pilot studies.

The exploratory method is based on stratified sampling, including the main population sub-groups presenting different degrees of disease. This method provides a fast and economic means of estimating the overall prevalence of periodontal diseases.
in the population and identifying the major variations in severity among the various subgroups.

In countries with well-developed dental healthcare systems, data are collected from sentry sites, dental clinics, insurance companies and national health information systems. In communities with little or no dental health care, special community surveys are called for. A 5-year period is recommended for harvesting information at a national level.

Minimum information collection

Aggregate data

Attachment loss (WHO 1998)

Pocket depth gives an indication of the extent of periodontal attachment loss. But this measure is unreliable in case of gum retraction. When the enamel-cement line is not visible and the upper value of the community periodontal index for a sextant is less than 4, any periodontal attachment loss for the sextant in question is estimated at less than 4 mm. The degree of attachment loss is recorded in terms of the following codes:

0 – Periodontal attachment loss 0-3 mm (enamel-cement line invisible, and community periodontal index 0-3)

If the neck of the tooth is not visible and the community periodontal index equals 4, or if the neck is visible:

1 – Periodontal attachment loss 4-5 mm
2 – Periodontal attachment loss 6-8 mm
3 – Periodontal attachment loss 9-11 mm
4 – Periodontal attachment loss 12 mm or more

x – Sextant not included (less than 2 teeth present)
9 – Data not recorded (enamel-cement line is neither visible nor discernable)

Community periodontal index (WHO 1998)

Three periodontal status indices are used for this assessment: bleeding gums, tartar under the gums, and periodontal pocket. A light CPI probe, with a 0.5 mm spherical tip and marked with a black band at between 3.5 mm and 5.5 mm and black rings at 8.5 mm and 11.5 mm from the tip, is used.

Sextants. The mouth is divided into sextants, defined by the teeth numbers: 18-14, 13-23, 24-28, 38-34, 33-43, and 44-48. A sextant is only to be examined if it contains at least 2 teeth which are not due for extraction.

Index teeth: in subjects under 20 years of age, only 6 index teeth are examined: 16, 11, 26, 36, 31, and 46. In children under 15, only bleeding and tartar deposit are taken into account. In adults over 20, the teeth to be examined are: 17, 16, 11, 26, 27, 36, 37, 31, 46, and 47. The 2 posterior sextant molars are coded together and, if one is missing, it is not replaced. If there is no index tooth present in a given sextant, all the remaining teeth in it are examined and the upper value attributed to the sextant. The distal sides of the third molars are not assessed.

Codes for examination and data recording:

0 – Healthy tooth
1 – Bleeding detected on exploration
2 – Tartar detected during exploration, but the black band of the probe remains perfectly visible
3 – 4-5 mm pocket
4 – 6 mm pocket or greater
X – Sextant not taken into account (less than 2 teeth present)
9 – Data not recorded

**Case data for survey and notification**

The information needed for effective and usable assessment of periodontal diseases prevalence relates to:

- Year of study, number of cases, region and population covered by the survey, information quality level (national, near-national, regional, local, informative), type of locality (urban, suburban, rural)
- Reference age-groups: i.e., 12 years (sub-gingival tartar and bleeding only), 15 years (sub-gingival tartar and bleeding only), 35-44 years, 65-74 years.

**Recommended data analysis, presentation and reports** (Benamghar et al. 1994)

- Percentage of subjects showing healthy periodontal tissue; percentage of subjects showing bleeding only; percentage of subjects showing tartar only; percentage of subjects showing 4-5mm pockets; percentage of subjects showing deep (at least 6 mm) pockets.
- Mean number of sextants with healthy periodontal tissue, bleeding or higher value, 4-5 mm pockets or higher value, and number of sextants excluded from examination.
- Number and percentage of subjects with attachment loss per highest score
- Mean number of sextants with attachment loss per highest score, mean number of sextants excluded from examination, and number of unrecorded sextants.
- Morbidity per age-group, ethnic group, place of residence, and type of locality.

**Main uses of the data generated**

- Assessment of the scale of periodontal problems at national, regional and local levels.
- Identification of population needs with regard to prevention and treatment for periodontal problems.
- Providing information on severity and development of disease, and an idea of whether it is increasing or diminishing.
- Identification of high-risk sub-groups.
- Assessment of how far existing dental health care services meet current needs.
- Assessment of type and scale of prevention and/or cure services required.
- Resources needed to set up, maintain and extend or reduce dental health programmes, including an estimate of the number and type of personnel required.

**General results**

**Overall**

New concepts have emerged from the development of epidemiological research. In the present state of the art, they may be summarised as follows:

- Adult periodontitis is a multi-factor disease;
- Periodontitis is caused by specific bacteria;
- The host's immuno-inflammatory response, while protective, leads to destruction of tissue;
- Periodontitis develops over phases of attachment loss;
- Sensitivity to periodontitis varies across individuals;
- Innate and environmental risk factors contribute to sensitivity to periodontitis.
**Gingivitis**

Gingivitis varies widely from one study to another. Such differences are probably more a matter of methodology than of real differences in the disease itself (Jenkins & Papapanou 2001). Gingivitis is widespread. Prevalence, severity and extent in young subjects increases with age, beginning with milk-teeth, reaching a peak at puberty, and then declining somewhat during adolescence.

Cutress et al. (1986) found that 96% of a New Zealand sample of 15-19, 25-29 and 35-44 year-olds presented gingivitis. Gingivitis was found in 34% of all sites examined. Ganghwin et al. (1999) found a prevalence of 85% in 5-6 year-olds in Australia, and 24% in 6-74 year-olds. In the USA, 14% of 6-11 year-olds and 32% of 12-17 year-olds presented gingivitis, the percentage in adults varying from 29% in younger to 13% in older subjects (Albandar & Kingman 1999, Jenkins & Papapanou 2001). Brown and Löe (1993), working from national probabilistic studies in the US and Denmark, reported 60% prevalence for teenagers and 40-50% for adults. Only 5-6% of gum sites showed inflammation. In comparison with studies dating from the ‘50s and ‘60s, they suggest gum health is improving, possibly due to the improved dental hygiene observed in industrialised countries as a whole, but also in a context in which no scientific or methodological guarantees exist.

At population level, the incidence of dental plaque and gingivitis is appreciably higher in boys than girls. Improved dental hygiene seems to have reduced gingivitis in a number of industrialised countries. Overall, available epidemiological data do not enable the hypothesis of a reduction in periodontal disease to be confirmed, due to a lack of perspective on the natural development of these pathologies (Papapanou 1996).

**Early-onset periodontitis**

Epidemiological data on childhood, teenage and early adult periodontal disease are scarce, and the methodological context is precarious. There has in fact been no recent epidemiological programme that might serve as a reference for the validation of epidemiological hypotheses.

Regarding milk-tooth periodontitis, data are limited. Jenkins and Papapanou (2001) suggest a rate of 5% in Caucasian children. Only a few sites were affected, and attachment and bone loss were variable. Very rarely, severe generalised periodontitis can affect milk teeth. Such cases are classically associated with major systemic disorder.

Loss of periodontal support due to periodontitis is the norm among most teenagers. This tends to be a matter of minor attachment or bone loss. Early periodontitis shows a 0.1-3.4% prevalence among young adults (Wisner-Lynch & Giannobile 1993). It is thus relatively infrequent in the population as a whole (Papapanou 1996). In the USA, prevalence at 14-17 years is below 1%, and reaches 3.6% by 18-34 years of age (Oliver & Brown 1993). Localised early-onset periodontitis is 4 times as frequent as generalised early-onset periodontitis. The proximal surfaces of the first molar are the sites most frequently affected by periodontitis and progressive destruction.

Non-normal periodontal destruction has been noted in teenagers. Stabholz et al.
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(1998) reported 38.4% prevalence in a specific Israeli population. Such differences are attributed to race, ethnicity, variations in available preventive dental health care, and gender (Wagaiyu & Wagaiyu 1992). Thus, localised juvenile periodontitis is considered to be higher in non-industrialised (0.3%) than industrialised countries (8%). Prevalence and extent of attachment loss were greater in Indo-Pakistanis than in Caucasians (Clerehugh 1993).

Necrotizing periodontal disease peaks in young adults, but is infrequent in industrialised countries, although found more frequently in HIV-positive subjects than in the population as a whole. In non-industrialised countries, young children already suffering from infection and malnutrition are at high risk of necrotizing periodontal disease with possible loss of facial tissue. Finally, smoking has been identified as a risk factor for periodontitis in young adults.

**Adult periodontitis**

Moderate attachment loss has been reported in a relatively high percentage of adults and elderly persons, severe loss being confined to a minority of subjects. Severe loss is further limited to a few sites, and is found to affect only a certain proportion of these sites on examination (Burt 1994). Some 1 in 5 adults present more generalised attachment loss. The rate is higher among older subjects. Similar findings apply in the case of bone loss (Locker et al. 1998).

The few incidence studies suggest that 50-75% of adults experience attachment loss in at least one site over relatively short periods (Burt 1994, Norderyd & Hugoson 1998, Hugoson & Laurell 2000). However, relatively few sites examined showed additional loss, so that – despite the high incidence rates – extent and severity remain low.

Many factors have been found to be associated with incidence and prevalence. Most are more to be considered as risk markers than as risk factors as such. At present, the evidence that smoking and particular periodontal pathogens play a causal role is stronger than for most other suggested risk factors (Berstrom et al. 2000).

Most studies world-wide report a 10-15% prevalence for severe periodontitis, defined as 6 mm or more attachment loss on one or more sites. The main change with respect to the previously described model is that 5-20% of the population suffers from a severe generalised form, even if a mild form of the disease affects most adults. Severe forms are more commonly found in young adults. Estimates of 80%, however, have been made for certain regions, although it cannot be affirmed that such diversity is real and not an artefact of methodological bias in sampling or examination. In the USA, moderate periodontitis, with one or more sites presenting at least 3 mm attachment loss, was estimated at 44% at 16 years of age, and at 80% between 18 and 64 years. Advanced periodontitis, with one or more sites presenting at least 5 mm attachment loss, also depended upon age, and affected 13% of the population. In the USA, this rate means at least 20 million people affected by advanced periodontitis. On the basis of a national study run from 1988 to 1994, with a stratified sample of 9,689 persons aged
between 30 and 90 years, Albandar and Kingman (1999) estimated that 23.8 million persons had at least one dental surface with at least 3 mm recession; 53.2 million had gum bleeding; 97.1 million had tartar; and 58.3 million had sub-gingival tartar: i.e., 22.5%, 50.3%, 91.8%, and 55.1%, respectively. In Europe, the prevalence of severe forms never exceeds 9% (Hescot & Bourgeois 1999). In France, the 1993 reference study for the 35-44 year age group found that 12.5% of that population had a healthy periodontium, 27% had periodontal pockets of between 3 and 5 mm, and 2% had severe forms with mean sextant damage of 1.3 (Bourgeois et al. 1997).

The periodontal health of the 65-74 years age-group depends strongly on the rate of edentulousness, which varies widely from one country to another in Europe (12.8% in Italy, 16.3% in France, 58% in the U.K., and 65.4% in the Netherlands) (Bourgeois et al. 1998).

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The development of the extended youth consultation

Jaap P. Veerkamp

Introduction

In the Netherlands the preventive efforts of the last twenty years have resulted in a large reduction of dental caries prevalence in children. This achievement however results in cutting back the finances used for the national preventive campaigns. This project deals with the idea to reallocate the finances for preventive measures and its long term consequences. Nowadays the 12-yr old Dutch children are amongst the dentally healthiest of Europe. The quality level of the teeth of the 5-yr olds however lies far behind that of their 12-yr old counterparts (Kalsbeek et al. 1994, Kalsbeek et al. 2000). The increase of dental caries in this young group seems to be visible in more western European countries (Haugejorden 2002). Between 1994 and 2000 the number of caries free 5-yr old children in the Netherlands went down from 55% to 51% and in the caries group the ds figure went up from 2 to 3, a 50% raise, where the percentage of restored teeth went don from 25% to 12%, a 50% reduction. Now it can be hypothesized that the dentist general practitioner (GP) has an increasing difficulty in treating children. On the other hand it has been assessed that the dental situation at the age of 4-5 years is a predictive measure for the relative caries risk of children (Roeters 1992, Billings et al. 1994) and has to be considered as a starting point for further monitoring of its preventive measures. Children’s poor dental health in the past led to a number of clearly well structured preventive measures. Those measures (fluoride applications and rinsing, group instructions, national campaigns and the use of fluoridated toothpaste) gave a maximum effect. Those large scale measures are a relatively simple and not expensive method to create results in large groups of people. When the dental health of the group increases the 80/20 rule will apply: with an original 20% effort an 80% result can be achieved. To reach the last 20% of the result, 80% of the effort is needed. Preventive measures do minimise the morbidity, but increase the costs of national

1. Academic Centre for Dentistry Amsterdam (ACTA), The Netherlands
health. In the discussion on national health the comparison can be positively influenced by a better identification of groups at risk for illnesses and replace group measurements with individual strategies when the group measurements are not cost effective anymore. In the dental situation we do need an individual caries risk assessment. This will only be possible when the groups that need this increased attention can be identified (Powell 1998).

Nowadays dentist it expected to “gives adequate information that is based on up-to-date scientific knowledge, informing the patient sufficiently enough for an informed consent” (Raadgevend Comité 2000). Translated to preventive measures the dentist should be able to answer questions like “How many cavities will my child have?” or “How many of those cavities can you prevent?” or, finally: “What are the costs of your preventive measures to prevent one cavity?”

Research shows us that the dentist’s clinical estimate of the condition of a person’s teeth differs widely. Variation in nominating a child “at risk” differs between dentists up to three times based on their clinical view (Alanen et al. 1994). For the patient this is difficult to understand, no matter he is in the group of false positives or false negatives (van Loveren en Veerkamp 2002).

Introduction of the EYC
(Extended Youth Consultation)

Let’s go back to the preventive dental measures. When group preventive measures have to turn into individual preventive strategies, we will need to identify the groups that are likely to develop dental caries. The matter has been studied extensively. This report focuses on the additional diagnostics tools that are needed, for instance by changing the half year check-up into a yearly extended youth consultation (EYC) to identify the children at (dental) risk.

In a committee, organised by the Dutch Dental Association (Nederlandse Maatschappij Tandheelkunde, NMT), the matter was studied extensively. Logistical and financial consequences were studied by a task group (POJG) and a test model was developed and applied in a try out project. The committee was asked to study on the following:

- Assessment of the dental risks for the child’s developing teeth that need further adjustment within a check-up period.
- How can the GP positively influence these dental risks?
- How often should the dentist see a child at risk to prevent further deterioration or even to improve the quality of the child’s teeth
- Can this be achieved by a yearly, more extensive check-up?
- Will a yearly check-up interval not be harmful for the children’s teeth?

The condensed aim of the evaluative study was to see if the caries risk could be assessed using appropriate parameters to transfer the finances, (unnecessarily) spend to the healthy group, to the groups/individuals at risk.

Age and dental risk periods: the Milky Way

In the development of the child’s teeth some repetitive aspects occur, needing close monitoring (e.g. oral hygiene). Some are related to growth and development of
The development of the extended youth consultation

the child, needing continuous attention, some others occur incidentally, but mostly within rather demarcated periods (e.g. nursing bottle caries, developmental disturbances in the first molars). After treatment they do not need further attention. Some of those aspects are important parameters for the caries risk assessment of the child. The use of the parameters can be put into protocols.

Risk is an age related phenomenon. In the Milky Way schedule below the quiet periods can be found. The “red” periods will create a higher number of children at risk.

**EYC attention areas**

| Age in years | 1 yr | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|--------------|-----|---|---|---|---|---|---|---|---|-----|----|----|----|----|----|----|---|
| Assessment caries risk$^a$ | | | | | | | | | | | | | | | | | |
| Preventive attitude$^a$ | | | | | | | | | | | | | | | | | |
| Cooperation$^a$ | | | | | | | | | | | | | | | | | |
| Developm.l disturbances | | | | | | | | | | | | | | | | | |
| Oral habits | | | | | | | | | | | | | | | | | |
| Approximal caries | | | | | | | | | | | | | | | | | |
| Fissure caries | | | | | | | | | | | | | | | | | |
| Feeding habits | | | | | | | | | | | | | | | | | |
| Periodontal problems | | | | | | | | | | | | | | | | | |

- **Score:**
  0: no plaque, no bleeding upon probing
  1: limited amount of dental plaque
  2: clearly visible plaque and bleeding upon probing


**Individual criteria for dental risk**

Using direct criteria the dental risk can be assessed easily. Evidence based criteria are:

- **Prevention:** level of personal preventive care. Brushing with fluoridated toothpaste works (Backer Dirks & Kalsbeek 1987). Without dental plaque no caries will occur, but solely brushing does not suffice. (Bellini et al. 1981, Levy et al. 2003, Schuller & Kalsbeek 2003,)
exposure leads to a sense of control of dental anxiety (Locker et al. 1996). Dentists are well able to assess dental anxiety on a simple scale (Ten Berge et al. 2002).

Score:
0: age appropriate behaviour
1: stress or anxiety during parts of the treatment
2: anxious. Overreaction on normal dental stimuli.

- **Caries.** Dental caries is the best known predictors of dental caries. (Pelkwijk et al. 1990, Roeters 1992, Vanobbergen et al 2001). Therefore children with recently developed or filled carious lesions (e.g. within the year) need to be put into a higher risk category.

Score:
0: sound, no demineralisations
1: one or two demineralisations
2: recently developed or filled lesions

*Each of the criteria above forms a separate risk category that can lead to a decisive risk assessment of the child.*

- **Caries risk:** the highest score is decisive Application of the rules above leads to the following risk categories, with risk-related preventive therapy.

0: no risk: a yearly check-up interval is sufficient
1: some risk: simple measures can be taken during the check-up session or in a separate control session.
2: risk: additional preventive measurements are needed to positively influence the caries risk; several additional appointments during the coming year.

If a child scores a 2 (risk) for one of the three categories, the child is automatically considered as a child at risk for the forthcoming year, the risk interval. For that year a higher level of preventive care is needed and paid for (Fig 1).

<table>
<thead>
<tr>
<th>Age</th>
<th>Prevention</th>
<th>Caries</th>
<th>Cooperation</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

...3 years, brushing o.k., sound teeth, not afraid: risk 0...

<table>
<thead>
<tr>
<th>Age</th>
<th>Prevention</th>
<th>Caries</th>
<th>Cooperation</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

...4 years, brushing mediocre, 1 cavity, afraid: risk 2...

**Relative frequency of the EYC**

The dental risk assessment is valid till the next EYC, after a year. Then the next risk assessment follows, resulting in a preventive planning for next year. From 5 years of age, bite wing radiographs are mandatory for refunding of the EYC. If no (initial) lesions can be found on the first x-rays, next bite wings can be made after 2-3 years. If the risk is assessed at level 2 preventive measures can be planned in the frequency the dentists considers necessary.

**Clinical try out**

The EYC was tested in a randomized group of 35 Dutch dentists. The dentist in total treated 1245 children in the period of 01-01-2003 to 01-03-2003. They assessed the caries risk for each individual child (table 1).

All dentists were well able to apply the risk assessment tool of the EYC adequately. The total reported risk group was 26,8%, which should be possible to reduce after closer instructions and guidelines. Risk assessment was related to patient’s age, dental status and preventive pattern. The dentists did not use more time with the schedule and seemed to see the EYC as a
The development of the extended youth consultation

Table 1. Risk status, as judged by the individual dentist. (n=1245).

<table>
<thead>
<tr>
<th>Risk level</th>
<th>Coöperation</th>
<th>Prevention</th>
<th>Caries</th>
<th>CPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>85.7%</td>
<td>53.3%</td>
<td>63.4%</td>
<td>41.4%</td>
</tr>
<tr>
<td>1</td>
<td>11.4%</td>
<td>36.0%</td>
<td>16.5%</td>
<td>31.8%</td>
</tr>
<tr>
<td>2</td>
<td>2.9%</td>
<td>10.7%</td>
<td>20.1%</td>
<td>26.8%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

support in the routine check-up and oral care of children teeth. The clinical use of the risk parameters is interesting.

The task force reports to the board of the NMT. A positive advice on the EYC was given. The board has to further decide on the financial consequences: develop the routine treatments that are allowed to be done in caries risk children. A further evaluative study on the financial consequences is advised.

References


Oral Health-Related Quality of Life (OHRQoL) Review of existing instruments and suggestions for use in oral health outcome research in Europe

Erik Skaret, Anne Nordrehaug Åstrøm and Ola Haugejorden

Introduction

The term “health related QoL” has no strict definition, but there is a consensus that the construct is multidimensional and captures people’s perceptions about factors that are important in their everyday lives (Slade, 2002). The oral health-related quality of life (OHRQoL) concept refers to self-reports specifically pertaining to oral health, and captures both the functional, social and psychological impacts of oral disease (Gift & Redford 1992). Shifting the purpose of measurement from disease conditions to the perceived impacts of oral diseases, the measures have varied from direct clinically based indices indicating normative needs to indirect measures of felt need in terms of self-report indicators. The measures have varied from instruments to measure single dimensions of oral health to scoring systems comprising composite socio-dental indicators or OHRQoL measures. Socio-dental indicators are defined as any measure to estimate the social impact of oral conditions (Reisine 1981) or the extent to which dental and oral conditions disrupt an individual’s quality of life. The various OHRQoL indicators are to varying extent based on a conceptual framework derived from the International Classification of Impairments, Disabilities and Handicaps (ICIDH) developed by WHO in 1980 (Badley 1987), and that was subsequently amended for dentistry by Locker (Locker 1988). The ICIDH model consists of the following key concepts: impairments, functional limitations, pain, disability and handicap. It provides a theoretical basis for the empirical exploration of the links between various dimensions of health and oral health.

Clinical studies using patient-based outcome measures have shown that they can provide new information about the effectiveness of different treatments (Heydecke 2002), and such measures are now generally accepted as the ultimate outcome of the oral health care system (Inglehart & Bagramian, 2002). The concept of OHRQoL has been confirmed and validated cross-culturally by the
ICSII study (*Comparing Oral Health Care Systems, a second international collaborative study*) in the context of a multinational investigation of oral health determinants and outcomes (Chen et al. 1997). However, the application of an increasing number of various socio-dental indicators makes surveillance and comparison of perceived oral health difficult, within and across different populations in Europe. If possible, a limited set of instruments should be recommended for use, and generally they should be efficient, easy to complete and easy to handle. The concept of oral quality of life is, however, imbued with values and thus varies according to social, cultural and political context, and therefore the efforts towards standardization of instruments are warranted in terms of agreeing upon instruments that can be recommended for use for different purposes (e.g. in population surveys, intervention studies).

A first step in selecting an appropriate OHRQoL instrument is to specify the exact purpose or aim in using such a measure in terms of being descriptive, discriminative or evaluative. The second step is to identify a measure whose properties conform to the intended study aims. In some cases there will be need for generic instruments and in other cases for more condition specific measurements. Instruments used in survey research will need specific qualities, while the use of questionnaires in longitudinal designs intended to measure change in OHRQoL on population- or on individual levels represents greater methodological challenges (Slade, 2002). It cannot be assumed that a measure proved to be reliable and valid in cross-sectional population studies will be suitable for the purpose of detecting meaningful clinical changes in a longitudinal intervention.

The latter purpose needs properties such as responsiveness and interpretability (Guyatt, Walter et al. 1987). To date, the responsiveness of many OHRQoL instruments has not been established, although there is an increasing tendency to use OHRQoL measures as outcomes in clinical trials and evaluation studies. Longitudinal studies assessing changes in OHRQoL as a time effect or in response to treatment and preventive procedures are needed (Chavers et al. 2003), to explore those qualities (Allen 2003).

For oral health related quality of life measurements, many different instruments already exist (*Table 1*). While most of the measures appear to be theory based and well tested for psychometric properties, only a few of them have been widely used by others in addition to the ones responsible for their development. There is need for an assessment aimed at presenting a priority of recommended instruments to be used for different purposes, and then plan for future research for further evaluations. The first step in this process should be to explore and evaluate existing instruments.

**Aims**

The present evaluation had the following aims: 1) Based on the existing literature, to evaluate currently used oral quality of life instruments in terms of the extent to which various psychometric properties have been established; 2) To include a few of the existing instruments in priority groups for measurement of the quality of life component of oral health in Europe; and 3) To recommend new research directions to further increase their qualities for future oral health outcome research.
### Table 1. OHRQoL instruments used in research during the period from 1985-2004.

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Abbrev</th>
<th>(# of Items)</th>
<th>Original reference</th>
<th>Long/Interv.</th>
<th>Studies used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Impact of Dental Disease</td>
<td>SIDD</td>
<td>14</td>
<td>Cushing et al. 1986</td>
<td></td>
<td>Cushing et al. 1986</td>
</tr>
<tr>
<td>Oral Health and the Sickness Impact Profile</td>
<td>-SIP</td>
<td>73</td>
<td>Reisine et al. 1989</td>
<td></td>
<td>Reisine et al. 1989</td>
</tr>
<tr>
<td>OHRQoL The DELTA</td>
<td></td>
<td>6</td>
<td>Kressin et al. 1996</td>
<td></td>
<td>Kressin et al. 1996; Jones et al. 2003</td>
</tr>
<tr>
<td>Rand Dental Health Index</td>
<td></td>
<td>3</td>
<td>Dolan et al. 1991</td>
<td></td>
<td>Dolan et al. 1991</td>
</tr>
<tr>
<td>Dental Impact Profile</td>
<td>DIP</td>
<td>25</td>
<td>Strauss &amp; Hunt 1993</td>
<td></td>
<td>Strauss &amp; Hunt 1993</td>
</tr>
<tr>
<td>Psychosocial Impact Score</td>
<td></td>
<td>42</td>
<td>Locker &amp; Miller 1994</td>
<td></td>
<td>Locker &amp; Miller 1994</td>
</tr>
</tbody>
</table>
Table 1. OHRQoL instruments used in research during the period from 1985-2004.

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<th>Original reference</th>
<th>Long/Interv.</th>
<th>Studies used</th>
</tr>
</thead>
<tbody>
<tr>
<td>German version of the Oral Health Impact Profile (OHIP 49)</td>
<td>OHIP-G</td>
<td>53</td>
<td>John et al. 2002</td>
<td>John et al. 2002 John et al. 2003</td>
<td></td>
</tr>
<tr>
<td>Oral Health-Related Quality of Life Measure</td>
<td>OHQOL</td>
<td>3</td>
<td>Kressin et al. 1996</td>
<td>Kressin et al. 1996</td>
<td></td>
</tr>
<tr>
<td>Dental Impact on Daily Living</td>
<td>DIDL</td>
<td>36</td>
<td>Leao &amp; Sheiham 1996</td>
<td>Leao &amp; Sheiham 1996</td>
<td></td>
</tr>
<tr>
<td>The Oral Health Quality of Life Inventory</td>
<td>OH-QoL</td>
<td>56</td>
<td>Cornell et al. 1997</td>
<td>Cornell et al. 1997</td>
<td></td>
</tr>
<tr>
<td>The Oral Health Quality of Life Inventory</td>
<td>OH-QoL</td>
<td>15</td>
<td>Cornell et al. 1997</td>
<td>Cornell et al. 1997</td>
<td></td>
</tr>
<tr>
<td>Subjective Oral Health Status Indicators</td>
<td></td>
<td>42</td>
<td>Newman 1999</td>
<td>Newman 1999</td>
<td></td>
</tr>
<tr>
<td>The Oral Health-Related Quality of Life Instrument for Dental Hygiene</td>
<td></td>
<td></td>
<td>Gurbury-Amyot et al. 1999</td>
<td>Gurbury-Amyot et al. 1999</td>
<td></td>
</tr>
<tr>
<td>Orthognatic Quality of Life Questionnaire</td>
<td>OQoLQ</td>
<td>22</td>
<td>Cunningham et al. 2000</td>
<td>Cunningham et al. 2000</td>
<td></td>
</tr>
</tbody>
</table>
Table 1. OHRQoL instruments used in research during the period from 1985-2004.

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<thead>
<tr>
<th>Instrument</th>
<th>Abbrev</th>
<th># of Items</th>
<th>Original reference</th>
<th>Long/ Interv.</th>
<th>Studies used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child Oral Health Quality of Life Instrument</td>
<td>COHQ OL</td>
<td>49</td>
<td></td>
<td></td>
<td>Jokovic et al. 2003</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Tapsoba et al. 2000</td>
</tr>
<tr>
<td>Child Perceptions Questionnaire</td>
<td>CPQ 13-14</td>
<td>36</td>
<td>Jokovic et al. 2002</td>
<td></td>
<td>Jokovic et al. 2002</td>
</tr>
<tr>
<td>Parental-Caregiver Perceptions Questionnaire</td>
<td>P-CPQ</td>
<td>31</td>
<td>Jokovic et al. 2003</td>
<td></td>
<td>Jokovic et al. 2003</td>
</tr>
<tr>
<td>Family Impact Scale</td>
<td>14</td>
<td></td>
<td>Locker et al. 2002</td>
<td></td>
<td>Locker et al. 2002</td>
</tr>
</tbody>
</table>

**Review**

*Table 1* shows a summary of available instruments that was used as the basis for further exploration of qualities. The overview of available instruments is based on a PubMed search covering the period 1985-2004.

Studies have shown that both additive and weighting standardized methods perform well for QoL instruments (Robinson al. 2003), but also that weighting not necessarily improves the psychometric properties (McGrath & Bedi, 2002). This methodological aspect has not been considered in this evaluation.

We believe that it might be difficult to identify one instrument that fulfils all requirements – and it seems reasonable to recommend a set of various indicators that can be used for different purposes.

Based on the review (*Table 1*), the instruments are therefore allocated to priority groups as agreed upon in the European Oral Health Indicators Project meeting (Lyon, September 2003):

Group 1: *Core indicators*. In this group we have decided to include generic instruments that have been widely tested. They have been shown to have the best qualities based on the research published so far, and are easy to use in population studies.

Group 2: *Expanded level of instruments*. In this group are included generic instruments that may represent supplements to the instruments in Group 1 as well as more condition or age specific instruments.

Group 3: *Optional level of instruments*. This group includes instruments that so far have been evaluated to a lesser extent. They may, however, by further testing show good qualities.

The selection of instruments in priority groups is shown in *Table 2*.

Our allocation of instruments to Group 1 and 2 is based on the following evaluation:

**Oral Health Impact Profile**

The original OHIP-instrument (OHIP-49) (49 items) was developed by Slade and
Spencer (Slade & Spencer, 1994) based on a conceptual framework of oral disease and its functional and psychological consequences. The instrument is divided into seven subscales (functional limitations, pain, psychological discomfort, physical disability, psychological disability, social disability and disadvantage) (Slade & Spencer 1994, Jones 1998). This instrument is widely used and tested, also in longitudinal studies to evaluate change in quality of life among elderly people (Slade 1998) and in patients with implant-retained dentures (Allen et al. 2001, Awad et al. 2003).

Shortened versions of the original scale have been developed, providing somewhat compromised instruments in terms of content validity. The OHIP-14 version is a shortened version of the original OHIP-49-item scale (Slade and Spencer, 1994). It is easy to use, and has been tested for psychometric qualities in several studies in different populations (Table 1). The OHIP-14 has been shown to have measurement properties comparable with the full 49-item version (Allen & Locker 2002). The short version instrument has also been used in clinical trials (Awad et al. 2000) and shown to be sensitive to clinical effects of treatment (McGrath et al. 2003). The fully developed instrument has also been shown to be better with respect to responsiveness than the shorter versions (Locker & Allen, 2002).

We are suggesting that both the Oral Health Impact Profile (OHIP-49) and the shortened version Oral Health Impact Profile (OHIP-14) could be included in the core group of instruments. They have both been tested extensively and shown to have good construct, discriminative and longitudinal validity.

The Oral Health Impact Profile (OHIP-EDENT) is also a modified shortened (20 items) version of the original 49-item scale. This modified version has been shown to have measurement properties comparable with the full 49-item version (Allen & Locker, 2002) and may be more appropriate for use in edentulous patients than the short version OHIP-14. We suggest that the (OHIP-EDENT) could be included as one of the Group 2 instruments (Table 2).

UK Oral Health-Related Quality of Life Measure (OHQoL-UK)

This instrument is also widely tested and used in different studies, both cross-sectional and longitudinal design. The instrument is easy to use, has shown good psychometric qualities and also found to be sensitive to clinical effects of treatment (McGrath et al. 2003d). We are suggesting that the instrument could be included in the core group.

Oral Impacts on Daily Performances (OIDP)

This instrument has 8 (9) items comprising one domain (the ultimate impacts or physical, psychological and social aspects of performance of daily living) and satisfactory psychometric qualities in terms of reliability (internal consistency and test-retest) cross-sectional construct and discriminative validity have been established in different cultural contexts (Adulyanon & Sheiham 1997, Melas et al. 2001, Tsakos et al. 2001, Masalu & Astrom 2002, Astrom & Okullo 2003, Masalu & Astrom 2003, Robinson et al. 2003).
Table 2. Proposed instrument in priority groups.

<table>
<thead>
<tr>
<th>CORE INDICATORS</th>
<th>Instrument</th>
<th>Abbreviation</th>
<th>Main domains covered</th>
<th>Recommended use</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Oral Health Impact Profile</td>
<td>OHIP-49</td>
<td>7 domains: functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability and handicap</td>
<td>Intervention Evaluation research</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Cross-sectional population studies</td>
</tr>
<tr>
<td></td>
<td>Oral Health Impact Profile OHIP-14</td>
<td>OHIP-14</td>
<td>7 domains: Functional limitation Physical pain Psychological discomfort Physical disability Psychological disability Social disability Handicap</td>
<td>Intervention Evaluation research</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Cross-sectional population study</td>
</tr>
<tr>
<td></td>
<td>UK Oral Health-Related Quality of Life Measure</td>
<td>OHQoL-UK</td>
<td>16 key areas: comfort, breath odour, general health, eating, appearance, speech, relax and sleep, smiling/laughing, confidence, mood, carefree manner, personality, work, social life, finances, romantic relations</td>
<td>Intervention Cross-sectional population research</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Oral Impacts on Daily Performances</td>
<td>OIDP</td>
<td>1 domain: disability in terms of physical, psychological and social aspects of daily performances</td>
<td>Cross-sectional population study</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Oral Impacts on Daily Performances</td>
<td>OIDP</td>
<td>1 domain: disability in terms of physical, psychological and social aspects of daily performances</td>
<td>Cross-sectional population study</td>
</tr>
<tr>
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<tr>
<td></td>
<td>Oral Health Impact Profile OHIP-14</td>
<td>OHIP-14</td>
<td>7 domains: Functional limitation Physical pain Psychological discomfort Physical disability Psychological disability Social disability Handicap</td>
<td>Intervention Evaluation research</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Cross-sectional population study</td>
</tr>
</tbody>
</table>

EXPANDED LEVEL OF INSTRUMENTS

|                  | Geriatric (General) Oral Health Assessment Index | GOHAI        | Physical function Psychosocial function Pain and discomfort                                                                                                                                                     | Cross-sectional population study |
|                  | Child Oral Health Quality of Life Instrument(including subscales, see text) | COHQOL       | Oral symptoms Functional limitations Emotional well-being                                                                                                                                                    | Cross-sectional population studies |
|                  | Orthognatic Quality of Life Questionnaire        | OQoLQ        | Social aspects of deformity Facial aesthetics Function Awareness of facial deformity                                                                                                                           | Intervention                     |
|                  | Oral Health Impact Profile (OHIP-EDENT)          | OHIP-20      | Functional limitation Physical pain Psychological discomfort Physical disability Psychological disability                                                                                                    | Cross-sectional population study |

OPTIONAL LEVEL OF INSTRUMENTS

The remaining instruments (not allocated to groups 1 or 2) may by further testing show good qualities, but we find no basis for any kind of priority assignment in this group.
The instrument consists of eight items covering physical, psychological and social performances (eating and enjoying food, speaking and pronouncing clearly, cleaning teeth, sleeping and relaxing, smiling, laughing and showing teeth without embarrassment, maintaining usual emotional state without being irritable, carrying out major work or social role, and enjoying contact with people) (Adulyanon & Sheiham, 1997). The scale assesses the frequency and the severity of the impact. The scores are weighted for each item and then summed to a total OIDP score. It is easy to apply in large population studies being short and in evaluating the ultimate outcomes of oral diseases. It is also easier to assess psychometric properties of behaviours compared to concepts like feelings, evaluations etc (measures reflect underlying phenomena). Recent research indicates that the instrument is responsive to change (Locker et al. 2004), and we find this instrument so promising that it is proposed as one of the core group instruments.

Geriatric (General) Oral Health Assessment Index (GOHAI)

This instrument was developed and tested by Atchison and Dolan (1990) for evaluating functional status, pain and discomfort, worry, ability to chew and swallow, and social functioning. The initial testing showed satisfactory psychometric properties, but correlated only weekly with some of the oral status indexes. The scale has been widely used, and also tested longitudinally for changes in perceived oral health among elderly (Dolan et al. 1998, Locker 1998). The instrument is age specific and could be one of the Group 2 instruments (Table 2).

Child oral health related quality of life questionnaires

The Child Oral Health Quality of Life Questionnaire (COHQOL) has been designed to assess the impact of oral and orofacial conditions on the quality of life of children and their families (Jokovic et al. 2002). The Family Impact Scale is one component of the COHQOL and consists of Child Perception Questionnaires (CPQ 11-14 and CPQ 6-10) and the Parental-Caregiver Perceptions Questionnaire (P-CPQ). Dependent on the age of the children, child oral health-related quality of life has to be measured either based on the caregiver’s or the child’s own views. Studies have indicated that both the views of the caregiver (measured by PPQ) and of the child itself (CPQ 11-14) should be included to fully represent child oral health-related quality of life (Jokovic et al. 2003). This child oral health related quality of life questionnaires could be included in the expanded level of instruments group as a supplement to the core group instruments.

Orthognatic Quality of Life Questionnaire

The OQoLQ is a condition-specific instrument for patients with severe dento-facial deformities requiring orthognathic treatment (Cunningham et al. 2000). We suggest that such condition specific instruments should be included in the expanded level of instruments group.

Directions for future research

No single instrument can be regarded as a standard, comprehensive instrument for measurement of OHRQoL. There will always be a need for generic and more dis-
Oral Health-Related Quality of Life (OHRQoL)

eases-/condition specific instruments. Characteristics of a good instrument may differ for group comparisons for public health purposes compared to measurement of within-subject changes. The present evaluation clearly shows that there is need for more research to be able to recommend a final list of core instruments that should be used in different types of research exploring OHRQoL aspects. A lot of methodological issues are still not finally evaluated for the assessment of quality of life aspects in Europe. Future studies should be designed to test the instruments’ discriminating qualities for different kinds of interventions in different age groups and European populations. The present list should be regarded as preliminary and as a basis for the selection of instruments for future studies.

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Kressin NR, Atchison KA, Miller DR. Comparing the impact of oral disease in two populations of older adults: application of the geriatric oral


Oral Health Indicators: National views

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Lisa Boge Christensen

Concise review on the provision of oral health care, oral health status and oral health indicators in the Belgian population.
Joana C. Carvalho and Jean Pierre Van Nieuwenhuysen

European Global Oral Health Project - Critical analysis of oral health determinants
Carina Källestål

Information needed for regulating oral health services: a Finnish perspective
Anne Nordblad and Annamari Nihtilä
Introduction

In 1972 a recording system was launched with the purpose of processing large quantities of dental health information obtained from the total population of school children in Denmark. The data collection system incorporates two important functions. It serves as a supplement to the patient’s individual dental record at the local level, and also it serves as input for further statistical data analysis at regional and national level.

Historical background

The background for developing such a recording system was the Act on Child Dental Health passed by the Danish Parliament in 1971. According to this law dental care shall be offered to all school-children in the country regardless of their residential area. According to the law all municipalities were made responsible of establishing dental clinics and employing dentists and auxiliaries in sufficient numbers to provide comprehensive dental care, preventive and curative services for all children 7-15 years of age. The service was extended to include 0-18 year-olds in 1986. Before 1971 dental care of Danish school children was based on the initiative and interest of individual municipalities and there were no overall planning or national coordination. The Act of 1971 imposed the National Board of Health the responsibility of developing a system for recording and analysis of dental health data in order to provide information for planning, monitoring, and evaluation at regional and national levels. Considerations were made on collecting epidemiological data from representative samples of children in selected municipalities receiving public dental care. However, it was found that such system would entail several disadvantages. Thus, the recorded data could not be used for planning and evaluation of programme at the municipal level, and the data could not be used for treatment planning of the individual patients. Collecting data by

1. Faculty of Health Sciences, University of Copenhagen, Copenhagen, Denmark.
sampling would imply that some staff would have an extra workload to obtain summary statistics of little relevance to the local clinic or local municipality. Such system might have a negative impact on the interest of staff involved, and it might affect the use and the quality of the data recording negatively.

Consequently, it was decided to base the data recording system on information from all children served (i.e. the total population of children) and thereby to stimulate providers of dental care to use the data and summary statistics for local purposes. Recordings of dental health status are made on duplicate forms partly to serve as a supplement to the patient’s individual treatment record and partly as input for further data analysis electronically. Such dual function became possible with the development of computer input devices for Optical Character Reading (OCR). Handwritten symbols were scanned, identified and coded for direct data entry. By means of such system conventional punch cards (normally used at that time) were avoided. Since the National Recording System for the Child Dental Health Services was launched in 1972 it has been reviewed and updated. Due to the significant decline in caries prevalence registration is compulsory by now for selected age groups only (5, 7, 12 and 15 years of age). Since 1994 electronic registration has been available and to-day 40% of the municipalities transfer data via the on-line system.

The system has been in function for more than 30 years, it has been revised and some changes have been made. By now the system is not only a tool for organization development and goals for health policy but also a system for monitoring the health situation.

The recording system
and oral health indicators

The registration of data is based upon a record form shown in figure 1. To enable the scanner to identify the input all data are entered as numbers written in a distinct way as indicated in the top-line of the record form.

Record form showing the findings at the examination of a girl born on March 26th, 1975. Municipality code 219; school code 003; school class not indicated; examination date 28th October, 1988: 8+, 2+ (congenital absence), +7, +8, 8-, and -8 have not erupted. 05+, 03+, +05, 05-, and -05 have not been replaced by their permanent successors.

Figure 1.
For DMF code numbers see text (Table 1). Gingivitis scoring upper jaw indicates healthy gingiva or only slight gingivitis, 2+ is missing, and recording can not be done on this specific tooth. Gingivitis scoring lower jaw indicates bleeding on probing. Pockets are not recorded (the child is only 13 years). Recording of rotation +2, deep bite, distal molar occlusion right site, mandibular midline displacement, crowding mandibular incisor segment.

The form includes boxes for recording identification of the child and for registration of disease conditions. Personal identification number includes ten digits (all Danish citizens have a unique identification number) containing information on date of birth and sex. Also, codes for municipality, school, and class are included in the form. Boxes are available for further individual classification such as social group, ethnic group etc. The largest part of the record form is used for registration of caries status. The form is based on the Haderup dental notation system (8+ to +8 for the maxillary and 8- to –8 for the mandibular teeth). An erupted primary tooth is indicated by 0 and a permanent tooth is indicated by 1 (Fig.1).

For each tooth a set of coding boxes are provided to enter observations relevant to the tooth surface level: Occlusal, mesial, facial (buccal/labial), distal, and oral (lingual/palatal). For canines and the incisors only four spaces are provided, the incisal edge not being counted as a separate occlusal surface. All sound tooth surfaces are left blank. For registration of caries and other conditions certain scores are specified (Table 1). Criteria for gingivitis and periodontitis are shown in Tables 2 and 3. Twelve index teeth per person are examined. In case the index tooth is not present the box is marked with X.

Table 1. Conditions, code, and diagnostics criteria for registration of caries, etc.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Code</th>
<th>Diagnostic criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial caries</td>
<td>0</td>
<td>The enamel has surface is rough with opacity, no cavity</td>
</tr>
<tr>
<td>Manifest caries</td>
<td>1</td>
<td>The enamel has surface is rough with opacity. Decay with cavity</td>
</tr>
<tr>
<td>Secondary caries or lost/defective filling</td>
<td>2</td>
<td>Manifest caries on a surface already filled due to caries</td>
</tr>
<tr>
<td>Chronic caries lesion (registration optional)</td>
<td>9</td>
<td>The enamel surface is hard, smooth, shiny, has whitish or brownish discoloration</td>
</tr>
<tr>
<td>Filling</td>
<td>4</td>
<td>Restorations made due to caries (fillings, inlays, crowns)</td>
</tr>
<tr>
<td>Trauma</td>
<td>3</td>
<td>Injuries due to mechanical trauma (treated or untreated) excluding infractions and enamel fractures.</td>
</tr>
<tr>
<td>Endodontic treatment due to caries</td>
<td>5</td>
<td>Pulp capping, pulpotomy or pulpectomy</td>
</tr>
<tr>
<td>Missing (due to caries)</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Missing (other reasons)</td>
<td>7</td>
<td>Missing due to trauma or orthodontic treatment</td>
</tr>
<tr>
<td>Fissure sealant (registration optional)</td>
<td>8</td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Registration of gingivitis (optional).

<table>
<thead>
<tr>
<th>Condition</th>
<th>Code</th>
<th>Diagnostic criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gingivitis</td>
<td>1</td>
<td>Bleeding after probing</td>
</tr>
<tr>
<td>Indicator tooth is missing</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
Criteria for compulsory registration of dental anomalies, occlusal anomalies and space anomalies are shown in Table 4. The purpose of registration of those five types of malocclusion is to enable the authorities monitor the occurrence of such conditions, which normally entail orthodontic treatment and consequently high costs. Other types of deviations are optional and comprise vertical anterior open bite, diastema, antero-posterior molar relation, spacing etc.

Table 3. Registration of marginal periodontitis (compulsory for 12 and 15 year old children).

<table>
<thead>
<tr>
<th>Condition</th>
<th>Code</th>
<th>Diagnostic criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Periodontitis</td>
<td>1</td>
<td>Loss of attachment observed by probing</td>
</tr>
<tr>
<td>Indicator tooth is missing</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

Table 4. Registration of traits of malocclusion, compulsory for 12 and 15 year old children.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Diagnostic criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anterior maxillary overjet</td>
<td>Overjet 6 mm or more</td>
</tr>
<tr>
<td>Deep bite</td>
<td>Vertical distance ≥ 5 mm between incisal edges in upper and lower jaw</td>
</tr>
<tr>
<td>Crowding</td>
<td>2 mm or more in total either in upper or lower jaw</td>
</tr>
<tr>
<td>Hypodontia</td>
<td>Aplasia 1-5 permanent teeth</td>
</tr>
<tr>
<td>Oligodontia</td>
<td>Aplasia more than 5 permanent teeth</td>
</tr>
</tbody>
</table>

Statistical output

Once a year health statistics are produced at regional and national levels and forwarded to the municipal oral health planners and providers of dental care. Sets of standard tables are produced for each municipality, each country, and for the whole country. All municipalities are provided a set of standard tables (Table 6). Additional tables can be obtained if required. Standard tables describe the prevalence of caries in the primary dentition (Table 1-3) and in the permanent dentition (Table 4-6). The tables present the distribution of caries quantitatively by the components of def-s and DMF-S, and qualitatively by caries distributions according to severity zones (Table 5). The descriptive statistics include parameters such as means and standard deviations. Medians are also shown and 1st and 3rd quartiles for def-s and DMF-S indices.

Table 5. Caries severity zones of individuals.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Diagnostic criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone 4</td>
<td>Caries in incisors and smooth surfaces</td>
</tr>
<tr>
<td>Zone 3</td>
<td>Approximal caries in canines, premolars and molars</td>
</tr>
<tr>
<td>Zone 2</td>
<td>Caries in pits and fissures</td>
</tr>
<tr>
<td>Zone 1</td>
<td>Caries free</td>
</tr>
</tbody>
</table>
Conclusion

The National Recording System for the Child Dental Health Services has been in function for more than 30 years. The system has currently been updated on basis of reviews and evaluations. This epidemiological tool functions as an integrated part of the Municipal Dental Health Service in Denmark. A number of reports have been published by the authorities on basis of the aggregated data. At the local level the system has been applied for cohort studies and evaluation of local oral health programmes. In addition, the recording system has been applied in a substantial number of epidemiological surveys in countries outside Denmark.

References


Table 6. List of standard tables produced once a year and provided to the users of the system.

<table>
<thead>
<tr>
<th>Primary dentition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Mean number of surfaces present, decayed, filled or missing due to caries per person by age</td>
</tr>
<tr>
<td>2. Percentages of persons distributed by def-s and age</td>
</tr>
<tr>
<td>3. Percentages of persons distributed by caries severity zones and age</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Permanent dentition</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Mean number of surfaces present, decayed, filled or missing due to caries per person by age</td>
</tr>
<tr>
<td>5. Percentages of persons distributed by DMF-S and age</td>
</tr>
<tr>
<td>6. Percentages of persons distributed by caries severity zones and age</td>
</tr>
<tr>
<td>7. Occurrence of initial caries (code 0) in permanent teeth</td>
</tr>
<tr>
<td>8. Distribution of persons by number of permanent teeth with loss of attachment, injuries after mechanical trauma and teeth with endodontic treatment due to caries</td>
</tr>
<tr>
<td>9. Occurrence of malocclusions etc.</td>
</tr>
</tbody>
</table>
Concise review on the provision of oral health care, oral health status and oral health indicators in the Belgian population

Joana C. Carvalho and Jean Pierre Van Nieuwenhuysen

Introduction

Belgium is a Federal state with a population of 10.309.725 million inhabitants (National Institute of Statistics, 2002). There are three regional authorities of Flanders, Wallonia and Brussels and three language communities, i.e. Dutch-, French-, and German-speakers, representing 57%, 42% and 1% of the population, respectively (Carvalho et al. 2001b). The oral health care system is unique for the whole country and it is under the responsibility of the Ministry of Health and Social Affairs.

The organisation of the oral health system can be categorised as the Bismarckian inspired model, which is rooted in the principle of the National Health Insurance (Widström & Kenneth 1999). In order to be covered by the National Health Insurance one may pay a contribution. This contribution is obligatory for those who work in Belgium, except for employees of the European Commission, European Parliament, United Nations Organisations, and Diplomatic Representations, that may have a private insurance. About 90% of the Belgian population benefited from the National Health Insurance (National Health Institute, 2003).

The contributions are paid to the National Health Insurance that refunds Mutual Insurance Associations. The Mutual Insurance Associations negotiate fees directly with dental associations and syndicates, every second year. The fees for selected dental procedures have to be agreed by 60% of the dentists, otherwise the fees proposal collapses (Widström & Kenneth 1999). The dentists who do not agree with the fees proposal have to inform it to the National Health Insurance by registered letter and may then establish their own fees.

The Mutual Insurance Associations reimburse their contributors based on the fees established by the agreement and contributor’s characteristics. Widows, disable, retired and orphan contributors are fully reimbursed while others get a reimbursement from 50-80%. The reimbursement is

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1. School of Dentistry, Catholic University of Louvain, Brussels, Belgium.
made on fee-per-service basis for selected treatments. Private insurances companies may either be responsible for the totality of the reimbursement of its contributors or offer a complementary reimbursement to those who already benefit from the National health Insurance.

The first part of this review deals with the provision of oral health care in Belgium. The second part describes oral health status in Belgian population. Finally, oral health indicators for the Belgians are discussed.

**Provision of Oral Health Care in Belgium**

In Belgium the delivery of oral health care is essentially private for citizens of all ages. There are no collective preventive programmes for children and adolescents. The water supply is not artificially fluoridated and most of the municipalities have very low levels of fluoride in drinking water, < 0.3 ppm F/I (Carvalho 1998). However, fluoridated toothpaste is prevalent on the market and one may find low-, conventional- and concentrated fluoridated toothpaste. Recent survey showed that 95% of 12-yr-olds used regularly fluoridated toothpaste and 91% of the children brushed their teeth with fluoridated toothpaste once or twice per day (Carvalho et al. 2001b).

On the other hand, all children under the age of 18 are enrolled in the School Health Care Service, which has been operating in the country for more than 40 years. This service, which depends on public subsidies, employs general medical practitioners who are responsible for counselling parents, children and school staff on topics like body hygiene, balanced diet, maintenance of sound teeth, weight control, and physical activity. These practitioners carry out medical check-ups in schoolchildren in their 1st and 3rd grades of primary school and in their 2nd and 6th grades of secondary school. The medical check-ups include dental examination followed by a report on treatment needs, which are sent to the parents by letter.

According to Belgian law any non-operative or operative dental treatment must be carried out by private practitioners or university clinics. The ratio dentist/population is 1 dentist per 1200 inhabitants (National Health Insurance, 2002).

Within the framework of the agreement on fees between the Mutual Insurance Associations and Belgian dentists the following treatments are currently offered: 1) two annual oral examinations to children and adolescents and one annual examination to individuals 18-50-yr-old, 2) dental sealants and orthodontics for children up to 14 years old, 3) scaling once a year for individuals older than 18 years and for disabled people, and 4) dental restorations, endodontics, removable prosthetics and some types of surgery for all.

**Oral health status in Belgian population in the 90s and 00s**

In Belgium, there is a lack of epidemiological studies on oral health in sub-populations, which are representative for the whole country. This is true for the entire population: children, adolescents, young adults and adults. Epidemiological surveys carried out in the individual regions of Wallonia, Brussels and Flanders give a general idea about dental health in the country (Van Nieuwenhuysen et al. 1992, Declerck & Goffin 1992, Lambert et al. 1997, Carvalho et al. 1998, Carvalho et al.

Children – Studies on caries prevalence in the primary dentition of Belgian 5-, 6 and 7-yr-olds documented that the percentage of caries-free children were 59% (Carvalho et al. 1998), 48% (Carvalho et al. 2003) and 44% (Vanobberegen et al. 2001, Vanobberegen et al. 2001, Vanobberegen et al. 2001, Declerck et al. 2002), respectively. The mean deft scores in these children were 1.6 (Carvalho et al. 1998), 2.4 (Carvalho et al. 2003) and 2.2 (Vanobberegen et al. 2001a, 2001b, 2001c, Declerck et al. 2002) and the defs scores, registered only in two studies, were 3.7 (Carvalho et al. 1998) and 5.1 (Carvalho et al. 2003). In the permanent dentition of Belgian 12-yr-olds, prevalence studies showed that the percentage of caries-free ranged from 25% in the early 90s (Declerck & Goffin 1992) to 50% in the late 90s (Carvalho et al. 2001b, Van Nieuwenhuysen et al. 2002) simultaneously with DMFT scores of 2.7 and 1.6, in that order. Data concerning DMFS scores were only registered in the later 90s with a mean value of 2.5 (Carvalho et al. 2001b, Van Nieuwenhuysen et al. 2002).

Cross-sectional investigations on changes in caries and oral health habits in Belgian children (Carvalho et al. 2003) and adolescents (Carvalho et al. 2001b, Van Nieuwenhuysen et al. 2002) during the last two decades showed the following: 1) a significant increase in the percentage of caries-free children in the primary dentition from 32% to 48% and in the permanent dentition from 4% to 50%, 2) a 40% caries reduction in deft scores and 78% in DMFT scores, 3) substantial improvement in home-based oral health care and dental appointments on regular basis (Carvalho et al. 2001a, 2001b, Van Nieuwenhuysen et al. 2002).

Young adults – a cross-sectional study carried out in 1989, 1994 (Van Nieuwenhuysen et al. 1998) and 19991 in samples of dental students, indicated a tendency to improvement. The percentage of caries-free young adults changed from 2.0% to 5.0% and DMFT scores decreased from 11.3 to 7.4.

Adults – an epidemiological study in Belgian 35-44 years, 45-55 years and > 55 years reported DMFT scores of 15.4, 15.6 and 16.4, correspondingly (Lambert et al. 1997).

Oral health indicators for the Belgian population

Within the limits of the published investigations on oral health indicators in the Belgian population, one may identify two main groups of studies. Firstly, those concerning oral health indicators to prevalence studies (D’Hoore & Van Nieuwenhuysen 1991, Declerck & Goffin 1992, Gizani et al. 1999, Vanobberegen et al. 2001a, 2001b, 2001c, Declerck et al. 2002) and secondly of oral health indicators to cross-sectional studies over a period of time (Carvalho et al. 2001a;
Concise review on the provision of oral health care, oral health status and oral health indicators


**Children** – in caries prevalence studies in children aged 7, starting bushing teeth with a fluoridated toothpaste at an early age, toothbrushing 1-2 times per day, fluoride supplements, geographic area of residence and high socio-economic status were considered as good oral health indicators (Declerck & Goffin 1992, Gizani et al. 1999, D’Hoore & Van Nieuwenhuysen 1991, Vanobbergen et al. 2001a, 2001b, 2001c).

Moreover, the prevalence of healthy gingivae in 12-yr-olds was linked to toothbrushing 1-2 times per day and to some extent to the use of electrical toothbrush (Carvalho et al. 2001a).

In cross-sectional studies, the oral health indicators associated with caries reduction in the permanent dentition were: toothbrushing with fluoridated toothpaste 1-2 times per day, dental appointments once or twice per year, early signs of fluorosis (Carvalho et al. 2001b) high socio-economic status (Van Nieuwenhuysen et al. 2002, Carvalho et al. 2003) and Belgian nationality (Carvalho et al. 2003).

**Adults** – an epidemiological study on prevalence of periodontal disease indicated that never smoking is a good oral health indicator associated with periodontal health (Bercy et al. 2002). The health indicators identified in Belgian studies are supported by the international literature. The challenge is to determine their real impact on oral health and their practical implementation in public health. Most of all, it is important to appreciate that only the determinants, biological factors, are able to interfere with the rate of disease progression and development. Non biological factors derive their association with dental diseases induced by microbial deposits only because their are associated with the determinants and through these determinants with the diseases (Thylstrup & Fejerskov 1994).

**References**


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Thylstrup A & Fejerskov O. Textbook of Clinical Cariology. 2nd ed, Munksgaard, Copenhagen, 1994


European Global Oral Health Project - Critical analysis of oral health determinants

Carina Källestål

Introduction

For this analysis of oral health determinants, oral health is understood as no presence of the main oral diseases; dental caries and periodontal diseases. To be systematic a search for review articles was made in the bibliographic database Medline for the period 1995 until June 2003 with the search terms: Dental caries, Periodontitis, Determinant/s, Risk factor/s, Review. A list of 15 articles on caries was chosen and of these 12 was ordered and read in full text. For periodontal diseases were eight articles identified and five were ordered and read in full text.

Caries in small children, so called early childhood caries (EEC)

Low birth weight has, as a biological factor, been suggested as a determinant for caries later in life. The review by Burt & Pai (2001) failed to show any relationship between low birth weight and subsequent development of caries. They are however, cautious because of the scarcity of studies and states that the question needs further research to be finally answered. Different behaviours has been suggested as determinants for EEC as poor oral hygiene, limited exposure to fluorides and frequent exposure to sugary snacks and drinks (Ismail 1998a). Especially behaviours as frequent use of sweetened feeding bottle, drinking soft drinks, and eating sweets are pinpointed for development of EEC (Ismail 1998b). The question if prolonged breastfeeding is also a determinant for EEC has been evaluated by a systematic review (Valaitis et al. 2000). There are some indications that breastfeeding for over one year and at night beyond eruption of teeth may be associated with EEC but there are conflicting findings and at present no definite time at which an infant should be weaned can be determined. A factor which must be considered structural is malnutrition which has been shown to lead to delayed eruption of primary teeth and possibly to increased caries prevalence (Ismail 1998b).

Caries in children and adolescents

For children and adolescents the behavioural factor sugar intake, particularly sucrose intake is the most important determinant according to a comprehensive review by Sheiham (2001). Both the frequency of consumption and total amount of sugars are important in the aetiology of caries. Increase in frequency of sugary intakes of more than four per day increases the risk for caries. Teenagers and adults intake of sugars should not exceed 60g/person/day and for pre-school children it should not exceed 30g/person/day. Tooth brushing per se and thus, oral hygiene does not prove to be a determinant for caries. But the use of fluoridated toothpastes has been shown to be important for preventing caries. Structural factors as socioeconomic level and ethnicity has proven to be strong determinants for caries (Sheiham 2001, Locker 2000). Several studies measuring socioeconomic level in different ways have shown that deprivation is associated with more caries. Also being an immigrant or belonging to a different ethnic group than the majority seems to be a determinant of dental caries. As a determinant for caries the past experience of dental caries seems to be paramount. This parameter is probably the best predictor of future caries in children (Messer 2000).

Caries in adults

Knowing that adults have similar incidence in caries as children (Sheiham 2001) and thus, caries being a disease for the whole life it seems odd that almost no scientific articles are published either on epidemiology or determinants of caries in adult populations. No review on caries in adults was found. There is however, no reason to believe that the determinants proven for adolescents should not be valid also for adults i.e., sugar intake and socio-economic determinants.

Caries in old and sick

Also for the old age groups there were no reviews identified. A problem most confined to older age groups is root caries. There are conflicting reports on the prevalence and incidence of root caries due to differing criteria and indices to express results (Clarkson 1995). The aetiology and thereby also determinants for root caries is not clarified. A common clinical knowledge although not reported in a systematic review is the increased risk for caries in conjunction to certain diseases and also with medications. Diseases or treatment that impairs the salivary flow are increasing the risk for caries. So are also drugs that decrease salivary flow or contain sugar. If these diseases and drugs should be considered determinants is however, a matter of definition.

Periodontitis in children and adolescents

The definition of periodontitis is not clear (Jenkins & Papananou 2001) and new systems for classification are seen in the literature every other year. Albandar and Rams (2002) are however using four classifications when describing periodontitis in youth; periodontitis as a manifestation of systemic disease, necrotizing periodontal disease, aggressive periodontitis and chronic periodontitis.
Systematic diseases associated with periodontal disease have a genetic aetiology as Pappilon-Lefèvre syndrome, Downíś syndrome, congenital neutropenia, leukocyte adhesion deficiency etc. Necrotizing periodontal diseases are associated with diminished host resistance to bacterial infection of periodontal tissues which may occur due to various environmental factors as malnutrition, psychological and physical stress, poor oral hygiene, alcohol use and smoking. Necrotizing periodontal diseases are more common in poor populations of undeveloped countries.

Aggressive periodontitis is characterised by rapid loss of periodontal tissues where there might be a genetic predisposition but local factors also play a significant role. These include certain bacterial species, particularly *Actomycetemcomitans* and *P. gingivalis*. Furthermore, immune defects, poor oral hygiene, local plaque retaining factors and smoking increase the risk of disease occurrence and progression. Aggressive periodontitis is more frequent in certain ethnic groups as African and Hispanics.

Chronic periodontitis is much more prevalent than the other three groups of diseases. It is believed to be similar to adult chronic periodontal disease. Poor oral hygiene, local plaque-retaining factors, and smoking are important etiological factors.

**Periodontitis in adults**

The definition of periodontitis is not clearer for adults but a definition based on clinical signs of lost periodontal tissue usually forms the basis for epidemiological research in the area. The principal etiological factors are microbiological dental plaque biofilms, whereas several other local and systemic factors have important modifying roles in the pathogenesis. Numerous behavioural and environmental risk factors are identified but only a few are what we could call determinants of the disease. The two factors having overwhelming evidence as determinants are smoking and diabetes mellitus (Albandar 2002, Genco 1996). For other factors are more research needed in order to establish accurately their contribution in the pathogenesis.

**Conclusion**

From the above cited reviews it seems that the main determinants for caries, irrespective of the age at which it occurs, are sugar intake and low socioeconomic level. For the sugar intake is both frequency and total amount of intake important.

To judge from the literature there is a shortage of aetiological epidemiological studies on adult caries. The influence of diseases, drugs and socioeconomic factors are not reported on as often as for adolescents. Also, for caries in the older age groups little is known of determinants for caries which is also true for root caries.

For periodontal disease it seems that smoking and diabetes mellitus are the main determinants except for some rare cases of periodontal disease at childhood which has genetic disorders as main determinants. The level of oral hygiene has equivocal associations with periodontal disease although it is an important factor for the aetiology. The main shortcoming for periodontal research is the lack of definition of the disease; it is unclear if there are several diseases or only one entity and how this should be defined. This is of course due to the aetiology not being clarified but it hampers the selection of determinants.
References


Introduction

In Finland, the organization and financing of health care has been considered a public responsibility for a long time. The state determines the general health policy guidelines and directs the health care system at the national level. The municipalities have the main responsibility for arranging health services. In general, legislation does not regulate in great detail the range and method of organizing the services. The municipalities can therefore arrange health services according to local circumstances and the population’s needs.

The amended provisions of Primary Health Care Act and the Health Insurance Act, which entered into force on December 2002, abolished the age limits to publicly subsidised dental care. Before that the local authorities could limit the access to dental care on the basis of age, likewise the eligibility for reimbursement under health insurance was determined on the basis of age. The municipalities have the main responsibility for arranging oral health care services as well as health services in general. At the same time all clients of private dental care are, irrespective of their age entitled to reimbursement from health insurance granted by the Social Insurance Institution according to the confirmed prices.

Organizing public oral health care services requires careful strategic planning. Indicators used for collecting data of oral health determinants and oral health care systems should serve the health strategy and health goals of the oral health services.

The indicators need to be clearly defined. There are now differences between the European Union countries in defining the used indicators. The most important future task is the detailed description of useful indicators that enables the comparison between different EU countries. Technical data collection is also an important issue. For comparisons between different countries the data/used indicators should be available in Internet.

1. Ministry of Social Affairs and Health, Ministry of Social Affairs and Health, Health Department, Helsinki, Finland.
2. EGOHID Consultant, Espoo, Finland.
This paper shortly describes the national health project proceeding in Finland, the indicators collected in national oral health surveys by the National Research and Development Centre for Welfare and Health (Stakes), the new strategic planning in oral health care services in municipalities. As a technical data collection example the Quality Recommendations for Care and Service for older persons project is presented.

The national health project

The Council of State initiated a national project to ensure the future health care in April 2002. The key areas of development are concerned with health promotion and preventive work, ensuring access to treatment, staff availability and the improvement of skills, reforming health care functions and structures and reinforcing financing. Concerning the access to treatment national guidelines for non-urgent treatment and queue management are being prepared. The principles of access to treatment within a reasonable period of time will be embodied in legislation by the year 2005. The basic premises of preparation are access of preliminary assessment of health within three days of contacting the service, access to outpatient assessment by a specialist within three weeks of referral and access to medically justified treatment assured with the time specified by the national treatment recommendations. These basic principles will concern also oral health care but are being modified and developed in detail for oral health care. Measuring the access to treatment would be a useful indicator. Supplementary training for health care personnel will be mandatory. At the moment supplementary training is not mandatory for dentists. The finances of health care will be augmented. The need for additional funding is a result of the increased demand for services caused by the change if the age structure of the population, the introduction of new technology and the additional costs arising from attaining the standards required by in-service training and quality recommendations.

Indicators used in national oral health surveys

In Finland national information of operation of the public sector oral health care and its effect on the oral health status of the population has been collected since 1970-1971. From 1980 national oral health surveys have been carried out every three years. The respondent rates from the health centers have been high (varying from 88% to 98%). Now that all Finns are entitled to subsidized dental care (since December 2002) information is gradually collected of entire population. Information is gathered of the number of oral health personnel (dentists, chief dentists, specialized dentists, dental hygienists, dental assistants) and the cost and financing oral health care. In the year 2000 survey the following indicators were used to collect total health status data: the age group and total number of age group, percentage of examined, dental visits, caries free, percentage of attending orthodontic care, d-index and dmf-index, CPI-index, sealants, fillings, percentage of edentulous, at least 20 functioning teeth, endodontic treatment, extractions, users of removable
dentures. The data has been summarized using the following age groups: 0-5, 6-18, 19-44, 45-64, 65-74, –> 75.
These national oral health surveys have been very important in estimating efficacy of the public oral health services and in improving their performance.

Organising public oral health care services requires careful strategic planning

The Balanced Scorecard method (BSC) has been proved to be an effective strategic planning tool in public sector oral health care. The idea is that crucial success factors based on vision and strategy can be used as indicators describing how well operations are being carried out, and these indicators can in turn be used for monitoring and measuring, and in comparisons between health centers.

The BSC method is based on four viewpoints: those of civic and political decision-makers, resource management and finance, the organization’s performance and functionality, and the workplace community and staff. The essentials for strategic success from each of these viewpoints are crystallized as crucial success factors. These factors were defined according to four viewpoints: performance, resources, process and renewal.

The evaluation criteria picturing the success factors in oral health care contain information that both describe and guides operations. This basic information can be used to create new derived indicators. Indicators can also be used to clearly express the desired direction or the desired standard aimed at. Indicators of this type are for example customer satisfaction index, DMF index, a service-use index illustrating the organization’s conscious care policy plus indices measuring efficiency and productivity in the production of services. In this method the use of common indicators in comparing organizations have been considered useful.

The technical data collection and follow-up

As an example of a technical data collection in Finland the quality indicators for evaluation of care and services for older persons project is presented. The Finnish Ministry of Social Affairs and Health and The Association of Finnish Local and Regional Authorities issued in May 2001 Quality Recommendations for Care and Service for older persons. To support municipalities in bringing these recommendations to practice STAKES (www.stakes.fi) has in collaboration with various municipal professionals collected these indicators. Included are 19 key indicators and various indicators covering 75 topics of data on most significant parameters of care and service for older persons. The indicator groups are the following: key indicators, demography, care structure, indexes for care load and disability, coverage of age groups by services, process and intensity of services, indicators on personnel, indicators on economy, planning and informing.

This information is available of all 451 Finnish municipalities. A demo version is available in the Internet.

References

Oral Health Indicators: Achievements and Perspectives

Are the “Quality Adjusted Life Years” and “Disability Adjusted Life Years” indices trustworthy?

Gérard Duru

Oral Health Indicators in Europe: Preliminary consultation on the information available in 15 EU countries.

Nicolas Nicoloyannis, Marie Hélène Leclercq and Denis M. Bourgeois
Are the “Quality Adjusted Life Years” and “Disability Adjusted Life Years” indices trustworthy?

Gérard Duru¹

Any action undertaken in the field of health uses resources and produces either positive or sometimes negative results. These results are generally described by two indices: an index of medical effectiveness considered relevant to the context of the action, plus either a quality-of-life (QOL) index or else an index of dependency.

One of the most widely used medical effectiveness indices is the number of years of life gained. There are, in contrast, a large number of quality-of-life indices, classified according to the “states of health” (also known as “states of life”) taken account of and how each such state is weighted. To simplify matters, there may be taken to be two main categories of quality-of-life index:

- Those in which states of health are defined in terms of response profiles on a closed, so-called “quality of life” questionnaire. The value associated to each state is obtained by scoring.
- Those in which states of health are descriptive. They are classified according to patient preferences. The value associated to each state is a numeric code representing the ranking given by the patient. The process whereby this value is associated to the state of health is called a “utility function”, and the value itself is called the “utility” of the state of health in question², ³, ⁴.

The same holds true for dependency indices.

It is obviously a good idea to be able to compare results from two (or more) actions in the field of health. And this is easy to do when all of the results are expressed in terms of the same index, but becomes much more complex when two different

¹ University Lyon I, France.


indices are involved. In point of fact, different indices can lead to different conclusions: action A may be deemed better than action B in terms of medical effectiveness, while B seems to be better than A in terms of quality of life. This is the whole problem of multi-criterion analysis.

One elegant way of solving this problem is to construct an index which performs a useful synthesis of the other two. Such an approach has given rise to two indices: QALY (Quality-Adjusted Life-Years), combining a QOL index on the one hand, and “years of life gained” as an indicator of medical effectiveness on the other; and DALY (Disability-Adjusted Life-Years), combining a dependency index with and “years of life gained” as a medical effectiveness index.

How is such a combination achieved? The procedure consists in weighting the number of life-years gained by the quality-of-life (or dependency) index associated with the state of health (or of dependency) in which they are going to be spent. The determination of the combination function is said to be multiplicative.

This is all very straightforward, not only mathematically but also from the point of view of interpretation. Take, for example, the case of an action which enables the subject to gain 10 extra life-years, which will be spent in a wheelchair. If the index value corresponding to the state of life referred to as “moving around in a wheelchair” is 0.5, then the combined index value will be given by $10 \times 0.5 = 5$. And if a state of life referred to as “disability-free” is indexed at a value of 1, then this combined value of 5 will also correspond to “5 extra years lived without disability”.

One should sometimes be wary of things which look simple, not to say simplistic. And such is the case with the specifications underlying the QALY and DALY indices. Two examples will serve to illustrate this.

The first example concerns the coming winter sports season. Being as we are a worried and anxious kind of person, we are thinking about the accidents which could happen to us. By the time the season is over, a bad fall may have us walking on crutches or with the help of a cane. Then again, we could fall over a cliff and either die, or end up bed-ridden, or confined to a wheelchair. Looking on the brighter side, we may equally well emerge from the coming season as from those that preceded it: i.e., with mobility unimpaired.

Any of these states of life and of health are possible consequences of our love of skiing. And we can, of course, rank them in order of preference. I imagine most skiers would agree with the following classification: “unimpaired mobility” is preferable to “using a cane”, which in turn is better than “being in a wheelchair”, which is preferable to “being bed-ridden”, not to mention “dead” – although there are those who feel that being bed-ridden is a fate worse than death.

Having drawn up this personal preference ranking, let us then ask ourselves what may seem to be a rather curious question: would we prefer to live 20 years moving around in a wheelchair, or just 10 years, but on crutches?

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We are, we confess, unable to give an answer. So let us consult two of our friends who are experts in the matter, Robert and Claude, and ask them to design a protocol to help reveal our actual preferences as between these two outcomes.

Their advice to us is: “You should first construct a utility function associated to the preference relations or the ranking of health-states you have drawn up; this is to be done by means of a standard gamble, which is an experimental means of associating an utility value to each life-state.”

Having done this, our two experts suggest constructing an index taking account of the duration and of the value attributed to the various states of mobility, by weighting the life-years by the utility value of the state of health in which the years would be lived. This is how indices such as QALY and DALY are determined.

As scientists, we are rather reticent about any new method, and so we get the reproducibility of Claude and Robert’s method checked by asking them to carry out the experiment separately.

Here, then, is Robert’s experiment: The standard gamble consists in offering two different contracts. The first states that: “Your accident means you have to walk with crutches”, and the second that: “There is a highly skilled surgeon who could operate and restore full mobility, although his operations are not always a success. There is thus a probability $p$ of your recovering full mobility if you agree to the operation, but also of course a probability $1-p$ of ending up bed-ridden.” If $p$ equalled 1, we should obviously not hesitate to take our chances in surgery. But, if $p = 0.99$, would we still risk being operated even with 1 chance in 100 of ending up bed-ridden?

The experiment consists in varying $p$ so as to discover the $p$-value at which the two contracts seem to the subject to be equivalent. This is a technique widely used on the other side of the Atlantic.

Robert attributes a value of 1 to the state of “unimpaired mobility”: it is his chosen unit-value of measurement. And the state of being “bed-ridden” scores 0, as the point of origin for the parameter Robert chose for measuring the utility value of states of health.

In science, all measurement is made along a parameter defined by the choice of a point of origin and of a unit value.

The results of Robert’s experiment are as follows:

The two contracts are found to be equivalent when $p = 0.3$. Robert thus assigns a value of 0.3 to the state designated by “walking with crutches”.

The same procedure is followed for the state designated by “moving around in a wheelchair”. In this case, the contracts are found to be equivalent at $p = 0.1$, which thus represents the utility value of “moving around in a wheelchair”.

Now we simply have to calculate the number of QALYs for each situation, as the product of the number of life-years multiplied by the utility value of the state of health in question. “20 years in a wheelchair” thus scores $20 \times 0.1 = 2$ QALYs, which is the equivalent of “2 years of life with unimpaired mobility”. And “10 years walking with crutches” scores $10 \times 0.3 = 3$ QALYs, making it the equivalent of “3 years of life with unimpaired mobility”.

So Robert tells us, “You obviously prefer the idea of living just 10 years with crutches to 20 in a wheelchair.”

Claude runs the same experiment, but not with the same unit-value or point of origin. No problem: he has simply chosen a dif-
different parameter, with its origin at “death” and the unit-value corresponding to “walking with the help of a cane”.

The results of Claude’s experiment are as follows:
When the state of health in the first contract is “walking with crutches”, the two contracts are equivalent for $p = 0.7$; and when the state of health in the first contract is “moving around in a wheelchair”, the two contracts are equivalent for $p = 0.5$.

Thus the number of QALYs corresponding to “20 years in a wheelchair” and “10 years on crutches” are respectively 10 and 7.

And Claude tells us, “You obviously prefer the idea of living 20 years in a wheelchair rather than 10 years with crutches”. I.e., his conclusions run counter to Robert’s, although the same experimental design was used. All that changed was the parameter.

This example goes to show how sensitive the QALY index is to the choice of parameter. You choose your parameter, and get your result!

**A second example** is intended to show that one should beware of so-called “league tables”\(^1\), comparing series of interventions in terms of QALY cost-effectiveness.

Let us imagine 2 articles, published in international peer-review journals, presenting the cost-per-QALY of two interventions, one for pathology X and the other for pathology Y.

The first article estimates the cost-effectiveness (cost per QALY) of an intervention for pathology X, from society’s point of view, with QOL measured on Rosser’s grid\(^2\), and finds a ratio of €2,067 per QALY.

The second article uses the same method, and assesses the cost-effectiveness of an intervention for pathology Y at €1,770 per QALY.

The intervention for pathology Y is thus preferable to that for pathology X.

Both articles present a cost-effectiveness analysis for the respective interventions. And both have the same cost: €10,000.

The first intervention, for pathology X, gives a gain of 7 extra life-years: the first 3 years are spent in a state described on the Rossner grid as “slight physical dysfunction and no emotional suffering”; the next 2 are spent in a state of “significantly limited activity, and mild emotional suffering”; and the last two years are spent in a state of “significantly limited activity, and significant emotional suffering”.

The second intervention, for pathology Y, gives a gain of 6 extra life-years: the first is spent in a state of “slight physical dysfunction and no emotional suffering”, the next two in a state of “significantly limited activity, and mild emotional suffering”, and the last three in a state of “significantly limited activity, and significant emotional suffering”.

It is clear that the results of the first intervention are better in terms of medical effectiveness and quality of life. But, strangely, for the same cost the cost-effectiveness ratio gives the advantage to the second intervention. How is such a paradox to be explained?

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Are the “Quality Adjusted Life Years” and “Disability Adjusted Life Years” indices trustworthy?

The paradox is in fact more apparent than real. In the first article, the author uses Rosser grid health-state values derived from physicians’ preferences. The utility values which physicians assign to states of “slight physical dysfunction and no emotional suffering”, “significantly limited activity, and mild emotional suffering” and “significantly limited activity, and significant emotional suffering” are respectively 0.981, 0.760 and 0.187, which results in a QALY number of 4.837 and a cost-effectiveness ratio of 10,000/4.837 = 2,067.

In the second article, the author also used the Rosser grid, but derived the corresponding values from preferences expressed by nursing staff. The utility values assigned here to states of “slight physical dysfunction and no emotional suffering”, “significantly limited activity, and mild emotional suffering” and “significantly limited activity, and significant emotional suffering” were respectively 0.992, 0.963 and 0.911, giving a QALY number of 5.651 and a cost-effectiveness ratio of 10,000/5.651 = 1,770.

The apparent paradox is no paradox at all, but just the kind of stupid mistake a bad pupil might make by trying to compare, say, physics results expressed in divergent units of measurement.

The fact is that, in league tables, the parameter used in the calculation of cost-effectiveness is never stated; the results are therefore to be taken with the greatest prudence. Justifying QALYs by insisting, as is so frequently done, that “a QALY is a QALY”¹ is more like claiming that “a length is a length” than that “a metre is a metre”!

Just try to imagine what would happen to air traffic control if the altitudes of planes using altimeters in feet were to be set against altitudes of planes using altimeters in metres, without specifying which unit the altitude was being measured in.

These two simple little examples explain why the French pharmaco-economic guidelines² are so reserved as to the use of this kind of index. In conclusion, let us quote from guideline n° 25:

“The QALY approach consists in combining in a single dimension two dimensions describing the results of an action in the health field in terms of life-years gained and of quality of life. The combination procedure raises a number of issues, both methodological and philosophical.

The lack of robustness in the approach means that the conclusions drawn from a study can be manipulated.

“This leads us to advise readers or users of studies with results presented in terms of QALY to look carefully at the following conditions:

“a) In each case it is vital to check whether the reference for the quality-of-life measure and the measurement method used are stated, and that the multiplicative combination function has been validated.

“b) The origin of the quality-of-life measures needs to be considered, and in particular whether they are psychometric or else derived from preference-revelation techniques such as TTO or standard gamble.

2. La lettre du Collège des Economistes de la Santé, Juin 2003. CES Website: http://perso.wanadoo.fr/ces/
“c) When versions of QALY are being used which rely on theories of utility or expected utility, the reader needs to consider whether the behavioural hypotheses and methodological and epistemological choices have been validated and what biases such choices may entail.

“d) In all cases, any attempt to make comparisons between studies and pathologies (e.g., league tables) should be viewed with the greatest caution: for example, one should check whether the same systems of reference have been used in the various cases. Nor is it advisable to take the health-state valuation from one study and use it in another, without first carefully validating the equivalence of the states of health.

“e) One should also be wary of the risk of distribution bias if comparisons are made between populations with very divergent socio-demographic characteristics or varying preferences for the treatments under analysis.

“f) In the present state of research, it is unadvisable to base any public decision on study results expressed in terms of QALY, given the possibility of generating divergent results from the same observed data.”
Oral Health Indicators in Europe: Preliminary Consultation on the Information available in 15 EU Countries

Nicolas Nicoloyannis¹, Marie Hélène Leclercq² and Denis M. Bourgeois³

Introduction

The research project to set up a European Consultation on statistical methods for oral health, involving the availability of indicators has been instigated and earmarked by the group members of the EGOHDP, as a research field to be promoted in view of its potential utility for the elaboration of a long list of oral health indicators.

The improvement observed in the status of oral health in the population of the industrialized countries has prompted the scientific community, professional bodies and decision-makers to ask which indicators policy strategies ought to be adopted in relation to surveillance in the future. This transition period provides a timely opportunity for identifying precisely these future options and objectives in oral health surveillance. This project is part of the wider attempt to identify indicators for oral health (problems, determinants and risk factors related to lifestyle), indicators for critical oral health care, the quality of care, for essential health resources and to identify the types of data generation and management problems within the health information system for long-term surveillance oral health among the European population.

The concept of development of operational indicators in oral health has been proposed in Europe (Biomed, Oratel, etc…) and in the world. So, in an unpublished WHO paper, Leclercq and al. in 1991 had already described the cornerstone and the need for an oral care management system. It was derived from four areas of concern:

- The lack of standard and reliable information for planning and monitoring care services;
- The change in the pattern of dental diseases and periodontal diseases and treatment and the implication for conventional epidemiological survey methods;

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1. EGOHID Consultant, Lyon, France.
2. University of Lyon, France.
3. Faculty of Dentistry, University of Lyon, France.
• The need to expand the sources of information beyond the standard epidemiological type of survey;
• The variety of existing systems.

A high priority was to encourage the development of standards for the design and implementation of computerized systems for the management of oral health care. A goal was to seek a level of agreement sufficient to allow comparability of data that are conceptually equivalent and permit clear delineation of data.

Moreover, in 1992, the WHO Expert Committee on Recent Advances in Oral Health pointed out in the Technical Report 826 that the objective of informatics developments in the advancement of oral health was to encourage the development and implementation of standards for clinical records, so that the benefits of information management can serve the decision-making process and allow appropriate oral health care to be implemented.

Thus, the goal of this consultation is not intended to question the utility of indicators as a method of surveillance but to reconsider, in view of continuing scientific uncertainty in respect of this issue, how indicators should best be used within a community. Informed by the hard knowledge and grey areas surrounding this issue these recommendations replace current indications for indicators utilisation.

For instance, dietary habits that increase the risk of overexposure of infants and young children to fluorides from different sources should be identified and appropriate surveillance measures taken. The efficacy of all caries prevention programmes should be periodically evaluated. In Europe, where caries prevalence is moderate to low, a cautious fluoride policy should be adopted. There are, however, some concerns: authorities may reduce their commitment to an oral health prevention policy that threatens to be the victim of its own success, scientists may question the validity of prevention in the light of its drawbacks, and consumer groups may then politicize this movement. As our knowledge stands at the present however, caries cannot be said to be eradicated. Should there be a loss of momentum in prevention, caries will again become common. We take the view that there remain many groups at risk for whom a specific approach is required.

How is oral health surveillance likely to develop? What will be the attitude of future generations to dental caries when, like their parent’s generation, they have no direct knowledge of caries? Is there not a risk that we will see inappropriate behaviour with regard to oral health prevention? There is therefore substantial thematic material to guide public health policy for administration. Oral health is clearly in a transition period, which is not to question the utility of indicators. This transition period provides an opportunity for identifying major trends and possible scenarios in oral health policy issues in the future.

This initial consultation within the EU Oral health SANCO project should be considered in this light. Its terms are intrinsically part of the current debate but consensus should also move beyond this framework especially since a wide variety of indicators delivering products of comparable efficacy is currently available.

The objectives of this consultation were to facilitate the achievement of the EU Workshop on Oral health statistics by:
• Presenting a review of the current situation in respect regarding oral health indicators relating to health problems, risk factors and determinants as well as an initial evaluation of action undertaken.
• Facilitating the reflexion of the various parties involved in the project in the EU region, on the availability of indicators at regional and national levels.
• Stimulating critical thought on the part of public health administrators on the future role of indicators in relation to oral health policy.

This consultation took place from 10 May to 25 August 2003 within the framework of the preparation of the EU workshop on statistics in Oral Health held in Lyon in September 2003. It was the first phase of the development process towards the elaboration of a long list of oral health indicators as described in the protocol of the EGHODP.

Methodology

Ideally, the prioritized indicators would already be routinely monitored in a majority of Member States, or easily added to current data. To ascertain what was already available, a questionnaire was devised to identify for which of the indicators information was currently available. The final first list of indicators thus, was able globally to reflect the current availability of information in the participating countries.

A search of relevant literature was undertaken to establish for which indicators a clear link with disease had been established. Methodologies available to meet the objectives of this project come within the purview of so-called consensus surveys. Investigation comprised three phases:
• Bibliographic research to identify current thinking on methods of administering indicators and to identify emerging trends.
• Methodological research to enhance and optimize the efficiency of consensus research fields applied to the topics previously identified.
• European consultation involving correspondence, meeting between the Experts Working Group of the EGHODP.

Administratively, the study required a scientific project leader, a consultant for project implementation and follow-up. Technically, it comprised two phases: (i) a preliminary phase to decide on the working design and the technical procedures; (ii) a general development phase to define the main list of indicators and questions linked to future fluoride use.

The following took place during this phase: (i) Information collation provided by secondary sources (references, statistical sources) and provided by collection of qualitative information (interviews with specialists, symposia, etc.): (ii) Listing of factors determining methods of oral disease surveillance linked to indicators use. Indicators were recorded based on the following variables:
• Variables linked to risk factors;
• Variables linked to oral health status;
• Variables linked to quality of life;
• Variables linked to the oral health systems

Project planning was under the jurisdiction of the Group Leader committee, University Lyon, France. It comprised various
steps: (i) Defining administrative and organizational structures for the process; (ii) Defining questionnaire items; (iii) Drafting and publishing the questionnaire; (iv) Validation of an expert panel; (v) Mailing of the questionnaire and corresponding administrative work; (vi) Data analysis and final report.

Selection of participants

The expert panel group consisted of 15 persons, national members of the European Group. Nineteen different countries were represented. Each of the members received an explanatory letter attached to the questionnaire inviting them to join the consultation in May 2003. The response rate was 100%. The national distribution was: Austria, Belgium, Denmark, France, Finland, Germany, Greece, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, and United Kingdom. The Consultation study comprised one phase, beginning in May 2003 and finishing in August 2003. The study was co-ordinated and run from the EOHDP headquarters in Lyon. All questionnaires and study data were dispatched to the principal investigator by mail and/or electronic means (e-mail and fax).

Structure of the questionnaire

The technical committee decided, based on initial discussion and arguments from the participants, which items and questions should appear in the questionnaire. According to most of ongoing SANCO projects, table of essential useful information, guidelines and recommendations were adapted from the “European Community Health Indicators Project” (ECHI), SANCO Project. Similarly, the identification of four primary categories of indicators “Demographic and socio-economic; Oral Health Status and Well being; Determinants of Oral health, Risk and protective factors; Health Systems and Policy” was recommended. Open questions related to the structured questions allowed due consideration to be given to arguments during the first phase. The target of this first questionnaire was principally to provide an overview of indicators in oral health and principal limitations to their administration.

Analysis

The analysis of the questionnaire focused on identifying problems and tried to establish which forms of indicators delivery might acquire future importance. 15 European countries are examined for their considerations of relevant indicators. This synthesis is based on the analysis of single country contributions channelled through the Group members according to the framework document provided. Both qualitative and quantitative analyses were made of answers to the consultation. Single country documents are not annexed. Detail of the results is available on requests to the co-ordinator Group Leader (DB).

Oral health indicators mentioned by the countries

All participating countries answered positively and 15 completed questionnaires

1. europa.eu.int/comm/health/ph_projects/monitoring_Project_en.htm
were received and analysed. A total of 66 indicators were proposed qualifying 4 areas related to oral health: Oral health determinants listing 10 indicators, oral health status – 14 indicators, Oral health systems – 23 indicators and oral quality of life based on recording 9 indicators. In addition 10 indicators on demography and socio-economic factors stratified by age-groups were indicated.

The results of the compiled information are presented in two series of tables:
- The total number of indicators available in each country from the list of 66 indicated
- The number of indicators available in each country, in each of the 5 domains: Demography and socioeconomic information, Oral health determinants, Oral health status, Oral health systems, Oral health related quality of life. This information is illustrated by a series of bar graphs.

The results have been computed on the basis of answers qualified by codes A and B as defined in the criteria proposed by the ECHI system: A- regularly available from international source, B- regularly available from national source.

The comments received stressed the need to better qualify the data source and at least to indicate the frequency and the geographical area in different categories.

**Figure 1. Total number of indicators per country**

![Graph showing the total number of indicators per country]
As illustrated by the bargraph, the total number of 66 indicators is out of reach for all countries. However, there are important discrepancies among the different countries, a group of seven claiming availability of 30 (plus or minus 4) i.e. about half of the group having less than half of the requested information. Two countries recording less than 10 and, at the other end, one outstanding value of 62. This reflects a) the relative scarcity of the information available b) tremendous inequalities in the oral health information systems in place in various European countries.

Looking at the same type of information, distributed by the 5 domains listed, provides additional information on areas where the biggest gaps can be expected, or on the contrary where information is reasonably available.

The section on Demography and socio-economic factors is an area where information can be obtained in all countries, 80% to 100% of the data set are found in 9 countries and there is only one country where only 40% is recognized to be available (Figure 2).

Figure 2. Demography and socio-economic factors, 10 indicators

The distribution of the availability of the oral health determinants indicators reflects a bigger discrepancy, ranging from 3 countries with 80% to 100% of the information available, to 3 countries claiming not having any information at all in this domain: Italy, Greece and Portugal. The other group of countries is distributed between 10 to 50%, as illustrated in figure 3.

The fourth graph shows the information that can be obtained by recording 14 indicators on oral health status. All countries with one exception – Greece – have information available on oral health status. The highest number of indicators available is 11 (out of 14 listed) available in 3 countries.

The fifth area investigated relates to oral health systems (figure 5) recorded by
23 indicators: 6 countries have 0 to 5 indicators only – Norway, France, Germany, Greece, Portugal, Italy and only 2 countries – Ireland and the Netherlands have accessible information with respectively 23 and 19 indicators recorded. Lastly, looking at figure 6 recording the availability of 9 indicators on oral health related quality of life reveals, as was expected, the scarcity of the information available. It is in this area that the gaps are most striking and deep inequality exists in
respect of existing oral health information systems. As shown in figure 6, 11 countries have no information at all (coded a and b), only little information is available in one country and only 3 have all 9 indicators available.

**Number of countries by specific indicators**

A series of tables have been computed that are showing the information available by countries and each of the indicators in the five areas covered.
Clearly, whereas the previous set of bargraph provides in a nutshell an immediate picture of the areas where most or least information is available, the distribution by specific indicators provides a sharper approach to where the major problem in information collection may be. One of the important criteria that will need consideration in further developments of this work will be the feasibility of obtaining the information either from existing systems or from surveys. These tables may be a help in providing initial directions of thinking. As was expected, demographic information of general nature with no specific link to oral health is largely available in all countries (table 1). Nevertheless, important gaps in the area of socio-economic factors are recurrent in Italy, Greece, Austria, Spain, France when looking at indicators related to oral health care services.

Table 1. Demography and socio-economic factors

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| Total          | 12                       | 14                     | 14                        | 13                     | 15                     | 14                                        | 8                                 | 8                     | 8                   | 8                     |

147
The absence of information regarding the median age of the country population signaled by Portugal, Italy and Norway may be explained either by the absence of a direct source or could relate by a misunderstanding of the questionnaire layout. In any case this could easily be calculated by existing demographic information in all three mentioned countries.

Looking at the distribution of indicators on oral health determinants (table 2) provides a very different picture. More than half of the group claim not having any information on perceived oral health, knowledge/attitudes and perception of the oral health system. This gap is noted in all Scandinavian countries except Sweden, in UK, and Greece. Adding Austria, Spain and Belgium, countries with only one indicator indicates that 10 countries have none or very little information.

**Table 2. Oral health determinants**

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<thead>
<tr>
<th></th>
<th>Personnal factors</th>
<th>Oral health behaviour</th>
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<tbody>
<tr>
<td></td>
<td>Perceived oral health</td>
<td>Knowledge /attitudes on oral health</td>
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</table>
Only four, Ireland, France, Sweden and the Netherlands have accessible information of this nature. Interesting to note that on oral health behaviour, two important indicators are available in many countries: adolescent smoking prevalence and sugar consumption. Both are important for oral health as well as for general health. It was expected that information on oral health status (table 3) would be commonly available across countries, especially in respect of the DMFT index and the CIPTN, both relating to the most prevalent oral conditions, dental caries and periodontal diseases.

This was confirmed for the carious morbidity indicators: caries free and the mean number of decayed, missing and filled teeth per person: the DMFT index. Both are available in 12 countries. This information is not available in Denmark, a

<table>
<thead>
<tr>
<th></th>
<th>Caries free</th>
<th>DMFT/dmft</th>
<th>Sealsants</th>
<th>Caries projections</th>
<th>Loss of attachment</th>
<th>CPTN</th>
<th>Oral cancer</th>
<th>DFA</th>
<th>Facial pain</th>
<th>Missing teeth</th>
<th>Edentulousness</th>
<th>Type of extracted teeth</th>
<th>Dental injuries from trauma</th>
<th>Xerostomia</th>
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country where other morbidity indicators are used within the oral health care system. Belgium and Greece are the two other countries with no information available on caries. Either because the information is indeed not recorded either in surveys or as part as the health information system, or because this information could not fit within the quality criteria (reminder: codes a and b) as required by the instructions given to fill in the questionnaire.

Regarding the periodontal status only 7 countries, nearly half of the group, have relevant information, either on loss of attachment or on the CPITN index. In other areas of oral conditions, little information is available, with two notable exceptions, one for oral cancer, the second on the level of edentulousness in the population, both

<table>
<thead>
<tr>
<th>Table 4a. Oral health systems: 13 indicators</th>
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<tbody>
<tr>
<td>Prevention, protection, oral health promotion</td>
</tr>
<tr>
<td>Children screening coverage</td>
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<td>Children's health monitoring</td>
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<td>Regulation on fluoride</td>
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<td>Regulation on public smoking</td>
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<td>Average price of toothbrush</td>
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<td>Oral health promotion campaign</td>
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indicators available again in 12 countries. The information availability in oral health systems is shown in two tables, 4a and 4b. Table 4a covers “prevention, protection and oral health promotion” totaling 6 indicators as well as “administration and financing” with 7 indicators. Apart from Ireland and the Netherlands offering complete sets of 13 indicators available, information on oral health systems in these two areas is rarely collected or accessible. Denmark, Sweden and Spain have some reliable information especially on administration and financing for Denmark and on Prevention and oral health promotion for Sweden and Spain. All other sites are ranging from zero indicator (France, Greece, Belgium, Italy, Portugal), to 4 in Finland, 5 in UK, 3

Table 4b. Oral health systems: 10 indicators

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<tr>
<th></th>
<th>Fissure sealing</th>
<th>Crown restorations</th>
<th>Bridges</th>
<th>Implants</th>
<th>Scaling for periodontal treatment</th>
<th>Fixed orthodontic appliance</th>
<th>Number of teeth with replacement of restorations</th>
<th>Average time for endodontic treatment</th>
<th>Cost of treatment</th>
<th>Access to care</th>
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indicators in Austria, and 2 in Norway. The situation is no better when considering the two other dimensions of oral health systems recorded by 10 indicators, 8 qualifying “interventions” and 2 for “patient satisfaction” (table 4b). Ireland is the only one country with a complete data set. Again a large group is indicating zero or only one indicator: France, Austria, Greece, Belgium, Norway, Italy, Portugal and Denmark with two. Information on “patient satisfaction” is totally absent except for Ireland. Greece being the only other site with data on “cost of treatment”. Whereas quality of life as become a recognised component of oral health outcomes and even the expression of the “ultimate” outcome of any health system, table 5 shows that this is the area in which the information is dramatically missing in most countries. The questionnaire articulated the oral health related quality of life around

<table>
<thead>
<tr>
<th></th>
<th>Functional limitation</th>
<th>Physical pain</th>
<th>Physical/behavioural disability</th>
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<td></td>
<td>Difficulty chewing</td>
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<td>Trouble pronouncing words</td>
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</table>

Table 5. Quality of life
three dimensions: function, physical pain, physical/behavioural functioning. Each section is comprised of three indicators. Three countries have all 9 indicators available, Finland, France and Ireland. Apart from Germany with the three indicators relating to “functional limitation”, the whole table is blank. This seems to reflect that with respect to data collection “quality of life” is either completely ignored or well accepted and documented in the three dimensions indicated.

Conclusion

This preliminary consultation on the information available in 15 EU countries has the merit to serve as a basis for reflexion on the ability of Members States to have available indicators on oral health at national or regional level. Without trying to give it too much scientific importance, it nevertheless reveals that the system is facing difficulties, most of them created by the scarcity of assigned quantitative public health objectives.

First, a quantitative dysfunction is noted: Ireland for example, stimulated by an operational surveillance system is recording almost all indicators proposed whereas, at the other end, some member countries seem to remain completely outside the surveillance system. From this angle, the inter-country variability on the amount of available information is important. Secondly, qualitative discrepancies are shown, due to the difficulties encountered by some countries to adapt to new knowledge and new needs of their society. Obviously, indicators on “Demography and socio-economic factors” from general sources are generally available. However, information relating to quality of life, functioning of the health system, is for the majority poorly available. This situation brings forward the use of “historical” indicators, as is the case for France, indicators which have a priority focus on oral health status.

This document reflects the need to initiate a broad European reflexion in the domain of health indicators and more specifically in relation to priorities on the implementation of the health surveillance programme and public health activities. Similarly, the document underlines the need to update current knowledge and to harmonize regional oral health information in order to obtain comparable data on health surveillance in EU countries. The quantitative and qualitative improvement of oral public health information should be linked to national health policies and public health objectives. Lastly, beyond the sole descriptive framework which provides a factual and perfectible picture of existing networks, a strong recommendation is emerging to identify the mechanisms – bridles and limits- of the system in relation to the production and the use of information.
European Oral Health Indicators.
Workshop on Oral health Statistics.
Consensus Report

WHO International Agency for Research on Cancer, Lyon, France
4-5 September 2003

Introduction

The objectives of the EU/Project Global Oral Health Indicators Development, project within the EU Health Monitoring Programme, SANCO/G/3 Health Surveillance, 2003-2004, was to support the exchange of expectations and experiences among experts of oral health statistics and their audience, policy makers in particular. It is also to conduct a systematic review and to outline a process for identifying a set of core indicators for oral health that will help professionals to promote and improve the global oral health promotion, quality of care and surveillance of people in Europe. To facilitate the achievements of these objectives, an EU/Workshop on Oral Health Statistics will be convened at Lyon, France, 4-5 September 2003. The major objectives of the meeting focused on:

1. Identify of the health information system problems relevant to the use of oral health indicators.
2. Identify of the principles for guiding the selection and use of oral health indicators.
3. Identify of the recent oral health indicator selection efforts.

44 projects leaders from the Global Oral Health Development Project and representatives from oral health institutions attempted to the two-day meeting. Members or representatives from the steering group committee were present. Representatives of the World Health Organisation, Geneva, representatives of Ministries of Health - Austria, France, Finland, Spain, Greece, UK-, delegates of the Council of European Chief Dental Officers, the European Association of Dental Public Health, the European Society of Periodontology assisted as the delegates – Latvia, Hungary – from EU candidate countries. Members from European universities – Italy, France, UK, Spain, Belgium- and officials from dental institutions were present. List members of participants are in appendix.

Content of the Group sessions

Working group 1 report: Oral health determinants, risk factors and factors of prevention

The discussion of the group addressed the following issues: terminology, what logic
should guide the selection of the indicators, which indicators should be retained and the selection of a “top five list”. In addition the group was asked to comment on the list of indicators, derived from the ECHI system that was provided prior to the meeting.

1. Definition of terms

The group had a long discussion on the definition of the terms “determinants”, “risk factors” and “factors of prevention”. Agreement was reached on the following definitions:

“Risk factors” are factors that are directly involved in the diseases process.

“Risk indicators” are the risks that are associated with the diseases.

“Factors of prevention” are those factors that can be changed i.e. tooth brushing habits.

Finally the group decided to leave out the term “determinant”.

2. Framework for selection

The group felt that the list distributed prior to the meeting was too constraining and it was decided to follow the framework proposed by WHO as the STEPWISE approach: three levels of sets of indicators are retained, the core, the expanded and the optional levels.

3. Selected lists of indicators

The first list restricts the number of risk indicator/factors to those related to one of the most common oral disease: dental caries. 8 indicators have been selected:

• Social class

• Sugar consumption: no agreement was reached as to whether sugar consumption should be recorded at individual or population level.
• Past caries experience
• Use of Fluoridated toothpaste
• Water or Salt fluoridation
• Frequency of eating and/or drinking
• Brushing frequency with F. toothpaste
• General health (General health included different diseases and functional disability)

Additional indicators were retained for risk of periodontal diseases

• Use of tobacco
• Oral hygiene techniques
• Bleeding when brushing
• Number of teeth present

In addition to tobacco use, two supplementary indicators would be necessary to record risk for oral cancer: Alcohol consumption and use of oral drugs (chewing betel for example). Risk for attrition/erosions could be covered by recording: Consumption of acidic drinks or substances of low PH, bulimia/anorexia

Risk for Trauma/injuries: use of mouth guards

The final “TOP 5” list

If only 5 indicators were to be recorded what would be the selection of the group? The outcome of the group referendum was:

• Social class
• Eating/drinking frequency (sugar containing food and drinks)
• Brushing frequency with fluoridated toothpaste
• Tobacco use
• General health
It should be noted that the list is provided in this hierarchical order

5. Comments on the distributed list of indicators

The group felt that the form developed from the ECHI system and distributed prior to the meeting provided a list that was too long and too broad. It was found to be lacking clarity and precision in several areas. More specific definitions are needed on point a, b, c, and d. Quality criteria should be defined in a clearer and more hierarchical way. More detail on the sources should be provided. Finally, the group recommends that statement of certainty should be in line with the WHO S.U.R.F. model.

Report from Working Group 2: Oral health status and Quality of life

Introduction

The topics submitted to the group discussion cover the 2 major outcomes dimensions of the process of production of oral health: oral health status and oral health related quality of life.

1. Oral Health Status
   • ECHI derived questionnaire:
     The group discussed the relevance and the quality of the questionnaire on oral health indicators which had been distributed to each project team for completion. It was acknowledged that the questionnaire design and content had not been discussed and agreed upon collectively prior to the meeting. The data quality criteria were unclear and whereas everybody did their best to indicate what information was or was not available in their site, the use of this documentation should be considered as working material and not be published.

   • Methodology:
     As for the definition of a list of indicators for recording oral health status the group felt that it should not try to come up with a list of indicators per se. Rather the group should try to identify the main issues and questions related to the development of such a list. The first question discussed was should we record Oral health or oral disease status? The group agreed that whereas the ultimate outcome of oral care is Oral health, it is oral disease status that should be assessed. Healthy people are of no direct interest in terms of public health decision making regarding improvement of the health care system. Costs of care and its reduction or containment is related to assessing disease trends and effects of preventive care. As for the methodology to be used in listing disease indicators, the group recommended that the WHO STEPWISE approach be used, thus listing three levels of sets: core, expanded and optional depending on the purpose and practical constraints of the information collection.

   • Issues related to specific diseases recording
     There are two main questions to answer: how much disease do we have? How do we assess diseases?
     Dental Caries: should be assessed in population with prevalence studies of affected people with repeated follow-up studies. It was felt that only active caries should be taken into account not
early lesions. The assessment should be done using the DMFT index especially the D component. The F component criteria should be revisited considering the use of non metallic filling materials (glass ionomer and composites).

Periodontal diseases: Considering the current expert debate on the relevance of existing indexes for periodontal disease measurement the group agreed that there is a need for a consensus on a standardised and simple methodology to be used throughout European countries. It is compulsory that an assessment of major risk factors be made and general medical information be included.

For other oral diseases (i.e. mucosal lesions, cancer, TMJ disorders), the group referred to the WHO Basic methods.

**Future directions**
The group suggests that all efforts be made at the level of the oral health system to include basic medical indicators and vice-versa, that the medical surveys include some basic information on oral health. Another important item for the future should be to prioritise oral health status indicators.

2. Oral Health Quality of life

**Background:**
Oral Health related Quality of Life (OHQOL) is generally accepted as the ultimate outcome of the oral health care system. This concept has been confirmed and validated cross-culturally by the ICSII study in the context of a multinational investigation of oral health determinants and outcomes. (“Comparing Oral Health Care Systems, a second international collaborative study”, Chen et al., WHO, 1997).

However, measurement of health related QOL and OHQOL is still an object of debate especially considering the difficulty of its assessment in an objective manner. Today, there is a broad consensus on the three dimensions of ORHQOL i.e. physical symptoms, perceived well-being, social and physical functioning.

**Issues addressed during the group discussion:**
Is OHQOL a component of oral health that should be measured in the European context? If so, do we have already existing instruments that can be reliable and applicable in a multinational context, what are the measure issues/obstacles related to their practical applicability, what should be the next step to implement standardised data collection on OHQOL in European countries?

**Discussion outcomes**
1. There was unanimous agreement that there is a need for measurement of quality of life in relation to oral health.
2. The multidimensional nature of OHQOL is acknowledged by the group. Consequently, there is a need for multidimensional instruments.
3. For measurement of OHQOL the group recognised that many instruments already exist. Most of them have been tested for their psychometric qualities including validity and reliability. However, only a few of the available instruments have been tested for their discriminating qualities – their sensitivity and their specificity. To this effect longitudinal studies are needed.
4. The group felt that an instrument that can measure OHQOL in different European populations is required.
5. The instruments selected must be easy to use.
A first step to the development of such instruments should start by exploring all existing instruments. This review could be done by a sub-group of project members. It should include a critical analysis of existing material.

Report from Working Group 3 – Oral Health Systems

Introduction

Working Group 3 concluded that, in general, the topics on oral health systems listed in the questionnaire distributed to national representatives before today’s meeting were not those for which Pan-European indicators should be developed. The working group’s members agreed that there were five areas within the topic of oral health systems that required indicators. All five areas could be considered as “first level” topics for oral health care systems. They were:
- Goals and Policies
- Access and Utilisation
- Effectiveness and Outcomes
- Workforce
- Costs

There was unanimous agreement that there is a need for anyone considering these areas to have knowledge of the current national systems for providing oral health care in Europe. Both the Council of European Chief Dental Officers (CECDO) European Liaison Committee (ELO) has published descriptions of the systems in the members states of the European Economic Area (European Union plus Iceland, Norway and Liechtenstein). The references for these existing publications are Andersen et al. (1998) and Widström and Eaton (1999). Both publications are being updated. The new editions will include details of the systems for the provision of oral health care in the ten accession countries as well as the existing member states of the EEA when they are published in 2004.

Goals and Policies
The working group agreed that all future goals and policies for oral health should fit within goals and policies for all aspects of health and should be developed in collaboration with health planners to ensure that they were integrated into national and European health plans.

Within the European Oral Health SANCO project the working group concluded that two questions needed to be asked of all national planners. These questions were:
- Is there an active national oral health policy in your country?
- If so what is it and what goals does it contain?

Once these questions have been answered, it should be possible to suggest “second level” indicators for national oral health goals and policies.

Access and Utilisation
Some countries (usually those with well developed publicly funded oral health care systems) are able to provide some data on these topics. However, they are generally far from comprehensive and the following “second level” indicators need to be developed in the future:
- For access to oral health care at area, regional and national level for the following groups:
  – At risk patients
  – Priority groups
- Others
- For the time (as opposed to distance) that patients travel to access oral health care.
- For access to:
  - “Preventive” care
  - “Curative” care
- For levels of access i.e. to:
  “Preventive” care
  - Basic (emergency) care
  - Care leading to disease elimination and oral stability
  - Total care (including “cosmetic” as well as “functional” treatment)
- For the percentage of the population using oral health care services within the previous 12 months.

**Effectiveness and Outcomes**

The working group were aware that the oral health care status group would be considering aspects of this topic and would be making recommendations on epidemiological indicators. It therefore sought to suggest second level indicators which would supplement the epidemiological ones and suggests that the following should be developed:
- For arresting the progression of caries.
- For the level of caries (from early enamel to pulpal lesions) c.f. the system used in Denmark.
- For the percentage of the population not requiring active oral health care (note – who decides this patients or clinicians?)

**Workforce**

Existing national data on workforce numbers reported to European organisations such as Eurostat, the Organisation for Economic Co-operation and Development (OECD), the ELO and the CECDO are not comparable (Eaton, 2002). The reasons for this are due to a lack of universally agreed definitions and lack of time and understanding by some of those reporting the data. In view of the European Directives, which allow freedom of movement throughout the EU, accurate information on workforce numbers should be a key priority. A recent complication has been the development of a number of private dental schools in Spain and Portugal which are likely to increase the number of dentists graduating in these countries to some 2,500 per annum from 2008 onwards. The following information should be collected and reported annually by all EU member states for all members of the oral health care workforce (dentists, dental nurses, dental hygienists, dental technicians (clinical and laboratory), dental therapists and for any new groups which may develop in the future:
- Total numbers
- Gender
- Age profile
- Numbers working
- Hours worked per year
- Area of practice e.g. general practice, hospital, public dental service, university.
- Numbers of specialists by specialty

In addition there is a need for annual reports from each EU member state on:
- Numbers of dental schools
- Numbers of other schools training members of the dental team
- Annual intake to dental and other schools indicating gender
- Annual output from dental and other schools indicating gender
• Length of all training courses in hours
• Whether or not continuing professional education (CPE) is mandatory
• If CPD is mandatory, how many hours per year are required

Costs
The working group felt that the following second level indicators should be developed against agreed criteria and reported annually by all EU Member States:
• Total expenditure on all aspects of oral health
• Expenditure on “preventive” oral health care
• Expenditure on “curative” oral health care
• Expenditure on all aspects of education and training
• Expenditure on work produced by dental technicians
• Expenditure on oral health care in hospitals

Other Points
The working group were aware that most, if not all, of the suggested indicators are not currently in use within European countries and that they will need to be developed. None of the existing indicators for oral health systems are reliable. When developing indicators the following points should be borne in mind:
• Agreement of definition of terms.
• An understanding of the oral health care systems in each member state.
• The tension between harmonisation and the reality of existing systems and a political will to maintain the status quo.
• Patients’ views conflicting with governments’ and other funders’ views e.g. the need to fund “cosmetic” oral health care.

The working group was aware that it would be very difficult to gather information in some countries. It was suggested one way to overcome the problem might be to include questions on the cost and utilisation of oral health care services in household surveys. The working group also felt that it would be necessary to agree which of the many indicators it would like to see developed could be developed immediately and which ones would need to be developed in the future.

Final Point
The responses to the questionnaire on existing national oral health indicators which was distributed before today’s meeting were not discussed within the working group. However, both the Chairman and Rapporteur for the group suggest that because no calibration of respondents took place before the questionnaires were submitted, their accuracy may be doubtful and that, in their present form, they should purely be used for discussion within the project and not published.

Perspectives - Conclusions
The specific objectives of the meeting were reached on the following points:
• Strengthen the ability at the local, national, regional levels to measure, compare and determine the effects of oral health services and use of resources
• Identify indicators of oral health (problems, determinant and risk factors related to lifestyles) of critical oral health care
• Identify the types of data generation and management problems within the HIS
• Identify principles for guiding the selection and use of OH indicators
• Identify a set of core indicators for oral health
• Review the recent oral health indicator selection efforts

The next step of the programme is to produce end of 2003 a compendium issuing of the meeting under the auspices of the SANCO Monitoring Programme including all the presentations, discussions, contributions of the Group.

The Oral Health Indicators questionnaire must be, in accordance with the recommendation of the working groups, revisited in order to increase the precision especially in the field of the quality criteria which should be defined in a clearer and more hierarchical way.

The finalisation of the long list of the indicators – end of 2003- will introduce the processes of the Delphi consultation through the European network in order to submit an initial short list in the next European meeting held on Granada, 8-9 May 2004.
Summary Report

Purpose
By holding the first official international research team gathering of the European Global Health Indicators Development (EGOHID) project of the EU Health Monitoring (SANCO) Programme, to launch the dynamic consultative process.

Brief summary
The meeting brought together members of the EGOHD Steering Group, WHO and many collaborative institutions within the EU (agenda and participant list attached). The overall goal was to address the profusion of internationally recommended indicators for oral health which have led to unnecessary and costly monitoring efforts. The specific objectives of the meeting were to
- Strengthen the ability at the local, national, regional levels to measure, compare and determine the effects of oral health services and use of resources
- Identify indicators of oral health (problems, determinant and risk factors related to lifestyles) of critical oral health care
- Identify the types of data generation and management problems within the Health Information System
- Identify principles for guiding the selection and use of OH indicators
- Identify a set of core indicators for oral health
- Review the recent oral health indicator selection efforts

Recommendations/Action to be taken:
- Statement of list indicators should be in line with the WHO S.U.R.F, NCD Info Base model.
- International expert groups should review the effectiveness and relevance of the methodology at regular intervals and commission auditors of surveys
- All future goals and policies for oral health should fit within goals and policies for all aspects of health
- This will require agreement on a standard minimum set of indicators suitable to measuring population levels of adult oral health
- The outcome on essentials indicators for oral health determinants, risk factors and factors of prevention by hierarchical order was: Social class, eating/drinking frequency (sugar containing food and drinks), brushing frequency with fluoridated toothpaste, tobacco use, and general health.
- There is a need for measurement of quality of life in relation to oral health.
- Five areas within the topic of oral health systems that required indicators could be considered as “first level” topics for oral health care systems: Goals and policies; access and utilisation, effectiveness and outcomes, workforce and costs.
List of Participants

European Global Oral Health Indicators
Development Steering Group

**Professor Denis M. Bourgeois**  
Project Leader, Department of Public Health, Faculty of Dentistry, University Lyon I, Rue G. Paradin, Lyon, France

**Professor Cesar Mexia de Almeida**  
Facultade de Medicina Dentaria, Citade Universitaria, P-1600-214 Lisboa, Portugal

**Professor Thomas Hoffmann**  
Department of Periodontology, Medical Faculty, University of technology of Dresden, Fetscher Strasse, 3e 74, 01307 Dresden, Germany

**Dr. Carina Källestål**  
Head of Unit, National Institute of Public Health, Unit for Intervention Research, Olof Palmes gata 17, SE-103 52 Stockholm, Sweden

**Professor Denis F. Kinane**  
University of Glasgow, Dental School, 378 Sauchiehall Street, G23JZ Glasgow, U.K

**Professor Juan Carlos Llodra**  
Facultad Odontologica, Universisas Granada, Campus Universitario La Cartusa, Granada, Spain

**Dr. Anne Nordblad**  
Head of Development (oral health), Docent, Ministry of Social Affairs and Health, Health Department, P.O Box 33, FIN-00023 Government, Finland

**Professor Poul Erik Petersen (represented by Dr. Lisa Boge Christensen)**  
WHO Collaborating Centre for Community Oral Health Programmes and Research, Department of Periodontology, School of Dentistry, University of Copenhagen, 20 Nørre Allé, 2200 Copenhagen, Denmark

**Professor Denis O’Mullane (represented by Dr. Helen Whelton)**  
WHO Collaborating Centre for Oral Health Services Research, Oral Health Services Research Centre, University Dental School and Hospital, University College Cork, Wilton, Cork, Ireland

**Dr. Erik Skaret**  
Associate Professor, University of Bergen, Center for Odontophobia, Aarstadveien 17, N-5009 Bergen, Norway

**Professor Laura Strohmenger**  
WHO Collaborating Centre for Epidemiology and Community Dentistry, Clinica Odontostomatologica, Instituto Scienze Biomediche San Paulo, University of Milan, Via Beldiletto 1/3, 20142 Milan, Italy

**Professor Jean-Pierre Van Neuwienhuysen**  
Université Catholique de Louvain, Cliniques Universitaires Saint Luc, Département de Médecine Dentaire et de Stomatologie, Hippocrate Avenue S15, Brussels, Belgique

**Dr. Jaap Veerkamp (Represented by Dr Maddelon Lenters)**  
Department Pediatric Dentistry, ACTA, Louwesweg 1, NL 1066 EA Amsterdam, Netherlands

**Dr. Gernot Wimmer**  
Universitätsklinik für Zähn, Mund- und Kieferheilkunde, Auenbruggerplatz12, A-8036 Graz, Austria
Guest Speakers

Prof. Pierre C. Baehni
Fédération Européenne de Parodontologie, Section de Médecine dentaire, Université de Genève, Rue B. Menn 19, CH-1205 Genève, Suisse

Dr. Ruth Bonita
Director, Surveillance Noncommunicable Diseases and Mental Health, World Health Organization, CH-1211 Geneva 27, Switzerland

Dr. Joana Carvalho
Associate Professor, Université Catholique de Louvain, Cliniques Universitaires Saint Luc, Département de Médecine Dentaire et de Stomatologie Avenue Hippocrate 15, 1200 Bruxelles, Belgique

Prof. Gérard Duru
Director of Research CNRS, UMR 5823 CNRS Bât 101 Université Lyon 1; 27, Bd du 11 novembre 1918, 69622 Villeurbanne, France

Dr. Kenneth A. Eaton
Adviser to the Council of European Chief Dental Officers, Old Saddlers, Kempe’s Corner, Boughton Aluph, TN 25 4EW Ashford Kent, U.K

Prof. Poul Erik Petersen
Group Leader, Oral Health Programme, World Health Organization, CH-1211 Geneva 27, Switzerland

Prof. Paul Riordan
Dental Services, Locked Bag, Bentley D.C. WA 6983, Western Australia, Australia

Prof. Eeva Widström
President of the Council of European Chief Dental Officers, Chief Dental Officer, STAKES P.O. Box 220 – Lintulahdenkuja 4 00531 Helsinki Finland

Others Participants

Mrs Sylvie Chartron
Scientific Affairs Manager, Masterfoods, BP 36, Haguenau cedex, France

Dr. Jacques Desfontaine
CCOMS pour le développement de nouveaux concepts d’éducation et de pratiques bucco-dentaire, Union Française pour la Santé Bucco-dentaire, 7 rue Mariotte, 75017 Paris, France

Dr. Alejandro Ceballos
Dean, Facultad Odontologia, Campus Universitario, La Cartuja, Granada, Spain

Dr. Paul Karsenty
Direction Générale de la Santé, Ministère de la santé, de la famille et des personnes handicapées, 8, avenue de Ségur, 75007 PARIS

Prof. Nigel B. Pitts
Vice President European Association of Dental Public Health, Dental Health Services Research Unit, Dundee Dental Hospital and School, Park Place, DD1 4HR Dundee Scotland, U.K
Dr. Paul Langmaid  
Council of European Chief Dental Officers, National Assembly for Wales, Cathays Park, CF 10 3NQ Cardiff, U.K

Dr. Henri Michelet  
Président Commission Europe, Conseil National de l'Ordre des Chirurgiens Dentistes, 22 rue E. Menier, Paris, France

Dr. Catherine Miller  
Associate Professor, Department of Odontology, Faculty of Dentistry, University of Paris V, 1 rue M. Arnoux, 92120 Montrouge France

Dr. Gianluigi Morciano  
Universita Degli Studi di Pavia, Department "Biotatistica e Metodologia Epidemiologica", Via A. Bassi, 21, 27100 Pavia, Italy

Professor Michèle Muller-Bolla  
Associate Dean, Oral Public Health Department, Faculty of Odontology, University of Nice Sophia Antipolis, 24 Avenue des diables bleus 06357 Nice, France

Dr. Livia Ottolenghi  
Preventive and Community Dentistry, Dental School, University of Rome "La Sapienza", v.le Regina Elena, 287/a

Dr. Elpida Pavi  
Chief Dental Officer, Hellenic Ministry of Health, 32 Hippocrates Street, 106 80 Athens, Greece

Mrs Gabrielle Sax  
Magister, Chief Dental Officers, Österreichisches Bundesinstitut für Gesundheitswesen (OBIG), Austrian Health Institute, Stubenring 6, Wien, Austria

Dr. Egita Senagola  
Medical Academy of Latvia, Institute of Stomatology, 20 Dzirciema Street, LV1007 Riga, Latvia

Dr. Judit Szoke  
Huba u 10, 1134 Budapest, Hungary

Dr. Alfonso Villa Vigil  
President of the National Dental Spain Association, Consejo General de Odontologos y Estomatologos de Espana C/Alcala 79, 2 Planta 28009 Madrid, Spain

Adviser

Dr. Annamari Nihtilä  
Sepontie 1 V, Espoo, Finland

Secretariat – EGOHID – University Lyon 1  
Laboratory of Analysis in Health System, UMR 5823 CNRS Université Lyon 1  
27, Bd du 11 novembre 1918, 69622 Villeurbanne, France

Professor Jean Paul Auray  
Director of Research CNRS

Dr Bruno Comte  
Associate Professor

Mrs Marie Hélène Leclercq  
Project coordinator

Mrs Claire Rigaud-Bully  
Logistic Manager
Chapter 2

Health Surveillance in Europe

European Global Oral Health Indicators Development Project

2004 Report Proceedings

1st Consensus Workshop for Selecting Essential Oral Health Indicators

University of Granada
Spain

7-8 May 2004

Project supported by the European Commission
Health and Consumer Protection Directorate-General
Health Surveillance in Europe
European Oral Health Global Indicators Development Project

Selecting Essential Oral Health Indicators in Europe

Report of the Consensus Workshop

University of Granada, Spain
7-8 May 2004
Selecting Essential Oral Health Indicators in Europe

Report of the Consensus Workshop

University of Granada, Spain

7-8 May 2004

This project received a financial support of the European Commission, Health and Consumer Protection Directorate-General contract n° SPC 2002472.
Numerous projects have been proposed by different teams from European countries within the framework of the Community action programme in the area of health surveillance. The major objective of this programme was to contribute to establish a community system for health surveillance. It embodied three specific objectives:

1- to develop community health indicators through a critical review of existing data and indicators;
2- to enable the realisation of a reliable communication system for data and health indicators transfer and sharing;
3- to define the necessary methods and instruments for analysis of activities and the production of reports on health status, trends, and policies' impact on health.

The project titled "European Global Oral Health Indicators Development" (SPC 2002472) has been developed under the auspices of this Programme. The first phase of the Project terminated and the final report was produced in February 2004. The second phase, including the workshop of Granada, is currently ongoing.

The purpose of the European project on Global Oral Health Indicators Development Project is to establish priorities for a specifically European context in coordination with the existing programme and to make new recommendations for improving health system performance when necessary. The goal of the first year of the EGOHD project was to initiate the long list of indicators, background document for the establishment of the major indicators.

To facilitate the achievements of the global objectives of the Project, the second European "Consensus Workshops for Selecting Essential Oral Health Indicators" has been convened in Granada, Spain, 7-8 May 2004. The aim of the workshop was to proceed with the selection of essential specific and generic oral health indicators at national and regional levels in Europe. The major objectives of the meeting focused on:

1- the identification of a list of priority oral health problems, populations and high risk group;
2- the definition of a table of essential indicators in the following areas: indicators of priority oral health problem, indicators of service delivery, quality of care and indicators of critical health resources;
3- the validation of the final long list of oral health indicators and
4- a common understanding of terms and criteria for selection of indicators.

In May 2004, thirty-one participants from oral health institutions attended to the two-day meeting in addition to the project leader staff. Members or representatives from the Steering Group Committee were present. Representatives of Ministries of Health - Austria, Finland, Spain, Greece, Sweden, UK, - delegates of the Council of European Chief Dental Officers, the European Association of Dental Public Health assisted as the delegates - Czech Republic Latvia, Hungary - from new European countries. Members from European universities - Italia, France, Spain and UK -, WHO Collaborating Centers and officials from dental institutions were present.

After the official opening ceremony by Mr Diaz Carillo, Vice Rector for International Relations, University of Granada, Professor Cabello, Dean, Dental Faculty of Granada, Mr Mérida, vice Mayor, and introductory considerations by Professor Bourgeois, group leader, the first day, mainly focused on methodological considerations to select a short list of indicators from the initial long list. Ten presentations underlined point of views of European health policy requirements and decision makers expectations on short list of indicators in Europe. The major concept to define the criteria for priority indicators was that the choice of a short list of indicators was related to choices of health policy. Thus, in order to compare the situation and the concrete, current and future knowledge of their countries, decision-makers presented expectations and needs for the development of a national program on oral health surveillance based on a minimum list of information. A short 10-15 minutes talk was proposed around three strategic questions:

1- How does the monitoring currently occur;
2- Which are the positive and negative points of the system;
3- Which priority information do we want to obtain and for which priorities on health objectives.

The second day - "Long List as the starting point for selecting Core Indicators" - was focused on the harmonization of knowledge, validation and critical analysis of the final long list issued from the European consultation, September 2003-May 2004. Three working group by theme were formed to identify broad issues which, if applied, would provide the greatest oral health gain and prioritise each intervention. The issue of indicators concerning the health determinants, oral health and quality of life and oral health systems was discussed in three rotating working groups thus the report from their deliberations encompasses the views of all participants of the Granada workshop.
There was unanimous agreement that the Oral Health System has to have the ability to identify the at-risk groups of the population in a global context where risk criteria may differ for different age groups. Main indicators should focus on school-based programmes implying that school children are a major at-risk group. Eventually, the main factor/indicator which should be formulated is the outreach philosophy and practice of the system which must adopt the common risk factor / multidisciplinary approach.

From the discussions which took place it was suggested that the following five areas/topics are of key importance when collecting data on oral health care systems and that further work is necessary to develop methodologies and mechanisms which overcome current problems in implementing their national data collection in all the countries of the Union:
1. Workforce (number, need/demand, migration);
2. Migration of oral health care workers and patients;
3. Access to oral health care;
4. Uptake/utilisation of oral health care services and
5. Costs of oral health care.

The view was accepted that oral health determinants are considered important because they allow us to actually identify the at-risk groups. The discussion on relevant determinants for the identification of those groups of population showed considerable confusion in the use of terminology and in the consistent application of standards.

Furthermore, regularity of dental attendance may be determined differently in different member states and it strongly correlates with needs. Differences in the optimal regularity (frequency) of dental attendance were also discussed. Eventually, it was concluded that the most important determinant of utilisation of dental services from the point of view of the at-risk groups is the economic status. The role of tooth-brushing behaviour, eating and drinking patterns, smoking, alcohol consumption and medications for chronic conditions were discussed and underlined. Frequency of intake was examined as an indicator. An important consensus was reached when all the working groups agreed that there is need for measurement of the oral health related quality of life.

The working groups’ reports and the general discussion provided the basis for the finalisation of the long list of oral health indicators.
Professor Denis Bourgeois, Group Leader

Professor Bourgeois gave information on the recommendations and results of the first workshop, Lyon, September 2003. The objectives of the meeting of Lyon was achieved by the identification of the health information system problems relevant to the use of oral health indicators, the identification of the principles for guiding the selection and use of oral health indicators, the identification of the recent oral health indicator selection efforts, the identification of four indicators categories of oral health (Determinant and risk factors; Health services, Oral health status, QoL) and with the review the recent oral health indicator selection efforts.

The major recommendations/actions to be taken of the first European Workshop on Oral Health Statistics, Lyon were underlined:

- Statement of list indicators should be in line with the WHO S.U.R.F, NCD Info Base model
- All future goals and policies for oral health should fit within goals and policies for all aspects of health
- This will require agreement on a standard minimum set of indicators suitable to measuring population levels of oral health
- The outcome on essentials indicators for oral health determinants, risk factors and factors of prevention by hierarchical order was: Social class, eating/drinking frequency, brushing frequency with fluoridated toothpaste, tobacco use, and general health.
- There is a need for measurement of quality of life in relation to oral health
- Five areas within the topic of oral health systems that required indicators could be considered as "first level" topics for oral health care systems: Goals and policies; access and utilisation, effectiveness and outcomes, workforce and costs.

This was followed by a presentation on the "objectives, models and expected products" of the workshop.

The objectives of the Granada workshop were to:

1. process of selecting essential generic and specific oral health indicators at several levels and especially to validate the final long list of oral health indicators;
2. provide a common understanding of terms and criteria of selection of indicators and
3. list of priority oral health problems, populations and high risk group.

Agenda, methods, process and work plan of the Granada workshop were outlined.

Before open the discussion, Professor Bourgeois presented and analysed some potentials models of oral health indicators developed at international or national levels.

This meeting is opening with an introduction to the issue relating to the guiding criteria for the selection of oral health indicators. Before even starting to develop a list of existing indicators - a list that should be as comprehensive as possible - the following question should be raised "which of those indicators are we going to collectively retain on the final list".

As soon as a selection process is engaged, a consensus should be reached on: what will be the sorting criteria and their hierarchical order. The methodological aspects relating to these questions will be the object of specific working sessions during the course of the meeting. This introduction is restricted to underline the main characteristics for a selection, in relation to the various reference areas: European Community health policies needs, scientific definition, usefulness and feasibility, ethical demand.

European Community health policy requirements

The European Commision Health Monitoring Programme has as its main objectives:

- Monitor the trends in the European community
- Evaluate Community Programmes and actions
- Provide Member States with appropriate health information to make international comparisons and to support their national health policies.

On this basis we may refer to the basic criteria proposed by the Group in charge of the ECHI project (European Community Health Indicators) which recommends that the indicator set should be:

1. coherent in the sense of conceptual consistency, this implies that a shortlist should nevertheless cover the multi-dimensional aspect of oral public health surveillance, all areas usually included in the field of oral public health. This is indeed the fact for the longlist already developed which is structured in the four main domains of reference; 2. respond to oral health policy priorities, acknowledging the fact that these will be defined by each Member State and adjusted at local or regional levels; 3. indicators should be scientifically valid, reliable and relevant.

1/ Paper written in collaboration with Mrs Marie-Hélène Leclerc, project coordinator
Conceptual consistency

A set of indicators in oral public health, even restricted to a minimal essential list, has a time dimension and should cover the four major following dimensions:
- Demography and socio-economic factors
- Health status, morbidity and oral function status
- Determinants (behaviour, life habits.)
- Oral health system/promotion, prevention, access to care, quality care and system performance.

The number of indicators in each area will vary mainly in relation to health policy priorities and to feasibility aspects of data collection and processing.

The issue of health policies

Increasingly EU member States or regions within MS have formulated health priority areas or targets for health policies. There is a noticeable trend to broaden the spectrum of health objectives moving from simple morbidity measurements, or prevalence of specific diseases to objectives expressed in terms of quality of life improvements, reduction of health inequalities with reference to social policies enabling goals. For example health promotion and prevention tend to focus on specific population groups according to specific life-styles (specifically children or elderly), goals are formulated for quality of care and access to care, or in terms of social life involvement of entire groups of population such as the aging population.

For the oral health sector, this evolution implies a broader concept of the role of oral health professions and their contribution to general health. In addition, special attention should be given to the systematic integration of oral health indicators in any health surveillance system so that trends and changes in life-style and quality of life behaviour in relation to oral health can be monitored effectively.

If there is a general move of health strategies towards health promotion and prevention, consideration should nevertheless be given to the fact that the situation varies considerably from country to country. There will be situations for example, where the information priority will be given to the organisation (or the reorganisation) of the health system for a better quality of care. Clearly health priorities are considerably variable in time and from country to country.

Scientific value, reliability and relevance of selected indicators

As short as the list may be, nevertheless, all selected indicators should have the four basic scientific qualities universally accepted.

We propose to stick to the definitions given by the WHO health statistics programme:

- **Validity**: it is a true expression of the phenomena it is measuring
- **Objectivity**: it is able to provide the same result if measured by different people under similar circumstances
- **Sensitivity**: it is capable of reflecting changes in the phenomena of interest and
- **Specificity**: it reflects changes in only the specific phenomena of interest.

If the WHO recommendations respond to the necessity of the scientific requirements it is also associated to a deep sense of pragmatism. An indicator that would be qualified “impeccable” scientifically but too expansive to collect or even impossible to use in a given practical situation would be totally useless. Therefore additional criteria should be considered relating to the actual use of the indicator and to the methodology used to collect the data:

- The data required for the indicator are useful for case management or taking action in the community by the staff who originally recorded the data or the service unit from which the data originated.
- It should be feasible to obtain as far as possible through routine service processes or through easily and rapidly executable surveys.
- It should be simple and understandable, measuring one health condition or aspect of the service.
- The indicator and the process of collecting and processing the relevant data are ethical.

Lastly, in the elaboration of the indicators selection process, quantitative principles should be considered as important criteria such as: the frequency of a given health problem, its total costs, its avoidable characteristic (prevention, promotion). This is particularly relevant for indicators of high oral health morbidity and indicators in the field or oral health determinants.

A flexible approach to a shortlist of oral health indicators

In September 2003 on the occasion of the first meeting held in Lyon, Dr Ruth Bonita gave a detailed and comprehensive description of the "Stepwise" approach developed by the WHO. This is a practical example of a dynamic, multi-dimensional health data collection system, highly adaptable to the objectives and priority information required. In the same spirit, the ECHI group proposed the concept of “user-windows” based on the selection of sub-sets of indicators taken from the comprehensive list of indicators developed. The specific user’s perspective for selecting user-window could be (i) specific areas of health policy interest (prevention oriented, services oriented, intersectoral policies), (ii) specific thematic entries such as age-groups, (iii) specific disease groups.
with their determinants and costs etc.. This concept offers a more "natural" approach than that of the "core" as the number of possible windows is countless with expansion of information at any level. Whatever system is envisaged, this notion of flexibility is essential. Whatever the final content of the list of oral health indicators will be, it will need revisions and updates as the diagnosis methods develop, as the care techniques evolve, as the knowledge on oral diseases progresses, as the information technology changes. Profound modifications will also occur in the way of thinking, in health values and quality of life behaviour, a number of living parameters dynamic by essence.

Indicators and health objectives

Indicators are markers for health status, system performance or available resources. They are usually established to ensure follow-up and evaluation of progression towards health targets formulated by strategic programmes. They should not be confused with public health objectives expressed in terms of disease reduction or public health improvements. These are quantitative measurable achievements reached within a specific time-frame.

A practical and interesting example is given by the work of the US Public Health Services, Department of disease prevention and health promotion. The document produced "Health 2010" can be consulted on their web-site.

For oral health, twelve priority objectives for 2010 have been formulated. Oral public health is a very broad concept. Objectives relating to the reduction or the prevention of the most common oral diseases: caries and periodontal diseases, are found among health promotion objectives such as "increase the number of health practitioners and dentists counselling their patients on tobacco consumption, physical activity and cancer screening", "increase the proportion and the number of local health services which have established preventive and health promotion programmes.", are found together with "reduce the proportion of children and adolescents with untreated caries" or "reduce periodontal diseases". Some objectives are formulated in terms of social equity "increase the number of children and adolescents having had at least one access to preventive oral health care in the last year", objective for "the integration of the oral health system within the first level of reference of the health system", "increase the proportion of oral care services within the school health system", an objective relates to the reduction of facial trauma by furnishing protective equipment during physical activities at school".

Each of the 12 priority objectives embodies subsets of goals with corresponding measurable indicators and a calendar for desired achievements.

It should be noted that oral health is broadly integrated within the health sector in the formulation of general targets as well as reflected in the list of proposed indicators. Oral health is considered as a full participative health sector, contributing not only to the promotion of oral health but also as a key actor to the promotion of general health.

Conclusions

In summary, we should keep in mind that beside their scientific qualities, the selected indicators should: respond to the priority needs of the community health strategies, national, local or regional, strategies for disease reduction and health promotion, be practically useful and easy to collect, be part of a highly adaptable information system, adaptable to the variety of needs and resources ant to the evolution of scientific and economic contexts.

The development of national and international health surveillance systems has resulted in a deluge of indicators overwhelming health services personnel in charge of epidemiological surveillance and evaluation of care programmes. The oral health sector is no exception. Within a context of a profusion of health indicators, operating a selection is not an easy task. The need for the necessary integration of the oral health sector within the national and European health information systems is an added challenge, considering that this should be done at all levels of the reference system. A challenge that this European research project will contribute to meet with practical and decisive recommendations.

References

Chapter 2
Methodological considerations

Validity criteria for health indicators in relation to priorities and health systems strategies
Professor Gerard Duru, University Lyon, France

Professor Duru presented an opening communication titled “Towards integrated surveillance”. Before beginning work on setting priorities and to develop a common understanding of terms, Professor Duru described in details the terms “Vision, goals, objectives, baselines, and targets” often are used differently by participants in planning processes. Then he described the criteria for objectives development. It underlined that the result to be achieved should be important and understandable to a broad audience and relates to the goals and focus areas. In his view,

1- objectives should be prevention oriented and should address health improvements that can be achieved through population-based and health-service interventions;
2- objectives should drive action and suggest a set of interim steps that will achieve the proposed targets within the specified timeframe;
3- objectives should be useful and relevant. States, localities, and the private sector should be able to use them to target efforts in schools, communities, work sites, health practices, and other settings;
4- objectives should be measurable and include a range of measures–health outcomes, behavioural and health service interventions, and community capacity-directed toward improving health outcomes and quality of life. They should count assets and achievements and look to the positive;
5- continuity and comparability are important. Whenever possible, objectives should build upon Healthy People 2010 and those goals and performance measures already adopted;
6- at least, there must be sound scientific evidence to support the objectives.

Professor Duru explained the criteria guiding selection of leading health indicators. Criteria Guiding Selection of Leading Health Indicators e.g.

1- Worth measuring;
2- Can be measured for diverse populations;
3- Understood by people who need to act;
4- Information will galvanize action;
5- Actions that can lead to improvement are known and feasible;
6- Measurement over time will reflect results of action.

He presented locally appropriate interventions developed by the task forces using an evaluation framework known as PEARL (Vilnius and Dandoy): a socio-economic, legality, and the task forces using an evaluation framework known as PEARL (Vilnius and Dandoy): a socio-economic, legality, and political viability tool.

To conclude, Professor Duru indicated the criteria to prioritise each intervention against the criteria:

1- Effectiveness
2- Strength of evidence that the indicator produces the outcome
3- Quality including precision, validity, repeatability, timelessness, sensitivity, responsiveness to change and consistency over time
4- Potential to change clinical practice to best practice
5- Feasibility of measuring the indicator (periodic compared to continuous monitoring)
6- Cost of collecting data.

Knowledge Discovery and Data mining: Methodology for aggregation of preferences
Dr Nicolas Nicoloyannis, EGOHIP Consultant

The transition from the individual to the collective is a real issue in social science. Indeed, to “govern”, a choice has to be made between different alternatives, but if it is the “population” which is governing, these choices must be made collectively. Individual choices or even individual preferences therefore must be aggregated into a collective choice.

The aggregation of individual preferences can be classed as “democratic” if it complies with a minimum of principles as follows:

Universality: This principle states that once the group of individuals whose preferences are to be established in a collective choice has been selected, we cannot eliminate the preferences of certain individuals.

Unanimity: If all of the individuals opt for A over B, then the collective choice must also opt for A over B.

Non-dictatorship: The preference of a single individual cannot be chosen as a collective preference if all of the others disagree.

Independence of irrelevant alternatives: The collective choice between A and B must solely depend on individual choices between A and B and not on an “irrelevant alternative” X which is entirely independent of A and B, or the aggregation procedure can be manipulated.

Transitivity: If A is chosen over B and B is chosen over C, then A must be chosen over C.

On the basis of these five principles which no democratic aggregation procedure can violate if it is considered as such, we can now state the Arrow Theorem, developed by the eponymous Kenneth J. Arrow, awarded the Nobel Prize in Economics in 1972.

The Arrow Theorem (1951): There is no procedure to aggregate individual choices into collective choices which complies with the 5 aforementioned principles.

It should also be noted that Arrow was not the only one to have developed the logical impossibility of democratic contentions. He merely expanded the theory of public choices, already approached in the eighteenth century by Borda and Condorcet, who highlighted certain inconsistencies inherent in voting procedures.

The formation of a preference aggregation method implies the elimination of one of the five proposed principles.

The principle which tends to be eliminated is the most antidemocratic one, that of non-dictatorship.

The method that we propose for preference aggregation complies with the four principles set out above and is based on the principle of comparison by pairs, or indeed the Condorcet approach.

It should also be noted that the classification implied by this methodology can give rise to an idea and a discussion between experts for a compromise to be reached which is acceptable for the project participants.
Chapter 3
Short list of indicators in oral health: Point of views: health policy requirements and decision makers expectations

The next section of the presentation was to consider responses to a central question relating to oral health indicators asked of a number of policies and decision makers: How does monitoring currently occur? and then seeks to illuminate issues where change is needed. Two additional questions were requested: What are the positive and negatives of current systems? and How can we combine the priority information which is needed into a rational template which will allow choice of the appropriate tool(s)?

3.1. Decision in Principle by the Council of State on securing the future of health care in Finland
Dr. Anne Nordblad, Ministry of Social Affairs and Health, Finland

In recent years, there have been growing problems in the operational framework for and availability of services and this is something which must be addressed. The service system is being developed in cooperation between municipalities and the state, taking into consideration the operations of the private and the third sector. According to legislation, the responsibility for arranging services lies mainly with the municipalities.

The Council of State issued a decision in principle to secure the future of health care in April 2002 (www.stm.fi Brochures 2002:6eng). The aim of the decision in principle is to develop health services as cooperation between the municipalities and the state so that the activities of NGOs and the private sector are also taken into consideration. In this way it is possible to ensure that the population receives the high-quality care that it needs in different parts of country in such a way that the provision of treatment is not dependent on the recipient's ability to pay. This includes oral health care services. In order to ensure the practicality of the service systems, the Council of State has decided upon the following measures:

Viable primary health care and preventive work
Sufficiently resourced and viable primary care is the foundation of the entire health care system. Preventive work is one of the paramount duties of primary health care, which together with the responsibility of the public for their own health and health habits, inhibits the rise in demand for services and redirects the need for services towards less demanding, more outpatient-orientated forms of treatment. The government has previously issued a statement concerning measures to promote health in the Health 2015 Programme.

Ensuring access to treatment
In order to decrease differences in the criteria for access to treatment, nationwide guidelines for non-urgent treatment and queue management will be implemented. The principle of access to treatment within a reasonable period including oral health care has been embodied in legislation which will be in force in March 2005.

Ensuring the availability and expertise of personnel
The Ministry of Education revised in 2003 the decrees concerning the further education in primary health care and specialised education of physicians as well as similar degrees applying to dentists, so that education following each primary physician’s and dentist’s first degree should include a period of at least nine months’ practical work at a health centre (for dentists practical work should include at least six months at health centre). At least half of the specialised education should be carried out somewhere else than in a university hospital.

In-service training for personnel will be arranged which, depending on the length of the basic education, on how demanding the work is and on the changes to the job description, should be in average 3-10 days a year. The employer will be responsible for the costs of in-service training.

The reform of functions and structures
Primary health care is organised as regional, operational entities, big enough to function. Operational cooperation and the division of work will be carried out. Emergency services are being rationalised. In laboratory and imaging operations, there will be a changeover to units formed out of one or more hospital districts, and municipal enterprises and state-of-the-art technology will be utilised. The preparation of national treatment recommendations and regional treatment programmes will continue and their application in practice will be enhanced, so that the increase in efficiency will achieve rationalisation-related benefits. Nationwide electronic patient records will be introduced.

Augmenting the finances of health care
As of 2003, state subsidies for social welfare and health care allocated to the municipalities will be increased by EUR 104 million a year in accordance with decisions made in government framework negotiations. The service system is being developed as programme work advancing in stages, for which from 2004 to 2007 a project allocation is of EUR 30 million annually for health care.

As conclusion the key spheres of development are concerned with health promotion and preventive work, ensuring access to treatment, staff availability and the improvement of skills, reforming health care functions and structures and reinforcing financing. This is a national reform, which concerns all parties. There is an urgent need to establish a good follow-up with clear indicators also in oral health care.

3.2. Point of views: health policy requirements and decision makers expectations
Professor Nigel Pitts, University of Dundee, Scotland, UK

Professor Pitts acknowledged the organisers for the invitation to contribute the perspectives of a range of interests on efforts to harmonise oral health indicators. This challenging task should be taken forward in an open way which acknowledges what has been achieved to date, together with the new evidence which is emerging on an international level both from within Europe and more globally.

The perspective presented by Professor Pitts is drawn from a range of views derived from a number of positions he holds and activities he participates in. These include:

- The European Association of Dental Public Health (EADPH), in which he is currently President and Chair of the Epidemiology Special Interest Group
- The British Association for the Study of Community Dentistry (BASCD), where he is an Scientific Coordinator of the BASCD / NHS Dental Information Programme
- From Scotland, experiences from the new National Dental Inspection Programme (NDIP)
- From a UK National Survey Consortium comprising: the Office of National Statistics and the Universities of Birmingham, Cardiff, Dundee and Newcastle
- From the International Caries Detection and Assessment System (ICDAS), where Professor Pitts is co-Chair the foundation ICDAS committee

How Does Monitoring Currently Occur?

In the UK the Policy role, which defines the monitoring required by the four UK Health Departments of England, Wales, Scotland and Northern Ireland, is led by the four Chief Dental Officers. The detailed policies, targets and information systems are increasingly diverging to meet specific local and regional needs of the four constituent parts of the UK. In terms of practical examples of monitoring oral health, let me summarise six areas of activity:

**BASCD (British Association for the Study of Community Dentistry) / NHS Dental Epidemiology Programme**

Historically this co-ordinated national programme working in partnership with the UK National Health Service ran between 1984-2004 using a 4-year cycle of annual epidemiological examinations of children in School aged: 5 / 12 / 5 / and 14 years old respectively.

The current programme in Scotland (NDIP) and Northern Ireland now uses a 4-year cycle of annual dental inspections of children in School aged: 5 / 11+ / 5 / and 11+ years old respectively.

In England and Wales the new timetable is likely to be annual dental inspections of children in School aged 10+ / 5 / followed by two years of collecting other locally relevant oral health information (other/other) and then returning to children in School aged 10+ / 5 / 5 years.

Current Developments in what is now becoming the BASCD / NHS Dental Information Programme are for developing more local user involvement, building on the core epidemiological data and supplementing it with data on the impact of oral disease, experience of pain, or days off school/work, enhanced estimates of preventive care need including estimating caries into enamel, and surveys of self reported oral health in adults where adequate response rates can be achieved. [see Pitts N B, Boyles J, Nugent Z J, Thomas N, Pine C M. Community Dental Health 2004 21:45-58. Annex 1 = Report of a Workshop held in London May 2003]

**National Dental Inspection Programme (NDIP) in Scotland**

Great care has been taken with the terminology used in this new Programme to ensure that it reflects the current best evidence from cariology and can also inform non-dental users of the information. Figure 1 shows a graphical representation of what information is and is not recorded in the detailed NDIP Inspections as “obvious decay into dentine”.

Terminology used in the NDIP Report to reflect the current evidence from cariology and to inform non-dental users of the information

<table>
<thead>
<tr>
<th>SIMPLER TERMS</th>
<th>DENTIST TERMS</th>
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<tbody>
<tr>
<td>severe decay</td>
<td>Pulpal decay</td>
</tr>
<tr>
<td>visible decay</td>
<td>obvious decay</td>
</tr>
<tr>
<td>hidden decay</td>
<td>sub-clinical</td>
</tr>
<tr>
<td>enamel decay</td>
<td>very early</td>
</tr>
<tr>
<td>dentine decay</td>
<td>established</td>
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<tr>
<td>dentine decay</td>
<td>visible dentine</td>
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<td>dentine decay</td>
<td>hidden dentine</td>
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<tr>
<td>dentine decay</td>
<td>visible dentine</td>
</tr>
<tr>
<td>dentine decay</td>
<td>obvious dentine</td>
</tr>
</tbody>
</table>

This should prevent abuse of the term “caries free” which to non-dental users and policy makers wrongly suggests that groups or individuals are entirely free of any stage of the disease, which is untrue. The Figure also shows the simpler lay terms which correspond to the terms that dentists use and indicates that the conventional visual only examinations in schools without the benefit of any diagnostic aids will inevitably under record even the level of dentine caries present.

The results for the first year of NDIP (2003) are now available. The report of the Programme (available at http://www.dundee.ac.uk/dhsru/) has been structured as a series of answers to policy relevant questions. These include such information as:

- How many children had a detailed inspection?
- What proportion of Primary I children have no obvious decay experience in 2003?
- What levels of decay are seen in Primary I children in 2003?
- Are we on track to meet the 2010 target?
- How does the dental health of Scottish five year olds fared over time?
- How does the dental health of Scottish Primary I children compare with that in most other parts of Europe?
- Is there a link between social deprivation and poor dental health among Scottish five year olds?

A key final question is: How can the NDIP Programme be applied to local services? The NDIP Basic Inspection classifies all children in the first year of primary education (and in alternate years the last year of primary education) into three simple Risk Groups: A: high carries risk – need to see a dentist immediately. B moderate carries risk – need to see a dentist soon and C low carries risk – need to see a dentist as part of normal oral health care. These assessments can be made quick and efficiently and this level of information can be made available at school and local levels reflecting service planning.

**The Modernised National Health Service in England and Wales**

NHS Oral Health Care Services are being “modernised” in England and Wales according to the Options for Change Agenda set out in 2002. [Pitts N B. NHS Dentistry: Options for change in context: a personal overview of landmark doc-
tumt and what it could mean for the future of dental services. British Dental Journal 2003 195: 631-635]. This change in service philosophy and structure reflects the changes in objectives for the provision of care that has now taken place in many countries. The answer to the core question: What should dentists now be doing for their patients? has now shifted away from merely filling and re-filling carious teeth towards the more preventive, evidence based, mission set out on a dental appointment card in Figure 2.

What should dentist now be doing for their patients?

![Figure 2](image)

In terms of clinical decision making and advice based on best evidence, it is now clear that, in most cases, dentists should be moving from operative to more non-operative / preventive treatment for dental caries management [Pitts N B. Are we ready to move from operative to non-operative/preventive treatment of dental caries in clinical practice? Caries Research 2004; 38:294-304.].

Obviously the indicators used to monitor oral health services providing this type of care will be different to the just collecting the "routine" dentine only level d3mfT/D3MFT data used previously. It is then reasonable to ask whether our Oral Health Indicators should in the future continue to ignore enamel caries and the issue of preventive treatment need? (Figure 3) and international efforts are underway to provide robust tools to collect this type of health information (see ICDAS below) and to incorporate such data into routine health data systems.

![Diagram](image)

**Diagnostic levels of visible tooth decay - terminology & tools**

**Figure 3**

**UK National Survey Consortium** (Office of National Statistics with the Universities of Birmingham, Cardiff, Dundee and Newcastle)

The results of UK National Surveys Consortium’s report for the UK Health Departments on the Adult Dental Health Survey carried out in 1998 graphically illustrates the effect of including or excluding visual dentine caries along with the more conventional traditional estimate of dentine decay, cavitated dentine caries. Traditionally only cavitated dentine was scored as caries, but with the changes in lesion morphology seen in recent decades, discoloured surfaces overlying obvious dentine lesions are now also registered as dentine caries, even if the dental probe does not fit into a physical cavity of specific dimensions. The impact of this inclusion/exclusion upon the proportion of dentate adults recorded with primary decay can be seen to vary dramatically with age. In the younger age groups (16-24, 25-34) the visual dentine decay dominates, whilst in the older age groups (45 years >) the cavitated dentine lesions are more common.

The UK National Surveys Consortium will publish the results of a National Child Dental Health Survey carried out in 2003 in October of 2004 and it is anticipated that due to the age effect seen with the adults in 1998 the results will illustrate the same effect in permanent teeth. It should be appreciated that both these surveys specifically exclude enamel lesions and therefore systematically under record the levels of clinical caries which dental clinicians would register when the same individual attend for modern dental examinations.

**International Caries Detection and Assessment System (ICDAS)**

ICDAS: The Committee - this work has been carried out under the supervision and control of an informal committee who were assembled following the NIH Consensus Development Conference on Dental Caries in 2001 and the International Consensus Workshop on Caries Clinical Trials meeting in 2002 to try to advance some of the key recommendations of these meetings. The early committee comprised: from the Dental Health Services Research Unit, University of Dundee (DHSRU): N Pitts, C Longbottom, G Topping, D Ricketts, A Forgie and C Deery (now Edinburgh); from the University of Michigan: A Ismail and W Sohn; from Indiana University: D Zero (joined more recently by other staff); from Copenhagen University: K Ekstrand; from the International Dental Federation (FDI) E Reich and from NIH / NIDCR: R Selwitz.

ICDAS: Background - the philosophy on which this collaborative initiative is based is one where the methodology from caries epidemiology meets that from caries clinical trials and practise and the whole is conducted according to the values of evidence based dentistry (EBD). There have been many systems devised over the years for grading dental caries which have been visually based and included non-cavitated lesions in enamel. In 1979 the World Health Organization (WHO) guidance publication offered methodologies for both Basic and more Advanced caries surveys, the Advanced criteria including the ability to score enamel caries. Over more recent years only the booklet describing WHO Basic Methods survived. Over the years a series of research reports exploring the importance of coding non-cavitated carious lesions in both enamel and dentine have been published [see Pitts N B. Review of the ICW-CCT Meeting, The Importance of Early Detection and the Philosophy / Approach of ICDAS. In: Stookey G (Ed), Early Detection of Caries III, Indiana University, Indiana 2004, in press].

ICDAS: Development Meetings - have been held in Dundee, Scotland in Spring 2002, in Ann Arbor, Michigan in August 2002, in Indianapolis, Indiana in May 2003 and in Bornholm, Denmark in April 2004.
ICDAS: Concept is that use of a standardized system should lead to better quality information to inform decisions about appropriate diagnosis, prognosis and clinical management of dental caries at both the individual and public health levels.

ICDAS at 2004 - Figure 4 summarises the key aspects of ICDAS at 2004. The caries detection criteria are ready for use and will be disseminated in 2005. The caries activity criteria and tools are still part of a research agenda.

EADPH and the Epidemiology Special Interest Group (S.I.G.)
Following a successful symposium at the Marburg EADPH meeting there have been a series of discussions starting to look at providing common, modern, epidemiological tools for use in Dental Public Health in Europe. At the 2003 EADPH meeting in Finland the work of the ICDAS group was outlined and a Special Interest Group formed. This Group will meet in Portugal in September 2004 at the Oporto EADPH Conference and will develop the agenda further.

What are the Positive and Negatives of Current Systems of using Oral Health Indicators?

The Positives
• There has been a lot of good and useful work in this area, much of which has continuing value and should be retained and built on.
• Some of the work developed to date has been well used, more should be done to ensure that data collected is used effectively and is made available locally.

The Negatives
• There remains considerable confusion in the use of terminology and in the consistent application of standards.
• Because of this there is an unfortunate and unnecessary lack of comparability between datasets within and between European Countries.
• There is also a lack of “joining up” the different needs of policy, modern research evidence and clinical practice. This has resulted in a focus on restorative treatment indicators in an era when preventive care is being advocated, funded and practised.

How to combine the priority information which is needed into a rational template which will allow choice of the appropriate tool(s).

The WHO STEPS approach was outlined at the Lyon workshop of this Oral Health Indicators Project Group. DHSRU has made an adaptation of this “Steppwise” approach, used by WHO in the Surveillance of NCDs, to allow its use with Oral Health Indicators, this is set out in Figure 6. The STEPS approach allows organisation of the different and often disparate indicators used into a series of core indicators which can be used at STEP 1, 2 or 3. Importantly, it also documents how each STEP can be supplemented into an expanded form when needed and also identifies a series of standardised optional indicators that could be added as and when they are needed or can be afforded. While the detail content may be in need of refinement, the overall framework seems to have much to commend it and the adaptation was well received at a meeting of BASCD at the end of 2003.

The final indicators emerging from this process should in the opinion of the author be able to be fitted into such a model. In addition they should:
• Be robust, appropriate and built around delivering effective preventive and restorative oral health care in the real world in Europe
• Should allow for IT based collection of data from dental practices in the future
• Be supplemented by badly needed more accurate and updated information on the dental workforce for the expanded EU

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3.3. Point of views: health policy requirements and decision makers expectations

Dr. Alfonso Villa Vigil, President of Dental Council, Spain

Dr. Alfonso Villa Vigil explained that Spain is comprised of 17 regions, each of them with a large political and health legislation autonomy. This political decentralisation has led to a situation reflecting important differences from region to
region in the organisation of oral health: 1) public health program focused on age groups seven to fifteen years old. 2) exclusive delivery of emergency care (teeth extractions, maxillo-facial surgery, etc.) Therefore today, there is no national oral health surveillance system in Spain. Because of the political decentralisation, it is unlikely that such a system will be established in the near future. Given the fact that the regions which have developed an oral care system based on public financing are usually focusing on children population and the tendency of the other regions to follow this model, it seems logical that the priority indicators in Spain be health promotion indicators in order to evaluate progress made in oral health in the future. In addition, there is a dramatic increase of the number of dentists in Spain – there are four times more dentists today than 20 years ago. Because of this situation, it is necessary to give priority to oral health system indicators in order to rationalise the number and the competence of oral health professionals.

3.4. Point of views: health policy requirements and decision makers expectations
Dr. Agneta Ekman, the National Board of Health and Welfare, Stockholm, Sweden

The interest among healthcare researchers and policymakers in measuring and reporting quality of care is growing, fuelled by two different secular trends in public policy in general and health policy in particular. The first is a declining willingness of consumers to remain deferent recipients of public services. There is an increasing desire to hold service providers, managers and politicians accountable for the quality of the services they deliver or procure. The second is a more widespread utilisation of market or quasimarket mechanisms to improve the effectiveness and the efficiency of the health care sector including oral health care. A precondition for markets to work properly is the availability of information about the quality of the different outputs.

As a consequence, substantial efforts have been made in recent years to develop and implement so-called quality indicators for oral health care. Quality indicators (QIs) here means measures of oral health outcome or oral health improvement attributable to dental care. QIs are frequently classified into three categories structure, process and outcome. I will not focus on definitions as they are completely clear to all of you. However, QIs can be used to benchmark performance along the dimension of quality, i.e. to compare for one provider or one dental care system to a reference group.

In the real world, formidable technical obstacles and resource constraints often force us to compromise. Consensus formation in an international forum, as for example in the OECD – Organisation for Economic Co-operation and Development, is a difficult and time consuming process, in particular if it is starting from scratch. The universe of potential quality indicators is very large, making a full review infeasible. Supporting evidence might be absent or inadequately documented. Existing data sources might not permit the construction of the desirable indicators, because the required variables are not at all recorded or differently recorded. Dedicated data collection that would yield comparable information on a national level might be prohibitively expensive. Thus, to tackle the problem in a way that respects time and resource constraints, an opportunistic rather than idealistic approach seems warranted.

The main disadvantage of relying on existing data sources is that the data systems have usually been designed for purposes other than quality measurement and may therefore not always provide exactly the desired information. The following limitations are commonly observed:

• Limited geographic coverage – in several countries, data are only available for selected regions.
• Limited coverage of populations – collection of administrative data is sometimes linked to individual characteristics, such as insurance status.
• Data access limitations – data collected by institutions other than national government or national institutes may sometimes not be readily accessible due to confidentiality issues or property rights issues, which prevent any release.

The main challenge is that although quality of care is a priority and being measured in many countries, the countries participating in the project probably are at different stages in measurement development and use different methodologies. Without coordination of our efforts international comparability is unlikely to emerge, depriving policy-makers of the possibility of benchmarking health systems.

Comments regarding the criteria to select indicators:
Of utmost importance that these matters will be discussed and agreed upon.

1. Importance of what is being measured
• Impact on health – what is the impact on health associated with this problem?
• Policy importance – are policy makers and consumers concerned about this area?
• Susceptibility to being influenced by the oral health care system – can the oral health system meaningfully address this aspect of problem?

2. Scientific soundness of the measure
• Validity – does the measure actually measure what it is intended to measure?
• Reliability – does the measure provide stable results across various populations and circumstances?
• Explicitness of the evidence base – is there scientific evidence available to support the measure?

3. Feasibility of using the measure
• Existence of prototypes – is the measure already in use? A further question is if the measure is in use at the national level, or for sub-national population groups.
• Availability of required data across the system – can information needed for the measure be collected in the scale and time frame required?
• Cost or burden of measurement – how much will it cost to collect the data needed for the measure?

From the Swedish point of view it seems given resource constraints, this work could be limited to reviewing existing indicators rather than developing new indicators, e.g. take advantage of what has been achieved by other groups. The work
Chapter 3: Short list of indicators in oral health: Point of views: health policy requirements and decision makers expectations

should continue identifying the most promising indicators in the respective area, discuss their policy relevance and scientific soundness. We should focus on the short list, a set of data for which there is agreement on validity, importance and for which comparable data are available in most EU-countries.

For the larger or the long list of indicators proposed, which definitely should contain much fewer indicators than today, it is also of utmost importance that there is agreement on validity and importance, but not necessarily including specific information on data availability.

It seems that two types of decisions now need to be made for the future path of the project. First, consensus on some conceptual issues has to be found, and second, participating countries have to agree on operational strategy and resources to realize the envisioned product. Finally, the question arises whether or not the boundaries of the project should remain as narrowly defined as they currently are. From our point of view we are interested in adding other dimensions of performance of dental care systems, like responsiveness and equity. However, this is not mandatory.

The prerequisites for monitoring the quality of care in general and the outcomes of care in specific are exceptionally good in Sweden. Data from National Health Data Registers can be used to monitor health care utilisation, morbidity and mortality on a population level. The establishment of approximately 60 National Quality Registers has created good opportunities for analyses of the medical quality and outcomes in part of the healthcare system and registers within dentistry are now established.

However, conditions in health care and medical services are changing constantly. New methods of investigation and treatment affect the structure, contents, quality and results of the care provided. In December 2001 the Swedish Government commissioned the National Board of Health and Welfare to compile an annual report on the performance of the health and dental care systems of the nation. According to the mission statement, the report should focus on the quality and accessibility of services, with special emphasis on policy-relevant trends and changes. The framework of the report includes four main dimensions of healthcare and dental care quality: responsiveness, accessibility, medical effectiveness and safety. The choice of quality measures was based on national and international work on health and dental care quality indicators. The indicators are reported using two main approaches, e.g. regional comparisons between the 21 counties/regions in Sweden, responsible for the delivery of dental and health services, and age- and gender-specific longitudinal trends in national data.

Although the prerequisites for monitoring the quality of care in Sweden are good, further development of models and methods for performance assessment is needed in order to be able to deliver policy-relevant information to the nation’s health policy makers. Within the European Global Oral Health Indicators Development Project we could create valuable indicators based on agreed and uniform definitions. Since indicators are an essential requirement for comparisons to be made over time not only between regions and care units but also at national level, these comparisons can be used as a basis in development and quality work at all levels of dental care and dental services.

3.5. Oral Health Monitoring from the Perspective of the Chief Dental Officer for Austria and as a Member of the Council of European Chief Dental Officers (CECDO) Executive

Dr Gabriele Sax, Chief Dental Officer, Austria

Health Care System in Austria - in brief

Austria’s health care system is based on social security. Therefore, as far as medical care is concerned, nearly 100% of the population and most treatments are covered by the Sick Funds. However, as far as dental care is concerned, the catalogue of treatments (which are paid fully by the Sick Funds) is nearly 30 years old and therefore a lot of treatments have to be paid for solely by the patients (with some co-payments by the Sick Funds; e.g. prophylaxis, implants, orthodontics).

Health and Oral Health Monitoring in Austria

There is a comprehensive health information system directed by the Austrian Health Institute, which monitors health and oral health. Data on structural, environmental and health related issues are collected (Fig. 1). It is used for regional analysis and health care planning. For oral health care information there are three sources:

Administrative Statistics:
- Number of dentists (with/without contract with the Sick Funds)
- Money spent for dental care by sick funds (but without any deeper explanation, e.g. how many patients consumed these treatments)
- Number of patients with a dental diagnosis treated in hospitals

Micro Census
- Self perceived health status and consumption of health services (since 1973, every 7-9 years)

Basic Oral Health Surveys (since 1996)
- Following the WHO guidelines
- Each age group is examined in consecutive years (6-year-olds in 1996 and 2001, 12-year-olds in 1997 and 2002 and so on)

Monitoring carried out by the CECDO

Since 1994, every two years a questionnaire is sent to the members of CECDO. The CECDO has collected national data from all EU and EEA-member states. The database comprises:
- General Population
- Dental Workforce: Number of dental professionals (e.g. general dentists and various dental specialists, dental hygienists, dental technicians, etc)
- Education system: number of dental schools (public and private); students and graduates per year; vocational training
- Financial data: % GNP total health care; % GNP dental care

2/ Austria, Belgium, Cyprus, Czech Rep., Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein; only data for 1996, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, UK. Plus Israel and Zurich.
3.6. Point of views: health policy requirements and decision makers expectations
Contribute for the Workshops for Selecting Oral Health Indicators in Italy
Professor Laura Stromengher, University of Milan, Italy

The intervention of Professor Stromengher was influenced by the country she came from and its peculiar situation. The oral indicators suggested to choose must be valid and specifically relevant for oral health conditions and strictly correlated to general health indicators. Otherwise, because of the lack of oral epidemiological data in Italy, our country would not be able to collaborate in data collection with the other EU countries. Furthermore, it should be stressed how important it is to contribute to choose essential indicators of oral health actually measurable and available in all the countries represented in this workshop.

To explain better what above mentioned, Professor Stromengher would like to illustrate a few Italian peculiarities.

"In Italy, she we never had, and still does not have today, a national health system comprising dentistry. It is known that 97% of dental care produced in Italy is carried out privately, that is not in public structures and without any insurance con-
Chapter 3: Short list of indicators in oral health: Point of views: health policy requirements and decision makers expectations

Professor Annerose Borutta, University of Jena, Erfurt, Germany

The remaining 3% of dental care is unfortunately not organized and managed nationally or locally, so that any quantification of dental care is not possible.” Therefore decision’s makers can’t know what happens in Italy concerning dental care. The only available data we have come from surveys, often questionnaires, carried out by marketing companies and regarding patients’ satisfaction and use of some oral health products.

This situation is going to change rapidly in the next years, due to the fact that a new system implying the introduction of insurance institutes will be introduced nation-wide. This change is supported by strong political motivations at a government level. The first application of such new system will take place in dentistry, since dentistry is the only field in medicine that is totally private. Therefore, it is very easy to apply modifications to the dental system. Of course, for obvious reasons, the main obstacles to the realization of this program come from private dental associations.

This “local” forward was necessary to underline that we participate to this meeting with a contribution of uncompleted epidemiological national data. Our data have been collected locally from centers spread on the Italian territory in the last 20 years and more and more intensely in the last 5 years. Furthermore, we have data from 2 national surveys and a third one is going on. In any case, almost all our data concern only children.

In conclusion, Professor Stromengher underlined that the contribution to the second workshop to the selection of essential oral indicators must take into consideration the problems and the peculiarities mentioned so far.

The following indicators are useful, even if with some critical observations, are as follows:

- **Caries experience** through DMFT/dmft index appears to be the most useful and repeatable index. It could be associated to certain specific age groups and it could be completed with the % of healthy subjects at 4 or 6 years of age. Furthermore, it is suggested that oral health indicators such as caries experience at 12 and 35-44 years of age and the % of affected subjects be introduced, so that all participating countries could gather homogeneous and generalized data on oral health in the young and adult population.

- **Periodontal conditions** through the CPITN index. Periodontal conditions could be evaluated in a similar way. In our opinion, though, rather than CPITN in general, bleeding on probing represents the most relevant index. In presence of bleeding on probing and absence of periodontal pockets, education and information can lead to healthy periodontal conditions. Simply knowing the percentage of periodontally healthy subjects at 12 and 35-44 years of age could be very relevant in the context we work in.

- **Percentage of edentulous** in adults and elderly people. Professor Stromengher considers this an important indicator mainly in the older population, because of its implications and way of conditioning life quality at certain ages.

- **Sugar consumption.** Recent studies confirm that there is a strict correlation between sugar consumption and oral disease, in terms of frequency of consumption and not of quantity per year. Therefore, we could consider sugar consumption a relevant index if it were expressed as a frequency index and not as consumption per subject per year. Nevertheless, expressing sugar consumption in terms of frequency on a large scale appears difficult from a practical point of view. Therefore, such index, already present in some extent among general health indicators, is nowadays less relevant for oral health status.

- **Use of toothbrush and fluoride toothpaste.** On the contrary, we consider those indicators very useful, easy to determine and indicative of the diffusion of instruments for oral health prevention and self-care. They are also indicative of behaviours whose measure and change over time could lead to epidemiological modifications in oral health conditions. Detecting differences in those indicators among countries, for example in Europe, could help evaluating also the different sanitary models and habits and their results in terms of prevention, both in the past and in the future.

- **Tobacco use and alcohol consumption.** Those indicators, probably already present among general health indicators, are very relevant also in oral health conditions and therefore it is important to pay careful attention in detecting them.

### 3.7. Point of views: health policy requirements and decision makers expectations in Germany

Professor Annerose Borutta described “How does the monitoring currently occur”. Since 1989 in Germany regularly epidemiological studies have been performed on a population level. Children, adolescents and adults as well elderly have been involved. The studies are under the responsibility of the Institute of German Dentists which was established by the German Dental Association and the National Association of statutory Health Insurance. The last study (third study) was performed in 1997. The results based on questionnaires and clinical examinations were presented. The existing preventive care included in the statutory health insurance system is manifestly appropriate for achieving substantially comparable dental health notwithstanding the influence of socio-economic parameters.

In adults in comparison with previous studies the results show that caries experience remained constant. Some 20% of the adults have removable dentures, more often in Eastern than in Western Germany. Symptoms of craniomandibular dysfunction are common. 50% showed no sign of pathology by clinical detection. Professor Borutta advanced that whereas children and adults showed satisfactory results of oral health, large deficits were obtained in the oral health status of elderly.

The results of the 1994, 1997 and 2000 studies showed a remarkable caries reduction over the time combined with an increase in caries free children of all age groups. All these data can be used by political decision makers to develop health strategies for improving the oral health in the population.

The positive and negative points of the German system were described by Professor Borutta. Among the positive factors of the system the general access to the dental health care system for all people should be
Some primary care and specialist private clinics have been local governments. Additionally, private service is available employers and employees. Health services are delivered pre-is based on compulsory payroll contributions from both National Health Insurance Fund for recurrent costs. The Fund Health services are funded chiefly from the compulsory so the government is the dominant regulator of health services. Hungary's health care system is still dominated by the state, female. GDP per capita as a ratio of EU average: 27. Average life expectancy at birth of the 10.17 million inhabi-
tants is respectively 68.1 years for the male and 76.5 for the
dental care for elderly, mostly for those who have multiple disabilities.

3.8. Current situation and future expectations concerning oral health monitoring systems in Hungary
Professor J’udit Szöke, Semmelweis University of Budapest, Hungary

In this talk, Professor J. Szöke presented a brief introduction to Hungary and its parameters (including population, econo-
my, health care system, dental care, insurance system, etc.); described current monitoring systems with a focus on oral health, discussing both positive and negative features; provided an overview of plans in the field and identified what priority information we want to obtain for which priorities on health objectives.

General Information - Country description
Hungary is a new member state of the European Union with an administrative structure - political and geographical - based on 7 regions, formed by 21 countries and the capital. Average life expectancy at birth of the 10.17 million inhabi-
tants is respectively 68.1 years for the male and 76.5 for the
female. GDP per capita as a ratio of EU average: 27. Hungary’s health care system is still dominated by the state, so the government is the dominant regulator of health services. Health services are funded chiefly from the compulsory National Health Insurance Fund for recurrent costs. The Fund is based on compulsory payroll contributions from both employers and employees. Health services are delivered pre-
dominantly by public providers in facilities owned mainly by local governments. Additionally, private service is available. Some primary care and specialist private clinics have been established where people pay for services.

For more than a decade, the health care systems in Hungary have been in transition, and new changes are now on the horizon with a view to privatization, outsourcing certain health care services to the business sector. Dental care, besides prosthetic work, is provided free of charge by the Public Dental Health Service. Children up to 18 years of age receive free dental care in the context of school dentistry.

Health monitoring in Hungary today
In Hungary, as in other countries, pollsters regularly collect and survey data on the population’s health and major influences, such as environmental and individual factors. Health monitoring is up and running, with regular collection, eval-
uation and publication of health data to identify health goals, determine the success rate of public health programs, and to support well-founded decisions. The central health records consist of data of individual citi-
zens and of the general population. On individual citizens, namely patients data are mostly collected by primary data collectors, that are the health care providers including den-
tists, who then supply the data to secondary data collectors; on the general population (samples), by secondary entities. These are typically national organizations, institutions and agencies, which collect, process and supply data concerning health/oral health:

Hungarian Central Statistical Office collects data annually under the National Statistical Data Acquisition Program, which is regulated and mandated for every provider by an annual Government Decree, and covers health and dental care as well. The Minister of Health issues an annual report on survey methods and formulae by indicators:
• number of visits to a dentist during the past year
• number of dentist interventions during the past year
As a downside, this survey contains no indicators whatsoever with respect to patient instruction and to preventive treatment (cleaning, fluoride treatments, sealing).

National Institute for Strategic Health Research provides data collection from primary data collectors and other entities for domestic purposes and international databases, according to specific indicators such as:
• European Health for All Database
• Organization for Economic Co-operation and Development (OECD)

National Center for Epidemiology obtains, processes and professionally analyzes data from primary sources, and as primary data collector is in charge of Hungarian Health Interview Surveys. These polls, conducted on 447 communi-
ties since 2000, interrogate a representative sample (5,000-
7,000) of the population over 18. “Use of dental services over the past 12 months” as oral health indicator was pres-
tently 38 % of adults visited a dentist, private or otherwise, during the past year. This is far below the EU average of 60%. Women had a higher visit rate (43 %) then men (34 %).

National Insurance Fund collects data based on an item-
ized list of dental services determined in a Government Decree. These data on the number of services extended to patents are then used to allocate financing to various practices.
National Oral Health Surveys. In addition let us take a brief look at this very important oral health monitoring program, which is run by a dedicated team of dentists organized for this purpose, and which I feel we have every right to be proud of. In Hungary the first national baseline examination (the so-called pathfinder survey) was carried out in 1985, followed by data collections several times in different index ages and age groups. The data are available from the WHO Global Oral Data Bank. The last time around, an oral health questionnaire administered to 12-year-olds and adults on dental knowledge and health care habits included questions about smoking.

Professor Szöke showed a few data on the prevalence, trend and treatment needs of dental diseases in various age target groups. (1) The DMFT mean value of 12 year olds was 3.3; (2) the caries trend of 12-year-olds has shown a decreasing tendency; (3) only 66% of the adolescents aged 18 had full dentition compared to the WHO goal of 85%; (4) the levels of oral diseases have been high and stable at the 35-44-year age group over the past fifteen years; (5) of the 65-74 age group 26% was edentulous.

Going back to our larger context, in summary we can say that data collection in Hungary still has its limitations nevertheless some good and useful features as well. The positives of current systems are (i) some data collection is very informative and useful and (ii) a lot of data collected are comparable. The negatives aspects are that there is no standardized list of core indicators. Otherwise, the existing monitoring mechanisms suffer from flaws, shortcomings, overlaps, and limited availability. Sometimes it seems there are too many data collectors and too many data; other times we realize that some basic data are missing or there is a lack of appropriate reference data for comparison. At least, the current data collection practices within the Hungarian health monitoring system fail to provide sufficient information on a considerable proportion of indicators. It is therefore a prerequisite for us to update and further develop the Hungarian system of health monitoring.

Plans and tasks for the future of Hungarian health monitoring

On the initiative of the Ministry of Health, in 2003 Hungary began to develop a population health reporting system, building on the collaboration of the major institutions of the sector. As a result of the cooperation, specific objectives and tasks have been identified.

Long term and short term tasks and developments:
- Organizational and capacity development, training
- National integrated health databases that provide feedback of comparative information in countries
- Identification of core indicators
- Regular updates of the health data bank
- Monitor non-communicable diseases of special significance for national health, also with regard to their determinant factors

Fortunately, we have hopeful perspectives due to our new Public Health Program. This program, called National Program for the Decade of Health, meshes with the World Health Organization’s Health21 policy and includes action plans that are essential to European Union accession.

The Program intends to move forward in four areas:
- Creating a health-promoting social environment
- Promotion of healthy lifestyles, reducing risk factors to human health
- Preventing avoidable mortality, morbidity and disability
- Strengthening the institutional system of health care and public health

This latter field has a high-priority popular health project centered on the topic of Information Technology for Monitoring. The program includes several subprograms. There is no separate sub-program for oral health. Oral health goals were set up and actions were defined, so the dental tasks are integrated into the different subprograms, but I still feel that the field is underestimated and underrepresented in this program.

In summary, Hungary’s own health policy needs and the expectations of professional and political decision makers dictate the establishment of a health database to European standards and in synergy with international databases, as well as the implementation of the appropriate health monitoring system. Competent experts in Hungary look forward to reviewing the material compiled as a result of our joint efforts here, and are prepared to accept the list of oral health indicators.

3.9. Oral Health Indicators: health policy requirements and decision makers’ expectations in Greece

Dr Elpida Pavi, Chief Dental Officer, Greece; President of the Council of European Chief Dental Officers

Oral health surveillance is the essential tool for the monitoring the oral health status and its determinants. It offers the information required for the formulation and evaluation of oral health policies and strategies. However, it relies on the infrastructure of the health and oral health system of each country, and thus differs among the E.U. member states.

The health and oral health system in Greece

The Greek health care system is a system of compulsory public health insurance with strong elements of a national health system and extensive involvement of the private sector. In the public sector, health care is provided by the National Health System called ESY which offers primary, secondary and tertiary care through a network of hospitals in urban areas, Health Centres in semi-urban and rural areas, and rural medical surgeries covering the whole of the country. Still in the public sector, health care is also provided by a number of the Social Insurance Funds which operate primary care polyclinics in urban areas. The private sector offers both primary and hospital care all over the country, mainly concentrated in the big urban centres, due to the prevailing free-market forces.

As far as dental care is concerned, dental departments operate within the Health Centres and the Hospitals of the National Health System (ESY). Dental departments also exist in certain of the polyclinics of the Social Insurance Funds, and finally, the main dental care provider by far, is the private sector.

The dental departments of the Health Centres offer Primary Dental Care which comprises:
1. Full dental care to children from birth to 18-years of age
2. Dental health education to the whole population of
their catchment areas.

3- Emergency dental care to adults.

Hospital dental care comprises of:

1- Dental treatment to patients suffering from systemic diseases or general medical problems which require hospital support and support from other medical specialties.

2- Emergency dental care to everybody as well as to in-patients.

Still within the public sector, dental care is provided by some of the Social Insurance Funds which operate polyclinics with dental departments. The major social insurance fund in Greece is IKA (Institute of Social Insurance) which covers the employees and labourers of the private sector. IKA is like a second health system on its own, as it operates dental departments in polyclinics based in urban areas, and thus IKA is actually a major provider of primary dental care of the public sector in the urban areas of the country. Dental treatment is provided free of charge at the point of delivery.

Another 10 Insurance Funds operate a small number of dental departments in polyclinics based in urban areas as well, offering dental care. Some treatments are free of charge at the point of delivery, for some others co-payments are charged.

Apart from IKA, all other Social Insurance Funds offer some coverage of dental treatment, but the level of coverage differs. They operate as purchasers of dental care from the private sector on behalf of their insured members. However, only a small number of them contract with private dental practitioners, as the fees-per-item they pay are considered low and dentists are not willing to contract. So the vast majority of dental patients pay their private dentist themselves and claim back a small percentage of the fees.

Last, but not least at all, comes the private sector, where the majority of Greek dentists work, in their own single or group dental practices. Approximately 88% of the Greek dentists work in the private sector. A most interesting figure concerns dental expenditure. 95% of the dental expenditure in Greece is private expenditure. This means that the dental care offered by ESY and the care covered by the Social Insurance Funds account only for 5% of the dental expenditure. So dental care is almost uninsured and left to the private sector.

Oral health information collection is better organised in the National Health System (ESY).

Dental departments of the hospitals and health centres of the National Health System (ESY), send to the Ministry of Health their annual reports with monthly breakdowns of their activities, that is, numbers of items of treatment provided and numbers of school visits (this is for the Dental Departments of the Health Centres only, not of the hospitals, because it is the Health Centres’ responsibility to cover the schoolchildren). They also keep in their archives the dental records of the children of their catchment area; however, they are not obliged to send oral health status reports to the Ministry.

So, for the level of oral health, ad hoc surveys are undertaken. In 2002-03, the second national pathfinder survey of the oral health status of children was carried out. However, we do not have a system of periodic national surveys like other European countries do.

The Dental Department of the Ministry of Health collaborates with the Hellenic Dental Federation and the District Dental Associations for issues of dental manpower, as well as oral health promotion programmes they undertake. Collaboration also exists with the Social Insurance Funds of Health Professions, in order to cross-check the active dentists (active dentists are obliged to pay their insurance premiums).

In conclusion, routinely collected oral health data in Greece are limited. Oral health surveillance in Greece relies on ad hoc surveys or reports which analyse the various fragmented sources of oral health information.

Weak links in oral health information collection in Greece

An inherent problem of the oral health information collection in Greece is that the private sector, the major oral care provider, cannot be obliged to provide the Dental Department of the Ministry of Health with routine data. An estimate only would be possible to be drawn indirectly, if oral health coverage either by the social insurance funds or private insurance companies was increased. This would act as a strong incentive to patients to claim back their dental care expenses and thus retrieve data from the claims. However, there is no indication that something like that is going to happen in the near future.

Another problem is that information technology and computerisation has not been adapted to the extent that would allow quick transfer and analysis of comparable data. So, there is a wealth of data at hospitals and Health Centres of the National Health System which cannot be readily transferred to the Ministry of Health.
From the above information it is evident that oral health and oral health care surveillance in Greece relies on ad hoc surveys.

This is the reason why Greece would not be in a position to provide full information (national figures in all fields) in the near future, if an ambitious database was instituted at European level.

Greek priorities in oral health information collection
Greece adopts the views of the Network of Competent Authorities of the Health Information Strand of DG Sanco of the European Commission to start with a core set of health indicators, from existing and valid data in order to have a fully completed core database. This will concern data which will continue year after year to be collected. As any database is a dynamic and not a static tool, more indicators will be developed in the future and will be built-in as new valid, reliable, sensitive and specific indicators.

Furthermore, data should concern topics of significant public health importance and for which there is space for improvement.

Great political importance at E.U. level is attributed to the mobility issue, a topic which is included in the mandate of the Health Systems Working Party of the Health Information and Knowledge Strand as implemented by DG Sanco. The mobility issue covers both aspects of oral health professionals’ mobility and dental patients’ mobility. Dental patients’ mobility can have a significant impact on dental expenditure and the dental market in general, as it entails costs for the insurance system which are incurred in another member state. This is an issue which is currently being discussed at the Council of European Chief Dental Officers.

Thus, it is proposed that this project includes an indicator for professionals’ mobility, perhaps % of foreign dentists practising in a country, and another indicator for patients’ mobility. Patients’ mobility is more difficult to trace and document, as patients can seek dental care in any E.U. member state. Indirectly this could be done through the Social Insurance Funds which keep data of the dental costs they cover for treatments abroad. However, this would only be a proxy measure as far as Greece is concerned, because as mentioned earlier, dental care is almost uninsured. Thus, more thought has to be given on this issue.

In conclusion, oral health care administrators of the Hellenic Ministry of Health look forward to:

- A realistic data set: data that can be found and a database possible to be filled in and not to remain with empty boxes and fields.
- To concentrate on oral health issues of public health importance, not on research oriented data. What is needed is monitoring. If a finding emerges which requires further research this can be undertaken by either the Dental Department of the Ministry of Health directly, or it can be commissioned to the Dental Schools or other research institutes, but it should be problematic if it is included in the core indicators list. Perhaps later on when a valid and reliable indicator is established, then it can be added in the database.
- Indicators to have been tested: valid, reliable, sensitive and specific. Indicators that are now being developed by the dental academia should not be included in the core set now. They can be added later on when proved valid and reliable.
- Socio-demographic information: collaborate and coordinate the oral health database with other European projects, in order to have the same indicators, so each country collects and reports one figure for the same issue.
- Finally, some of the indicators under discussion relate to country oral health systems profile. However, other projects already have done relevant work, so again collaborate and co-ordinate with them (EUCOMP, CECDO etc.).

As administrators, we want to know what is:
- the supply of dental services,
- the oral health status and oral health needs of the population and the vulnerable population groups,
- the utilisation of dental services,
- at which costs care is provided,
- the quality of oral health care services including accessibility and responsiveness of dental services,
- also, indicators selected to give us the opportunity to monitor the achievement of the HEALTH21 Goals,
- the mobility of oral health professionals and patients.

3.10. Point of views: health policy requirements and decision makers expectations
“Caries Risk Assessment”
Dr. Jaap.SJ. Veerkamp, ACTA University, Netherlands

The European 12-yr old children are among the dentally healthiest in the world. Some specific groups of children however, are not. As a European community it is our duty to identify those groups and assist them in preventing or solving their dental problems. In this lecture we will clarify that mainly economical reasons play a role in the decision to prevent and treat dental carries in risk groups.

The groups at risk are mainly the very young patients, the mentally disabled and the elderly people. Group strategies on preventive issues are mainly paid according to the 80%-20% principle: with 20% of the costs 80% of the effect must be achieved. In this case a preventive campaign should have an 80% effect for very limited costs. To reach the last 20% of the people, the vulnerable people, the costs would be a lot higher and probably an inversed situation might occur; we would need 80% of the costs for a 20% effect.

Taking the consequences of these facts, national campaigns on carries are out. We need to find other ways to inform the last 20%, the people at risk, the vulnerable people. The finances on such a project have to be limited; otherwise such a project would not leave the drawing table. In developing new indicators, in assessing their efficacy, economical factors are very important.

In the Netherlands the dmfs in 5yrs old children is approximately 4.0 (no X-rays taken, therefore probably an underestimated figure). The restorative degree is app. 12.5% though 85% of the dentists claim that treatment of toddlers should be their first priority.
A representative graph of children referred to Dutch paediatric dentists for dental treatment shows that 75% of the children are in the 3-7 yrs group. This apparently being the most difficult part of paediatric dentistry focuses on the preventive need of the referred group of paediatric risk patients; solely restoration will not solve the problem. Next year probably a new wave of referrals will appear.

In a survey we found four factors related to dental health: Age-caries-cooperation and preventive attitude. A short outline of the relevant studies is given.

1. Age. In the Dutch study, as well as in many others, age is the strongest factor associated with dental caries. Nursing bottle caries and developmental disturbances en adolescent behaviour is the most striking examples.

2. Caries. The occurrence of caries in the deciduous dentition is a strong predictor for further caries in the deciduous en-with limited figures- the permanent dentition.

3. Dental anxiety is strongly and positively related to dental decay, mostly in cases where the mother is not able to take care for adequate dental treatment of the child due to her own dental anxiety.

4. Prevention. The most effective attitude to prevent dental caries is brushing with fluoridated toothpaste. The evidence is overwhelming.

References


Working Groups by theme: Long list vs. short list: Harmonization of knowledge, validation and critical analysis

The goals of the working groups were to identify broad issues which, if applied, would provide the greatest oral health gain and prioritise each intervention against criteria below.

Process: As an initial step after reviewing needs assessment data, ask members of the planning group to describe the three most important health areas of concern for the state in the next decade. For each issue, list the primary goal and the primary strategy that has been or could be used to approach it. After consensus on the priorities has been achieved, consider this input in ranking potential goals and issues to address.

The following questions were addressed to the groups: Indicators and health policies
- Which are the big problems in terms of general public health policy maker and the big chances for improvement?
- Which “indicators” represent overall (negative or positive) health measures, or the largest health problems (largest ‘disease burden’) in terms of diseases or functional health at the population level?
- Where the most important oral health inequalities appear (possibly to be implemented by SES stratification of many indicators)?
- Which focus on determinants of oral health can be influenced by oral health and other policies and on associated interventions in health promotion, health protection, prevention and/or health care?

Indicators and long list structure
- Is the format of the long list proposed OK?
- Which indicators - selects between 3 and 6 indicators - in each of the 4 chapters are the most crucial ones from a general public health point of view? Include arguments why the indicators are selected.
- Will we keep Qol as a separate category or should it be included as part of the section Oral Health Status (Class 4)?
- Are the categories included OK?

4.1. Oral Health Determinants
Report from Working Groups
Chairperson: Dr Jaap Veerkamp; Rapporteur: Dr Elpida Pavi

The issue of indicators concerning the oral health determinants was discussed in three rotating working groups, thus the report encompasses the views of all participants of the Granada Meeting. The view was accepted that oral health determinants are considered important because they allow us to actually identify the at-risk groups. So, this was established as the focus of the discussions.

The method of the work was decided to be the examination of the indicators included in the long list with the objective to select the core set from the point of view of the identification of at-risk groups.

Long List Class 1: Soco economic and demographic indicators
The first issue raised and agreed upon was that we should not concentrate only on dental caries, but to keep in our view the oral health as a whole.

Main indicators
Various socio-demographic characteristics were discussed as being important in identifying or characterising at-risk groups, like age (children-elderly), low SES, people with special needs, ethnic minorities, lack of insurance etc. After extensive discussion it was concluded that the main indicator is Education, and then follow the other indicators: Economic status, Social class and Vulnerable groups. Those indicators must be seen in relation to a country resources and possibilities. All other indicators from the long list (family situation, GNP, immigrant or refugees) are more or less related to the basic items.

It is acknowledged that social class may be determined differently in each country and this may be a problem. It is also suggested that vulnerable groups is an open indicator. This will allow each country to report on its own vulnerable groups, which may differ from the vulnerable groups of another country.

Considerations
During the discussions considerations raised related to the ethnic minorities, migrants (legal and illegal), language, family composition (one-parent families), as well as ethical and democratic considerations on categorising or labelling people. While these have to be kept in mind, the indicators suggested for inclusion in the core set are those mentioned above.

Long List Class 2: Oral health Systems
There was unanimous agreement that the Oral Health System has to have the ability to identify the at-risk groups of the population.

Main indicators
Discussion started with the school-based programmes (implying that school children are a major at-risk group) and their components. Then, other population groups emerged like the medically compromised elderly. Eventually, it was concluded that the main factor/indicator which we should formulate in a way (not known yet) is the Outreach philosophy and practice of the system. It is stressed that the oral health system must be active and reaching out to at-risk groups and not just operate passively and wait for these groups to initiate themselves contact with the service.

Another conclusion was that another important indicator to be included in the core set is that the system must adopt the Common risk factor / Multidisciplinary approach. There is good and ever increasing evidence from countries like the UK, Denmark and Italy that oral health awareness is successfully raised by community nurses visiting nursing mothers, or by paediatricians advising mothers and communicating with children. Oral health education to pregnant women was also discussed as an example of good practice.

Considerations
During the discussions considerations raised related to the
age factor as being important (see introduction), because risk criteria may differ for different age groups. However, we have to be cautious because there are different epidemiologic profiles in different member states.

**Long List Class 3: Use of Services**
Frequency of utilisation of oral health services was the first issue discussed, and there were arguments on how to define regular attendance. Also, whether frequency of dental visiting is more important than reasons for dental visiting or not.

**Main indicators**
The drawbacks of reported measures of dental services utilisation were noted. Furthermore, regularity of dental attendance may be determined differently in different member states and it strongly correlates with needs. Differences in the optimal regularity (frequency) of dental attendance were also discussed.

Eventually, it was concluded that the most important determinant of utilisation of dental services from the point of view of the at-risk groups is the **Economic status**. Other indicators discussed and agreed upon were **Availability** and **Accessibility** of dental services. Also, percentage (%) of population with individualised recall system.

The proposal of this indicator expresses the unanimous view that optimal dental attendance differs according to needs.

**Considerations**
During the discussions considerations raised related to distance and time as important factors influencing use of dental services, the economics of dental care (cost), and the avoidance of specific diseases and proposed indicators.

**Long List Class 4: Risk Behaviours**
The role of toothbrushing behaviour, eating and drinking patterns, smoking, alcohol consumption and medications for chronic conditions were raised during the discussions.

**Main indicators**
There was unanimous agreement that the most valid indicator for toothbrushing behaviour is **Toothbrushing twice per day with fluoride toothpaste**. The importance of fluoride toothpaste is stressed.

Frequency of intake of fermentable carbohydrates was examined as an indicator. After extensive discussion it was agreed that the most appropriate indicators are **Frequency of eating** and **Frequency of drinking** in general (not just carbohydrates) as two separate indicators. Still, it was mentioned that **Past Caries experience** (last year’s) is the strongest predictor of future at-risk status. **Smoking, Alcohol and Medication** taking were also accepted as important behaviour indicators for identifying at-risk groups.

**Considerations**
Considerations related to the age factor. Risk behaviours differ in the various age groups. Caution is needed when compiling and interpreting data of self-reported measures of behaviours.

The database will have to be constructed in such a way so that it will allow combinations - cross tabulations of age and the various behaviours, as well as the examination of the interrelationships of the behaviours.

A final point considered concerned the fact that nowadays there is a shift from the study of the constituents of an unhealthy behaviour towards the characteristics of a healthy behaviour (i.e. research on the profile of the non-smoker or the non-drinker, rather than on the profile of the smoker or the drinker).

**4.2. Oral health status and oral health related quality of life (OHQOL)**

**Report from Working Groups**
Chairperson: Professor Denis Bourgeois; Rapporteur: Dr Anna Mari Nhila

The working groups were asked to identify the main problems in terms of public health policy maker and also to identify which indicators represent the largest health problems in terms of diseases or functional health at the population level. The working groups were also asked to comment on the format of the long list and to select between 3 to 6 indicators that are the most crucial ones for a general public health point of view.

**Indicators and health policies**
All the working groups identified the inequality in oral health as the main problem. This concerns especially children, adolescents and frail elderly. The major issue is to identify the **risk groups**.

**Specific diseases and proposed indicators**

**Dental caries**:
The groups discussed of recording oral health or oral disease status and agreed that oral disease status should be assessed. The proposed indicator was the percentage of population affected and the mean DMFT of those affected. The DMFT index with its limitations was still valued, as it is useful for benchmarking between countries and for detecting trends and for planning oral health services. Especially the D component was considered important.

Working group one recommended a new and robust indicator, **caries of the first permanent molars** to be added to the long list.

**Periodontal diseases**: The CPTDN indicator was discussed and agreed that it is difficult to get reliable data by using this indicator only. The following indicators were proposed for assessing periodontal diseases: **CPI and** the loss of attachment, presence of pockets, bleeding on probing.

**Missing teeth**: Edentulosity was considered useful indicator at the moment, but in the future as edentulosity is decreasing rapidly in the European countries this might not be a practical indicator. A widely used indicator, 20 or more teeth present was proposed to be added to the long list of indicators.

**Oral health related quality of life (OHQOL)**
All the working groups agreed that there is need for measurement of the oral health related quality of life and it should be included as part of the oral health status section. The
OHQOL indicators should be simple and robust. Pain and functional limitations were considered the key concepts.

Oral Health Impact Profile (OHIP) instrument was regarded useful. When monitoring the health of populations it is necessary to measure not only the clinical signs of diseases but also the impact of diseases on the physical, psychological and social wellbeing of people, i.e. subjective health. Measures of subjective oral health or health related quality of life should have sound theoretical basis and should be an integral part of population-based health surveillance.

In oral health, a conceptual model based on World Health Organization’s first classification of impairment, disability and handicap has been proposed by David Locker to explain the biological, behavioural and psychosocial consequences of oral disease. Since the publication of Locker’s model, a variety of subjective oral health status measures have been developed. The 14-item version of the Oral Health Impact Profile is one such measure: It has been tested for reliability and validity and has been widely used all over the world. It has been used as part of national surveys in Australia, Finland and the United Kingdom. The longer version has been used in national surveys in Germany and the United Kingdom. The longer version has been used in a national survey in Germany and the NHANES-04 includes six quality of life questions that are based on the OHIP14 questionnaire, with some changes to wording.

The seven dimensions and the subjects of the questions included in OHIP14 are:

- **Functional Limitation:** trouble pronouncing words, worsened taste.
- **Physical Pain:** aching in mouth, discomfort eating food.
- **Psychological Discomfort:** feeling self-conscious or feeling tense.
- **Physical Disability:** interrupted meals or poor diet.
- **Psychological Disability:** difficulty relaxing, embarrassment.
- **Social Disability:** irritability, difficulty in doing usual jobs.
- **Handicap:** life less satisfying, inability to function.

The frequency of each impact during the preceding year are reported on a five-point scale ranging from “never” through “hardly ever”, “occasionally”, “fairly often” to “very often”.

The wide use of OHIP14 is based on its feasibility. It takes only few minutes to administer and it can be used in postal, computerised or interview form.

**Other discussion outcomes**

- **Oral cancer**
  Collecting data on oral cancer (incidence and mortality rates) is a national responsibility and this information is available in the cancer registries.
- **Fissure sealants**
  Indicators collecting information of sealants should not be in the oral health status section and it was proposed that these indicators would be moved to the prevention section.
- **Orthodontic care**

An indicator connecting malocclusion and the quality of life was regarded important in the European context. At least, the structure of the list was discussed in the working groups and the following change to the structure was proposed:

1. To merge the thematic “oral health and quality of life”.
2. To produce literature on Evidence and Feasibility

**4.3. Oral Health Systems**

**Report from Working Groups**

Chairperson: Dr Kenneth A. Eaton; Rapporteur: Professor Joana C. Carvalho

**Introduction**

Three different small groups of delegates took part in sequential discussions during three sessions which took place in Granada, on 7/8 May 2004. At the beginning of each session, each group was given a concise description of the existing oral health system in the countries of the expanded European Union (EU) and European Economic Area (EEA) to provide a background for the work in hand. In subsequent discussions the following points were then considered to aid the small groups in their choice of appropriate oral health indicators, relevant to current and future conditions:

- What is the importance of oral health system indicators for the quality of oral health care on a population basis?
- Does it help to measure the effectiveness of the system responsible for delivering care?
- Do the indicators bring any benefit to the system?
- What does the health system lose by not having this indicator?

A start was made on exploring the feasibility of recording such indicators in the EU/EEA; taking into account the time required and costs (recording may at present be realistic in some countries while in others it may need to be encouraged in the future). It was agreed that it would be essential to assess the strengths and weaknesses of the indicators against evidence from scientific investigations rather than opinions.

Finally, a set of core indicators for the next 10 years was suggested.

**Existing Oral Health Systems in European Countries**

According to Andersen et al. (1995), an oral health care system is composed of policy, organisation and resources. These three components can be considered when comparing oral health systems in European countries. In principle, the policy of a system should guarantee to a large extent the prevention of oral problems and, in cases of their occurrence, the system should, in order of descending priority, offer relief of pain, restoration of function and aesthetics (Tickle et al. 1997). The organisation of oral health care systems may follow a uni-disciplinary approach (oral health care professional working in private or public clinics) or a multi-disciplinary approach (oral health care professional working in a team to promote general good health). The organisation and the coordination of the oral health systems may be established at national, regional or municipal levels and their performance is dependent of the available financial and human resources.
oral health care therapists are now in training.

and the Netherlands, where equal numbers of dentists and hygienists and dental nurses, to support dentists in Italy, is growing use of other clinical personnel, such as dental technicians are not employed. In Belgium and France the majority of dentists do not employ dental nurses.

Bismarckian System – (Austria, Belgium, France, Germany, Luxemburg)

There is little government involvement in the system, which is based on the principle of obligatory social insurance, funded by employers and employees. Payments for oral health care are made by sickness funds. Apart from recent national oral health surveys (in Austria and Germany, data collection has been largely related to the payments made by sickness funds. Dental hygienists (with the exception of Germany) and clinical dental technicians are not employed. In Belgium and France the majority of dentists do not employ dental nurses.

Beveridgian System – (United Kingdom)

Until recently, the vast majority of oral health care has been provided through the Beveridge, inspired National Health Service, in which private dental practitioners have contracted with the government to provide oral health care. The system is financed by the government and a wide range of data, on both oral health status and costs are collected for the government. There is widespread and growing use of oral health care clinical personnel other that dentists to provide oral health care under the supervision of dentists.

Southern European System - (Cyprus, Greece, Italy, Portugal, Spain)

The system is essentially private with virtually no government involvement. Data collection is fragmented and associated with regions or municipalities. At present, there is generally little oral health care data collection at a national level. There is growing use of other clinical personnel, such as dental hygienists and dental nurses, to support dentists in Italy, Portugal and Spain.

Hybrid – (Ireland, Malta, Netherlands)

This system is a mixture of the Bismarckian and or Beveridgian systems with a private system Children benefit from publicly funded oral health care. Oral health status data are collected at a national level in Ireland and Malta. There is widespread and growing use of other clinical personnel in Ireland and the Netherlands, where equal numbers of dentists and oral health care therapists are now in training.

Transitional - East European countries (Czech Rep, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, Slovenia)

Since 1990, these countries have experienced changes in their oral health system. With a move away from highly centralised co-ordination and largely publicly funded clinics employing many dentists to small privately funded practices. Some national data on oral health care status are collected but data on costs are generally unavailable. Other clinical personnel are employed to support dentists.

Choice of appropriate oral health indicators relating to oral health systems

In discussion it was agreed that in the past ten years there had probably been a gradually increasing demand for representative and reliable data for planning and monitoring of oral health in most EU/EEA countries. Some of the data required are connected with the organisation and resources of the individual systems. For example, there is a lack of data to assess aspects of workforce and of patients’ mobility in the EU/EEA.

Data related to the workforce should provide information about training of professionals to deliver provision of appropriate oral health care, number of dentists entitled to work in Europe - not only those registered, but also those who are actively providing clinical oral health care (university-trained dentists, stomatologists, some doctors and a few no-universit-y-trained dentists) - and the number of other clinically active professionals working in dentistry (hygienists, therapists, dental nurses, dental technicians, denturists and general nurses).

Data relating to the mobility of oral health care workers from country to country was thought to be important. The mobility of patients was also thought to be an important issue, as it appears that growing numbers of patients are travelling across international borders to obtain oral health care (usually at a lower cost) in countries other their own. It may be difficult to quantify such migration of patients. However, it should be established as a future goal.

The evaluation of effectiveness of oral health polices is partly founded on the accessibility of the services for the general population. It has agreed that an attempt should be made to collect data at a national level on this topic and on selected groups of young and old people considered at risk, in the future. Such data might be collected by assessing the number of people who potentially have access to oral care and then determining the percentage of people reporting difficulties in accessing oral health care.

Group members who worked for governments or advised insurance systems felt that it was essential to improve the quality of data on oral health care costs and to devise mechanisms to ensure that such data were collected in all EU/EEA countries.

Finally, it was agreed that uptake/ utilisation of oral health care services by the population was important and would give a measure of the extent to which a system was effective in educating/informing the general population about the benefit of using the available services, their awareness of these benefits and of the effectiveness of delivering these services. It would also help to assess demand when workforce planning.
Strengths, weaknesses and feasibility of recording the suggested indicators taking into account time and costs.

It was agreed that the existing systems for collecting data on the key topics identified in discussion were often neither robust nor reliable in the countries where they existed and that they did not exist at all in some EU/EEA countries. However, it was felt that methodologies should be developed and piloted in the near future. One suggestion was that in countries with little or no previous experience of collecting national oral health data, questions could be added to national household (consumer) surveys or possibly carried out in collaboration with national dental associations. Time did not permit any deep consideration of the issues involved, if it were decided to collect national data on the five topics identified by the group in all EU/EEA countries. However, they clearly need to be addressed in the future.

Conclusions - Suggested Key Oral Health Indicators for Oral Health System

From the discussions which took place it is suggested that the following five areas/topics are of key importance when collecting data on oral health care systems and that further work is necessary to develop methodologies and mechanisms which overcome current problems in implementing their national data collection in all the countries of the EU/EEA:

- Workforce (number, need/demand, migration)
- Migration of oral health care workers and patients
- Access to oral health care
- Uptake/Utilisation of oral health care services
- Costs of oral health care

References

Oral Health Systems


Tickle M., Jenner A. & Kay E. A model to meet the strategic information needs of dentistry in England. Community Dental Health 1997; 14: 127 – 128


Oral health related quality of life


The specific objectives of the workshop were reached on the initial points proposed at the beginning of the meeting. The next step of the project is to produce in September 2004 a compendium issuing of the meeting under the auspices of the SANCO Monitoring Programme including all the presentations, discussions, contributions of the Group. The Oral Health Indicators questionnaire must be, in accordance with the recommendation of the working groups, slightly revisited in order to increase the precision especially in the field of the quality criteria. The finalisation of the long list of the indicators will introduce the processes of the consultation through the European network in order to present a short list in the next meeting, Nice, France, 5.6 November 2004.
Chapter 5: Final list of oral health indicators

80. Dentists
81. Chairside assistants
82. Hygienist
83. Laboratory technicians
84. Dental therapists
85. Clinical Dental technicians (denturists)
86. Other types
87. Practising dentists density
88. Practising dentists per 100,000
89. General dentists per 100,000
90. Specialists dentists per 100,000
91. Practising dentists rate (%)
92. Public Services
93. Private Services
94. Universities/Dental Schools
95. Others
96. Practising dentists by sex (%)

Activities: Per dentist per year
97. Number of patients in private practice
98. Total dentist income
99. Number of working hours
100. Total number of patients
101. Total number of patients
102. Number and percentage of patients in regular care
103. Number of yearly vacation week
104. Number of working day per week
105. Number of daily working hours
106. Number of patients attended per day
107. Age of the primary dental unit (years)
108. Number of dental chairs normally operate concurrently
109. Number of years practising as a dentist

Care regulations
110. Who is responsible for licensing/relicensing dentists?
111. Who is responsible for licensing/dental hygiene? registration?
112. Who is keeping registry of oral health personnel?
113. Who is responsible for the supervision of professional practice?
114. Regulations on X-rays?
115. Are there guidelines on treatment procedures and who is responsible for updating guidelines?

Interventions
Percentage of persons having received per year
116. Fissure sealing
117. Fillings
118. Non-operative occlusal caries treatment
119. Crown restorations
120. Veneers
121. Bridges
122. Implants
123. Scaling for periodontal treatment
124. Fixed orthodontic appliance
125. Number of teeth with replacement of restorations
126. Average time by endodontic treatment

Estimation of time spent on patients in the various categories of treatment
127. Check up
128. Preventive
129. Non-surgical Periodontal
130. Periodontal Surgery
131. Non-operative dental caries treatment
132. Simple restorative
133. Advanced Restorative
134. Endodontic
135. Extractions
136. Orthodontics
137. Others

Average Time Estimation for Treatment
138. Full O rhodontic treatment course
139. Periodontal scaling per sextant
140. Periodontal complex therapy per sextant
141. Fixed and removable Prosthetic Care
142. Endodontic treatment
143. Restorative care
144. Non Interventive care
145. Extraction

Knowledge, Attitude, Questions on Sealants
by Dentists (i.e. Agree, Undecided, Disagree)
146. Newly erupted permanent molars are the most important candidates for sealant.

147. Sealants are of great value in preventing caries
148. Sealants are difficult to apply
149. Sealants are easy to promote patients
150. Sealants are not practical in the private office setting

Level of satisfaction with the remuneration provided for:
151. Preventive services
152. Restorative services
153. Prosthetic services
154. Orthodontic services

Level of satisfaction with the quality of care given to the patients
155. Full O rhodontic treatment course
156. Periodontal scaling per sextant
157. Periodontal complex therapy per sextant
158. Fixed and removable Prosthetic Care
159. Endodontic treatment
160. Restorative care
161. Non Interventive care
162. Extraction

CLASS 3, USE OF SERVICES AND RISK BEHAVIOUR

USE OF SERVICES

Dental visits
1. Number of visit to the dentist (including orthodontics) during the last 12 months (No visit, Once, Twice, More than twice, Don’t know)
2. Percentage of people who visited the dentist within the past year
3. Proportion of long-term care residents who use the oral health care system each year
4. Proportion of low-income children and adolescents who received any preventive dental service during the past year
5. Visit to the dentist for a check up in the last 2 years
6. How long since the last visit to dental practice Less than 6 months (6-12 months, 1-2 years, More than 2 years, Never)
7. Individual based control interval
8. Occlusal caries control during tooth eruption.
9. Percentage of people who had a teeth cleaning within the past year

Reason for the last visit to the dentist
10. Reasons had made an appointment
11. Appointment initiated by the dentist
12. Follow up treatment
13. Emergency appointment
14. Others

Act(s) carried out by the dentist during the last visit
15. Provided fillings
16. Removed calculus
17. Extracted tooth
18. Examined the teeth
19. X-ray
20. Provided fluoride treatment
21. Explain how to take care of the teeth
22. Checked the need for orthodontic treatment
23. Other treatment

Main reason for not visiting the dentist in the last 2 years
24. Couldn’t afford it
25. Don’t want to waste money on dental care
26. Afraid I might not like him
27. Too busy
28. No need
29. No serious dental problems
30. Dental problems will go away
31. Dentist’s office too far away
32. Others
33. Don’t know
34. I am too afraid of the dentist

Reason for the most recent visit to a dentist
35. Something was wrong
36. Time for a check up
37. Recall by a dentist
38. To have the teeth clean
39. Part of a treatment
40. To remain within the payment system
41. Never received dental care
42. Acute pain

Treatment received at the most recent visit
101. Preventive Treatment for Caries-active Children (percentage of all caries-active children who receive a dental sealant or a fluoride treatment within the reporting year)

102. Dental caries experience in their primary or permanent teeth

103. Children who have received dental sealants on their molar teeth

ORAL HYGIENE AND HEALTH STATUS

104. Frequency of brushing the teeth

105. Use of manual or electric toothbrush

106. Use of fluoride toothpaste

Use of additional measure to clean teeth or gums

107. Wooden toothpicks Plastic toothpicks

108. Dental floss

109. Charcoal, Chewstick /meswak, Other

110. Xylitol containing chewing gum

Mothers opinions and attitudes (Fully agree to totally disagree)

111. It is important for children to have dental checkups at least once a year

112. ‘Topical fluoride is important in preventing tooth decay for children’

113. Children’s baby teeth should be filled only when they hurt

Compliance (Fully agree to totally disagree)

114. Brushing one’s teeth prevent tooth decay

115. Brushing one’s teeth makes for healthy gums

116. Using floss to clean the space between one’s teeth

117. Teeth is no guarantee of healthy gums

118. Tobacco is bad for teeth and mouth

119. Sweet products are bad for the teeth

120. Fluoridated drinking water protects your teeth

121. Using fluoride is a harmless way of preventing tooth decay

122. Going to the dentist will solve my problems

I have with my teeth, gums, dentures

Perception of or feel about health (Fully agree to totally disagree)

123. Poor teeth are detrimental to one’s appearance

124. The state of the teeth is of great importance for me

125. Conserving one’s teeth is not important

126. Dental problems can affect the organism as a whole

Beliefs on dental health (Schoolchildren) (Agree/disagree)

127. Tooth decay can make me look bad

128. Keeping natural teeth is not that important

129. False teeth will be less of a bother than natural teeth

130. I’m afraid of going to the dentist because of possible pain

131. Regular visits to the dentist keep away dental problems

132. Brushing my teeth can prevent tooth decay

Which advise to take care of the teeth (Schoolchildren)

133. Friends, Parents, Relatives, Teachers

134. TV Radio, Cinema, Newspapers, Dentist

135. Medical Doctor, Medical nurse, Nobody Others

TOBACCO, DIET ALCOHOL AND OTHERS RISK FACTORS

Tobacco

136. Current cigarettes smokers

137. Former cigarettes smokers

138. Never cigarettes smokers

139. Current cigarettes smoker:<19 per day, 10-19 per day, 20 per day, 21-30 per day >30 per day

140. Former cigarettes smokers: 0-2 years, 3-5 years, 6-10 years, >10 years

Frequency of use of types of tobacco

141. Cigarettes, Pipes

142. Cigars

143. Chewing tobacco

144. Snuff

145. Others

Diet

146. Body Mass Index (by categories)

147. Intake frequency (daily) meals and snacks

148. Snack category (no snack to six or more snacks)

149. Frequency of use of ear or drink even in small quantities (Schoolchildren)

150. Fresh fruit, Biscuit, cakes, buns, etc

151. Lemonade, cocoa-cola, etc, Jam/honey

152. Chewung gum, containing sugar

153. Sweet, Milk with sugar, Tea with sugar

154. Children who have received dental sealants on their molar teeth

155. Topical fluoride is important in preventing tooth decay for children

156. ‘Children’s baby teeth should be filled only when they hurt

Compliance (Fully agree to totally disagree)

157. Brushing one’s teeth prevent tooth decay

158. Brushing one’s teeth makes for healthy gums

159. Using floss to clean the space between one’s teeth

160. ‘Teeth is no guarantee of healthy gums

161. Using fluoride is a harmless way of preventing tooth decay

162. Going to the dentist will solve my problems

I have with my teeth, gums, dentures

Perception of or feel about health (Fully agree to totally disagree)

163. Poor teeth are detrimental to one’s appearance

164. The state of the teeth is of great importance for me

165. Conserving one’s teeth is not important

166. Dental problems can affect the organism as a whole

Beliefs on dental health (Schoolchildren) (Agree/disagree)

167. Tooth decay can make me look bad

168. Keeping natural teeth is not that important

169. False teeth will be less of a bother than natural teeth

170. I’m afraid of going to the dentist because of possible pain

171. Regular visits to the dentist keep away dental problems

172. Brushing my teeth can prevent tooth decay

Which advise to take care of the teeth (Schoolchildren)

173. Friends, Parents, Relatives, Teachers

174. TV Radio, Cinema, Newspapers, Dentist

175. Medical Doctor, Medical nurse, Nobody Others

TOBACCO, DIET ALCOHOL AND OTHERS RISK FACTORS

Tobacco

176. Current cigarettes smokers

177. Former cigarettes smokers

178. Never cigarettes smokers

179. Current cigarettes smoker:<19 per day, 10-19 per day, 20 per day, 21-30 per day >30 per day

180. Former cigarettes smokers: 0-2 years, 3-5 years, 6-10 years, >10 years

Frequency of use of types of tobacco

181. Cigarettes, Pipes

182. Cigars

183. Chewing tobacco

184. Snuff

185. Others

Diet

186. Body Mass Index (by categories)

187. Intake frequency (daily) meals and snacks

188. Snack category (no snack to six or more snacks)

189. Frequency of use of ear or drink even in small quantities (Schoolchildren)

190. Fresh fruit, Biscuit, cakes, buns, etc

191. Lemonade, cocoa-cola, etc, Jam/honey

192. Chewung gum, containing sugar

193. Sweet, Milk with sugar, Tea with sugar

Alcohol

194. Current, Former, Never

195. What kind of alcoholic drink do you prefer?

196. Current, Former, Never

197. What kind of alcoholic drink do you prefer?

198. Information concerning treatment options and procedures

199. Dentists explain all the dental problems that a patient has

200. Dentists devote enough time to their patients

201. Which advise to take care of the teeth (Schoolchildren)

202. Friends, Parents, Relatives, Teachers

203. TV Radio, Cinema, Newspapers, Dentist

204. Medical Doctor, Medical nurse, Nobody Others

TOBACCO, DIET ALCOHOL AND OTHERS RISK FACTORS

Tobacco

205. Current cigarettes smokers

206. Former cigarettes smokers

207. Never cigarettes smokers

208. Current cigarettes smoker:<19 per day, 10-19 per day, 20 per day, 21-30 per day >30 per day

209. Former cigarettes smokers: 0-2 years, 3-5 years, 6-10 years, >10 years

Frequency of use of types of tobacco

210. Cigarettes, Pipes

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212. Chewing tobacco

213. Snuff

214. Others

Diet

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222. Sweet, Milk with sugar, Tea with sugar

Alcohol

223. Current, Former, Never

224. What kind of alcoholic drink do you prefer?

225. Current, Former, Never

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232. TV Radio, Cinema, Newspapers, Dentist

233. Medical Doctor, Medical nurse, Nobody Others

Selecting Essential Oral Health Indicators in Europe
Chapter 5: Final long list of oral health indicators

notice it

160. Mouth usually feel dry

Pregnancy Oral Health related Risk Assessment

161. I was sent to a dentist by a maternity clinic for counselling
162. Is there any referral system for pregnant women

Care of teeth during the most recent pregnancy

163. I needed to see a dentist for a problem
164. I went to a dentist or dental clinic
165. A dental or other health care worker talked with me about how to care for my teeth and gums
166. I went to a dentist or dental clinic for routine care such as teeth cleaning or regular check-up
167. I had been told that I have problems with my teeth or gums such as cavities, gingivitis, root canal, etc.
168. I had problems with my teeth or gums, but I did not see a dentist
169. Satisfactory the dentist or dental clinic for a problem with my teeth or gums.
170. I received treatment for a problem with my teeth or gums
171. How long has it been since you had your teeth cleaned by a dentist or a dental hygienist? Within the past year, 1 to less than 2 years, 2 to less than 5 years, 5 or more years, never

CLASS 4, QUALITY OF LIFE AND ORAL HEALTH STATUS

QUALITY OF LIFE
1. Description of the teeth and gums (Excellent to Poor)
2. Avoid smiling and laughing on account of unattractive teeth, gums or bad breath (Very often to Never)
3. Avoid conversation on account of unattractive teeth, gums or bad breath (Very often to Never)
4. Capacity of chew hard things, such as hard bread or apples (%)
5. Toothache or feel discomfort on account of the teeth during the last 12 months (0 to 12 months)

Following problems during the last 12 months
6. Gums often bleed when brushing the teeth
7. Teeth hurt when hot or cold consumption
8. Cannot chew hard things
9. Teeth hurt when having sweets or sweetened drinks
10. Satisfactory the appearance of the teeth (Very poor to Not at all)
11. Do other schoolchildren make fun of your teeth
12. Missing classes occasionally or for whole days caused by toothache or discomfort during the last 12 months (Schoolchildren)
13. Any natural teeth at all (%)
14. Number of natural teeth do you have

Removable dentures (Adults)
15. Partial denture, (%) Full upper denture, (%)Full lower denture (%)
16. Can you pronounce clearly
17. Difficulty to eat
18. Dentures well fixed
19. Dentures hurt
20. Dentures nice to look at

Oral disadvantage due to disease/tissue damage
21. Avoid laughing or smiling because of unattractive teeth or gums
22. Avoid talking to someone because of unattractive teeth or gums
23. Embarrass by the appearance or bad health of teeth or gums

Oral disadvantage due to functional limitation
24. Avoid chewing hard things because of teeth or dentures
25. Prevented from eating foods because of teeth or dentures
26. Avoided eating with others because of a problem with chewing

Oral disadvantage due to pain
27. Pain or discomfort from teeth or dentures prevented normal daily activities
28. Trouble sleeping because of pain or discomfort from teeth or dentures

Orofacial pain prevalence and behaviour from pain
29. Pain in the jaw joint or in front of the ear
30. Dull aching pain across face or cheek
31. Painful sores or infections around the lips or mouth
32. Teeth sensitive to hot or cold fluids
33. Tooth pain while chewing
34. Burning sensation in the tongue or any other part of the mouth

35. Oral Health Impact Profile (OHIP)

DENTAL CARIES
36. Caries-free (%) 37. Proportion of subjects with no “obvious decay into dentine”
38. Primary dentition: prevalence and extent of caries
39. Primary dentition: incidence and extent of caries
40. Early childhood caries
41. Severe early childhood caries
42. DMFT / dft
43. DMFT 1st permanent molars
44. Number of initial lesions (occlusal surfaces)
45. SIC Index
46. Prevalence of individuals with 5 or more DMFT/dmft
47. Caries experience: percentage of the population with one or more decayed, missing or filled teeth (primary, permanent and mixed dentition)
48. Number of sound unrestored teeth
49. Number of initial lesions (smooth surfaces)
50. Number of initial lesions (occlusal surfaces)
51. Number of restored teeth
52. Number of teeth with decay
53. Caries of the first permanent molars
54. Occlusal caries in first permanent molars
55. Untreated caries percentage of the population with one or more untreated decayed teeth
56. Percentage with 20 teeth in functional occlusion, 57. Sealants (any sealant, complete or incomplete)
58. Percentage of children with 4 sealants, more than 4 sealants, 8 sealants
59. Quality of sealants
60. Percentage of the population with any sealant
61. Presence and number of crowns, bridges, @denture
62. Caries projection (future trends)

PERIODONTAL DISEASES
63. Loss of attachment
64. Community Periodontal Index (CPI)
65. Periodontal disease
66. Presence of > 1 site with clinical attachment level>/>4mm and probing depth >/>4mm
67. Periodontal disease
68. Prevalence of sites with PD>/5 mm (%) and sites with AL>/4 mm (%) 69. Bleeding sites (%) 70. Presence of pocket more than 6 mm

MISSING TEETH
71. Edentulous
72. Prevalence of missing teeth
73. Type of extracted teeth
74. Number of tooth loss
75. Number of teeth loss
76. Complete tooth loss
77. Number of natural teeth

DENTAL FLUOROSIS
78. Percentage with any opacity on their teeth
79. Percentage with normal, questionable, very mild, mild, moderate, severe fluorosis according to Dean’s index for 8-year-olds and for 15 year-olds

DENTAL CARIES
80. Cancer of the oral cavity (Incidence and mortality rates)
81. Cancer of the pharynx (Incidence and mortality rates)

HIV/AIDS related lesions
82. Oral lesions
83. Candidiasis
84. Erythematous gingival bleeding
85. Necrotizing gingivitis
86. Ulcerations
87. Recurrent herpes labialis, recurrent aphthous ulceration atypical oral ulcerations
88. Herpes simplex
89. Oral candidiasis
90. Oral Kaposi’s sarcoma
91. Oral ulcerations

OTHERS
92. Percentage with any treated or untreated trauma
93. Percentage with traumatised incisors needing treatment
List of Participants

Dr. Lis Boje Christensen, WHO Collaborating Centre for Community Oral Health Programmes and Research, Department of Periodontology, School of Dentistry, University of Copenhagen, 20 Nørre Alle, 2000 Copenhagen, Denmark. Tel: +45 35 32 66 94 - Fax: +45 35 32 66 99 E-mail: bjc@odont.ku.dk

Professor Denis Bourgeois, EU Project Leader, Department of Public Health, Faculty of Odontology, University Lyon 1, Rue G. Paradis, Lyon, France. Tel: +33 4 78 77 86 81 - Fax: +33 4 78 77 86 89 E-mail: bourgoisdm@wanadoo.fr

Professor Annesore Borutta, WHO CC for PreventioOrail Diseases, Department of Preventive Dentistry, Dental School of Erfurt, Friedrich-Schiller University of Jena, Nordhäuser Strasse 78, 99089 Erfurt, Germany. Tel: +49 361 741 1309 - Fax: +49 361 741 1109 E-mail: borutta@zmkh.uni-jena.de

Dr. Joao Carvalho, Professor Asocie, Université Catholique de Louvain, Cliniques Universitaires Saint Luc, Département de Médecine Dentaire et de Smbmatologie, Avenue Hippocrate 10, 1200 Bruxelles, Belgique. Tel: +32 2 764 5748 - Fax: +32 2 764 5727 E-mail: joana.carvalho@patd.uct.ac.be

Dr. Alejandro Ceballos, Dean, Facultad de Odontología, Campus Universitario, La Cartuja, 18071 Granada, Spain. Tel: +34 958 243801 - Fax: +34958243795 E-mail: ceballos@ugr.es

Mrs Sylvie Chartron, Scientific Affairs Manager, Masterfoods, BP 100036, 67501 Haguenau cedex, France. Tel: +33 4 92 00 11 14 - Fax: +33 4 92 00 12 63 E-mail: sylvie.chartron@eu.effem.com

Dr. Jacques Desfontaine, Centre Collaborateur de l’Organisation Mondiale de la Santé pour le développement de nouveaux concepts d’éducation et de pratiques bucco-dentaire, Union Française pour la Santé Bucco-dentaire, des Systèmes de Santé UMR 5823 CNRS, 7 rue Mariotte, 75017 Paris, France. Union Française pour la Santé Bucco-dentaire, des Systèmes de Santé UMR 5823 CNRS, Bât 101 Université Lyon I, 27, Bd du 11 novembre 1918 69622 Villeurbanne, France. Tel: +33 4 72448139 - Fax: +33 4 72440573 E-mail: mhl.henri@wanadoo.fr

Professor Carlos Mesia de Almeida, Facultade de Medicina Dentaria, Cidade Universitaria, P1600-214 Lisboa, Portugal. Tel: +351 21 7922660 - Fax: +351 21 7922660 E-mail: calmeida@fml.uf.pt

Dr. Gianluigi Morciano, Universita Degli Studi di Pavia, Department “Biostatistica e Metodologia Epidemiologica”, Via A. Bassi, 21, 27100 Pavia, Italy. Tel: +39 392 507 537 - Fax: +39 392 507 570 E-mail: gianluigi.morciano@unipv.it

Professor Michelé Muller-Bolla, Associate Dean, Oral Public Health Department, Faculty of Odontology, University of Nice, Sophia Antipolis, 24 Avenue des diables bleus 06357 Nice, France. Tel: +33 4 92 00 11 14 - Fax: +33 4 92 00 12 63 E-mail: muller@unice.fr

Dr. Nicolas Nicoloyannis, 48 Avenue du Chater 69340 Francheville France. Tel: +33 4 78774492 - Fax: +33 4 78772375

Dr. Annamari Nihtila, Seportie 1 V. Espoo, Finland. Tel: +358 40 579 5137 - Fax: +358 94 734 7473 E-mail: annamari.nihtila@espoo.fi

Dr. Anne Nordblad, Head of Development (oral health), Docent, Ministry of Social Affairs and Health, Health Department. PO Box 33, FIN-00023 Government, Finland. Tel: +358 9 160 73240 - Fax: +358 9 650 442 Email: Anne.Nordblad@stm.fi

Professor Livia Ottolenghi, Preventive and Community Dentistry, Dental School, University of Rome “La Sapienza”, v.le Regina Elena, 287/a, Roma, Italia. Tel: +39 6 44230807 - Fax: +39 6 44230811 E-mail: livia.ottolenghi@uniroma1.it

Professor Laura Strohmenger, WHO Collaborating Centre for Epidemiology and Community Dentistry, Public Health Economics, 196 alexandras Ave., 115 21 Athens, Greece. Tel: +30 2106435328 - Fax: +30 210649571 E-mail: l-strohmenger@unimib.it

Dr. Alfonso Villa Vigil, Chief Dental Officer, Hellenic Ministry of Health, National School of Public Health, Department of Health Economics, 196 alexandras Ave., 115 21 Athens, Greece. Tel: +30 2106435328 - Fax: +30 210649571 E-mail: e-pavi@ath.forthnet.gr

Professor Nigel. B. Pitts, Dental Health Services Research Unit, The Mackenzie Building, King’s College campus. Tel: +44 1382 420067 - Fax: +44 1382 420051 E-mail: n.b.pitts@dundee.ac.uk

Mrs Claire Rigaud-Bully, Logistic Manager ESCD Project, Laboratory of Analysis in Health System. UMR 5823 CNRS, Bât 101, Université Lyon I, 27 Bd du 11 novembre 1918, 69622 Villeurbanne, France. Tel: +33 4 78943616 - Fax: +33 4 72430144 E-mail: crbully@univ-lyon1.fr

Mrs Gabriele Sax, Magister, Chief Dental Officers, Osterrösterreichisches Bundeinsitut für Gesundheitswesen (ÖBIG), Austrian Health Institute, Stubenberg 6, A-1010 Wien, Austria. Tel: +43 1 515 61 120 - Fax: +43 1 513 84 72 E-mail: sax@oebig.at

Dr. Egita Senagola, Riga Stradins University, Docent, Head of Oral Health Centre, Institute of Stomatology, 20 Dziercza Street, LV1007 Riga, Latvia. Tel: +371 7455560 - Fax: +371 7455055 E-mail: esenako@latnet.lv

Dr. Erik Skaret, Associate Professor, University of Bergen, Center for Odontophobia, Aarstadveien 17, N-5009 Bergen, Norway. Tel: +47 5558 6575 - Fax: +47 5558 6461 E-mail: eirik.skaret@odont.uib.no

Professor Laura Strohmenger, WHO Collaborating Centre for Epidemiology and Community Dentistry, Clinical Oralontologia, University of Milan, Via Beldiletto 1/3, 20124 Milan, Italy. Tel: +39 2 5031 90 00 - Fax: +39 2 5031 90 40 E-mail: laura.strohmenger@unimi.it

Professor Judit Szöke, Associate Professor, Semmelweis University Budapest, Faculty of Dentistry, Huba u 10, 1134 Budapest, Hungary. Tel: +36 1 340 2953 - Fax: +36 1 340 2953 E-mail: szoke@fok.un.hu

Dr. Jaap Veerkamp, Department Pediatric Dentistry, ACTA, Louiseweg 1, NL 1066 EA Amsterdam, Netherlands. Tel: +31 20 5188 470 - Fax: +31 20 518 8544 E-mail: J.Veerkamp@acta.nl

Dr. Elpida Pavi, Chief Dental Officer, Helminic Ministry of Health, National School of Public Health, Department of Health Economics, 196 alexandras Ave., 115 21 Athens, Greece. Tel: +30 2106435328 - Fax: +30 210649571 E-mail: e-pavi@ath.forthnet.gr

Dr. Erik Skaret, Department Pediatric Dentistry, ACTA, Louiseweg 1, NL 1066 EA Amsterdam, Netherlands. Tel: +31 20 5188 470 - Fax: +31 20 518 8544 E-mail: J.Veerkamp@acta.nl

Dr. Alfonso Villa Vigil, President, the National Dental Spain Association, Consejo General de Odontólogos y Estomatólogos de España C/Alcala 79, 2 Planta 20809 Madrid, Spain. Tel: +34 91 264410 - Fax: +34 91 770639 E-mail: mavilla@infomed.es

Dr. Gernot Wimmer, Medical University Graz, Dental School, Auenbruggerplatz12, A-8036 Graz, Austria. Tel: +43 316 3852535 - Fax: +43 316 385 4046 E-mail: gernot.wimmer@nestra.at
Chapter 3

Health Surveillance in Europe

European Global Oral Health Indicators Development Project

2004 Report Proceedings

2nd Consensus Workshop for Selecting Essential Oral Health Indicators

University of Nice Sophia-Antipolis
France

5 – 6 November 2004

Project supported by the European Commission
Health and Consumer Protection Directorate-General
Health Surveillance in Europe

European Global
Oral Health Indicators
Development Project

Selecting Essential Oral Health Indicators

Report of the
2nd Consensus Workshop

University of Nice Sophia-Antipolis
France

5 – 6 November 2004
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Report prepared by Professor Denis Bourgeois, University of Lyon, France and Professor Michele Muller-Bolla, University of Nice Sophia-Antipolis, France.

Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use which might be made of the following information. The authors alone are responsible for the views expressed in this document.

For further information about the European Oral Health Global Indicators Development Project, please contact:
Professor Denis Bourgeois
EU Project Leader
Department of Public Health
Faculty of Odontology
University Lyon I
Rue G. Paradis
69372 Lyon cedex 08
France
Tel: +33 4 78 77 86 81
Fax: +33 4 78 77 86 89
E-mail: bourgeoisdm@wanadoo.fr
Oral Health Indicators in Europe

Project Closure Meeting

2nd Consensus Workshop for Selecting Essential Oral Health Indicators

University of Nice France

5 – 6 November 2004

This project received a financial support of the European Commission, Health and Consumer Protection Directorate-General contract n° SPC 2002472.
Executive Summary

The meeting was hosted by the Dental Faculty of the University of Nice Sophia-Antipolis, France, on 5 and 6 November 2004. A list of participants is attached.

Professor Bourgeois (Project Leader) welcomed all participants and, on their behalf, thanked the officials, who were present for the opening of the meeting.

They were: as representatives from the University of Nice - Professor Maroni (President of the University) and Dr Bolla (Dean of the Dental Faculty), the Representative of the President of the General Council, and Dr Jean Jacques Romatet, Director of the CHU of Nice.

Professor Bourgeois summarised the objectives of the project whose main focus is to provide useful information to decision-makers in the EC and at a primary level to Ministries of Health.

The Official Representatives of the University of Nice stressed the importance to their university of the co-operation in the European Research programme. The competence and interest of the General Council in health related matters was explained to the participants, as well as the need for clear information to support political the decision-making process.

The CHU Representative placed the workshop in the context of the restructuring of the University Hospital and the creation of the new Public Health Hospital which will include an oral health unit.

These brief statements from the officials illustrated the political will at all levels - State, University, City of Nice, Regional Council, Social Security Institution- to develop Nice’s scientific and cultural roles within European and the Mediterranean region.

After the officials had departed, the proposed agenda was adopted. It was agreed that it gave maximum flexibility for working groups to achieve the main objective of the workshop: the adoption of the recommended shortlist of indicators.

Dr Ken Eaton was invited to chair the meeting.
Update on the Project

Professor Bourgeois reported on his participation in a meeting held in October at the European Commission’s (EC) offices in Luxembourg. During this meeting he had given a progress report on the Oral Health Indicators project. He had elaborated the list of indicators, the voting process, the conceptual approach –long list, short list-. The EC officials had given a positive response to the report "European Global Oral health Indicators, 2003 Report Proceedings" available on the site of the Commission at: www.europa.eu.int/comm/health/ph_projects/2002/monitoring/.

The Meeting of the Working Party on Morbidity and Mortality Luxembourg, 13 October 2004 were presented. The main information issues interesting the EGOHIP Group were:
- The relative weight of the oral health sector and its integration in the Health Information Strategy (HIS). The HIS is the cornerstone of decision-making at a political level. It will include health related indicators. It will also provide a knowledge base available to decision-makers at all levels of the EC (now comprising 200 Regions) in reference to the ISARE I, II, III project
- HIS is currently moving towards its operational phase. The fruits of the first phase should provide the basis for an interpretation of information with managerial and governance implications.
- There will be a further phase, within the overall HIS programme 2003-2008, which will see the development and coordination of health information systems, developed on the basis of the 1997-2002 programmes.

The following comments on the SANCO Health Information System were presented:

- Choosing the most relevant set of data indicators, an up-to-date information technology and relevant statistical analysis, represent some of the essential steps to assure a functional Health Information System

A European Union Health Information and Knowledge System (EUHIKS) should be an organized set of procedures for collecting, processing and dissemination information to assist decision-making at all level in the health sectors. It includes:

- Data
- Information
- Knowledge consists of the interpretation of information
- Decision is a choice between alternatives supported by knowledge
- Management
- Dissemination, how is knowledge made available to decision makers, professionals and citizens

The decision N°1786/2002/EC of the European Parliament and of the Council of 23 September 2002 were presented and analysed. The main interesting decisions were:

- Adopting a Programme of Community action in the field of public health (2003-2008)
- Developing and Co-ordinating the health information system: The creation of a comprehensive and sustainable health monitoring, information and knowledge system, building on work done in previous Community healthy programmes such as the research programme, and taking into account the activities of related international organisations

In this context, “DG SANCO is giving also a high priority to developments in other areas covered by existing Health Monitoring Programme projects, especially Reproductive and Perinatal Health, Oral health and issues in the new programme”.

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Using a simple and didactic example, Professor Duru and Dr. Nicoloyannis illustrated the various methods to find an agreement among a group of persons rating a list of indicators. He explained that in the current project the Condorcet method and the Borda method had not been used, to allow for a more democratic approach based on the calculation of agreement rates. He then presented the results of the group’s votes. He explained the tables of results, which were in both graphic and numeric formats. Each individual’s votes appeared anonymously under a given number. This enabled all group members to evaluate their vote in relation to the group consensus. Despite some huge individual variations, the consensus reached was above 70% for all classes of indicators.

Logic and motivation applied to the vote

Five participants were asked to present their rationale for the way they voted. The selection of the five was made by statisticians (the only people who knew the names of the voters) to illustrate the noticeable variations in the results.

Dr Joana Carvalho, University of Louvain, Belgium found that it was difficult to follow the criteria indicated because of the huge number of indicators, insufficient knowledge in some areas and limited time available for updating from the literature review. She illustrated her approach with two examples: tooth brushing with F toothpaste (strong scientific evidence once per day) and non-operative treatment in erupting 1rst molar, because they are very susceptible to caries development.

Dr Juan Carlos Llodra Calvo, University of Grenada, Spain based his decision on group discussions organised with several collaborators. As consensus was difficult to reach on many indicators, they decided to concentrate on only some of them. For this reason many had been left blank in his final vote.

Dr Jacques Desfontaine, French Union for Oral Health, France focused his presentation on the role of the UFSBD having undertaken the task of public health preventive programme in the context of the French liberal practice with no State oral public health programme and policy.

Dr Gabriele Sax, CDO, Ministry of Health, Austria indicated that she voted as a Chief Dental Officer acting as adviser to the Minister of Health. Quality of life and quality of care were her primary foci. "The focus is on the patient not on the dentist".

Dr Annamari Nihtilä, Finland considered the indicators that are used in Finland and issues already discussed in previous meetings. On quality of life she focused on functional and pain limitations and the OHIP list. She made a request to discuss the possibility to include mucosal lesions and orthodontic care. Oral cancer was not considered as data are available from a cancer registry.

Dr Ann Nordblad, Ministry of Social Affairs and Health, Finland, then gave an extensive presentation on the recent legislation in Finland to ensure access to and uniform criteria for care. It will come into force on 1 May 2005. The primary health care Act includes Oral health services.

The Oral Health shortlist: results, comments and discussion

Professor Bourgeois in collaboration with Professor Duru and Dr. Nicoloyannis presented the general results of the vote to classify the selected indicators. Indicators results were identified by class - Socio Economic, Cultural and Demographic Factors, Oral Health Systems, Use of Services and Risk Behavior, Quality of Life and Oral Health Status. The format of presentation included: Global Agreement Rate of the group, by Individual Agreement Rate of the members – from 1 to n members -, presentation of the best solution classified by priority group (1 the best, 4 the less good) and the presentation of the best rank inside the best group.
General Results of the Vote to Classify the Selected Indicators

Class 1
Socio Economic, Cultural and Demographic Factors

Agreement Rate 0.700

Individual Agreement Rate
1: 0.537 2: 0.732 3: 0.776 4: 0.532 5: 0.647
6: 0.721 7: 0.697 8: 0.674 9: 0.800 10: 0.695
11: 0.732 12: 0.645 13: 0.724 14: 0.742 15: 0.811
16: 0.661 17: 0.674 18: 0.716 19: 0.645 20: 0.711
21: 0.645 22: 0.616 23: 0.932 24: 0.747 25: 0.650
26: 0.661 27: 0.782 28: 0.711

*: 20 indicators

Oral Health Systems

Prevention, Protection, Oral Health Promotion
Administration and Financing
Interventions
157 indicators

Prevention, Protection, Oral Health Promotion
Agreement Rate 0.726

Individual Agreement Rate
1: 0.642 2: 0.698 3: 0.761 4: 0.617 5: 0.671
6: 0.725 7: 0.665 8: 0.693 9: 0.727 10: 0.665
11: 0.698 12: 0.610 13: 0.754 14: 0.774 15: 0.758
16: 0.689 17: 0.701 18: 0.731 19: 0.724 20: 0.680
21: 0.651 22: 0.631 23: 0.619 24: 0.690 25: 0.705
26: 0.690 27: 0.723 28: 0.738

*: 70 indicators
Oral Hygiene and Risk Behaviour

Use of Services and Risk Behaviour

Class 31
USE OF SERVICES
Taux d'accord 0.70
Individual Agreement Rate
1: 0.818  2: 0.862  3: 0.743  4: 0.763  5: 0.667
6: 0.668  7: 0.661  8: 0.645  9: 0.780  10: 0.661
11: 0.862  12: 0.672  13: 0.744  14: 0.838  15: 0.697
16: 0.704  17: 0.751  18: 0.653  19: 0.751  20: 0.649
21: 0.649  22: 0.636  23: 0.578  24: 0.554  25: 0.631
26: 0.750  27: 0.713  28: 0.832
*: 104 indicators

Class 32
Oral Hygiene and Risk Behaviour

The Best Solution
Group 1
201 203 235 247
Group 2
216 237 238 249
Group 3
202 204 205 207 208 209 210 211 212 213 214 215 216
217 218 220 222 223 224 225 226 227 228 229 230
231 232 233 234 235 236 239 240 241 242 243 244 246
248 254 256 257 258 259 260 261 262 266 267

Group 4
206 219 221 245 255 263 264 265 268 269 270 271 272

Group 5
250 251 252 253
* 72 indicators

Class 32
Oral Hygiene and Risk Behaviour

The Best Agreement Rate 0.702

Taux d'accords par groupe
1: 0.604  2: 0.754  3: 0.688  4: 0.645  5: 0.775
6: 0.671  7: 0.656  8: 0.773  9: 0.758  10: 0.656
11: 0.754  12: 0.702  13: 0.707  14: 0.735  15: 0.708
16: 0.664  17: 0.636  18: 0.662  19: 0.666  20: 0.741
21: 0.704  22: 0.632  23: 0.683  24: 0.698  25: 0.742
26: 0.750  27: 0.740  28: 0.762

* 72 indicators
Class 32
Oral Hygiene and Risk Behaviour
The Best Rank
1: 2.269 2: 3.268 4: 4.255 5: 2.270 6: 2.264
7: 7.263 8: 2.221 10: 2.265 11: 2.267 12: 2.214

Quality of Life and Oral Health Status

Class 31
Quality of Life
Agreement Rate 0.714
Individual Agreement Rate
1: 0.672 2: 0.918 3: 0.671 4: 0.579 5: 0.722
6: 0.594 7: 0.734 8: 0.739 9: 0.891 10: 0.745
11: 0.744 12: 0.918 13: 0.676 14: 0.694 15: 0.788
16: 0.648 17: 0.654 18: 0.618 19: 0.640 20: 0.668
21: 0.795 22: 0.594 23: 0.722 24: 0.620 25: 0.618
26: 0.755 27: 0.647 28: 0.644 29: 0.776 30: 0.918

Class 32
Quality of Life
The Best Solution

Group 1
1 13 15

Group 2
2 3 4 5 6 7 8 9 10 12 14
16 17 18 19 20 21 22 23 24 25
26 27 28 29 30 31 32 33 34 35

Group 3
11

Oral Health Status
Agreement Rate 0.716
Individual Agreement Rate
1: 0.636 2: 0.847 3: 0.721 4: 0.627 5: 0.710
6: 0.707 7: 0.734 8: 0.852 9: 0.815 10: 0.713
11: 0.720 12: 0.880 13: 0.758 14: 0.717 15: 0.855
16: 0.665 17: 0.642 18: 0.699 19: 0.678 20: 0.638
21: 0.651 22: 0.666 23: 0.821 24: 0.552 25: 0.649
26: 0.663 27: 0.630 28: 0.732 29: 0.704 30: 0.800

Use of Services
Oral Hygiene and Risk Behaviour

Quality of Life and Oral Health Status

Class 31
Quality of Life
Individual Agreement Rate

Class 32
Quality of Life
The Best Rank
1: 11 2: 34 3: 9 4: 10 5: 12
6: 20 7: 3 8: 30 9: 31 10: 7
11: 32 12: 3 13: 8 14: 28 15: 22
16: 18 17: 29 18: 19 19: 23 20: 26
31: 5 32: 1 33: 14 34: 13 35: 15

Oral Health Status
Individual Agreement Rate

Class 41
Quality of Life
Agreement Rate 0.714
Individual Agreement Rate
1: 0.636 2: 0.847 3: 0.721 4: 0.627 5: 0.710
6: 0.707 7: 0.734 8: 0.852 9: 0.815 10: 0.713
11: 0.720 12: 0.880 13: 0.758 14: 0.717 15: 0.855
16: 0.665 17: 0.642 18: 0.699 19: 0.678 20: 0.638
21: 0.651 22: 0.666 23: 0.821 24: 0.552 25: 0.649
26: 0.663 27: 0.630 28: 0.732 29: 0.704 30: 0.800

* 35 indicators

Class 41
Quality of Life
The Best Solution

Group 1
1 13 15

Group 2
2 3 4 5 6 7 8 9 10 12 14
16 17 18 19 20 21 22 23 24 25
26 27 28 29 30 31 32 33 34 35

Group 3
11

Oral Health Status
Agreement Rate 0.716
Individual Agreement Rate
1: 0.636 2: 0.847 3: 0.721 4: 0.627 5: 0.710
6: 0.707 7: 0.734 8: 0.852 9: 0.815 10: 0.713
11: 0.720 12: 0.880 13: 0.758 14: 0.717 15: 0.855
16: 0.665 17: 0.642 18: 0.699 19: 0.678 20: 0.638
21: 0.651 22: 0.666 23: 0.821 24: 0.552 25: 0.649
26: 0.663 27: 0.630 28: 0.732 29: 0.704 30: 0.800

* 35 indicators
Quality of Life and Oral Health Status

Selected Indicators

Classification of Selected Indicators
Final Primary and Secondary List of Selected Indicators

Primary List of Oral Heath Indicators

CLASS 1, SOCIO ECONOMIC, CULTURAL AND DEMOGRAPHIC FACTORS

1. Population (in millions)
2. GNP per capita
3. Health Care GNP (%)
5. Population under 15, 16-64, 65+ (%)
18. Finish education level

CLASS 2, ORAL HEALTH SYSTEMS PREVENTION, PROTECTION, ORAL HEALTH PROMOTION

13. School that promote based Programs centred on daily toothbrushing with fluoride toothpaste (%)
31. Population with free oral health care, payed by government/public insurance (%)
34. Fluoridation status (% population receiving)
36. Daily toothbrush with F toothpaste (% population that claims to)
50. School-based health centers with an oral health component High Risk Strategies (% categories at risk covered by) Children, Adolescents, Adults, Elderly

ADMINISTRATION AND FINANCING

Cost
101. Total Public Private expenditure on oral health
102. Oral Health Care GNP (%)
107. Access to care: proportion of population within e.g. 5km of a dentist?
108. Dentists
110. Hygienist

Interventions
213. Estimation of time spent on patient in the preventive treatment
231. Knowledge, Attitude Questions on Sealants by Dentists: Newly erupted permanent molars are the most important candidates for sealant
236. Level of satisfaction with the remuneration provided for Preventive services

CLASS 3, USE OF SERVICES AND RISK BEHAVIOUR

USE OF SERVICES
1. Number of visit to the dentist (including orthodontics) during the last 12 months
2. Percentage of people who visited the dentist within the past year
99. Assessment of Disease Status (percentage of all child enrolles who have had their periodontal and caries status assessed within the past years)
103. Dental caries experience in their primary or permanent teeth

ORAL HYGIENE AND HEALTH STATUS
201. Frequency of brushing the teeth
203. Use of fluoride toothpaste

TOBACCO, DIET, ALCOHOL AND OTHERS RISK FACTORS
235. Current cigarettes smokers
247. Intake frequency meals and snacks
CLASS 4, QUALITY OF LIFE AND ORAL HEALTH STATUS

QUALITY OF LIFE
1. Description of the teeth and gums
13. Any natural teeth at all (%)
15. Presence of removable dentures (Adults)

DENTAL CARIES
101. Caries-free (%)
102. Proportion of subjects with no “obvious decay into dentine”
103. Primary Dentition: Prevalence and extent of caries
105. Early Childhood Caries
106. Severe Early Childhood Caries
107. DMFT / dft
108. DMFT 1st permanent molars

PERIODONTAL DISEASES
128. Loss of attachment
129. Community Periodontal Index (CPI)

MISSING TEETH
136. Edentulous

ORAL CANCER
144. Cancer of the oral cavity (Incidence and mortality rates)
145. Cancer of the pharynx (Incidence and mortality rates)

Secondary list of Selected Oral Health Indicators

CLASS 2, ORAL HEALTH SYSTEMS

PREVENTION, PROTECTION, ORAL HEALTH PROMOTION
7. Children screening coverage (%)
8. Children covered by school dental services (%)
22. Preventive oral health programmes in kindergartens (%)
26. Dentists who counsel their at-risk patients about tobacco use cessation and cancer screening. (%)
27. Population covered by Prevention and Control of Intentional and Unintentional Injury
30. Population covered by Primary Systemic Oral Health Care (%)
32. Actual Estimated levels of Demand for Oral Care (%) 0-14 yrs 15-29 yrs 30-64 yrs 65+
35. F toothpaste daily (% population that claims to use)
Public fluoride programmes
40. Fluoride toothpaste
School Oral Health Programmes (%)
41. Regular oral examinations
45. Oral health education

ADMINISTRATION AND FINANCING

Cost
106. Remuneration system, Salaried, fee per item, capitation
107. Oral Health Care Providers (Number and Density per 100,000)
109. Chairside assistants
110. Practising dentists density
116. General dentists per 100,000
117. Specialists dentists per 100,000
Interventions
Percentage of persons having received per year
208. Scaling for periodontal treatment

Estimation of time spent on patients in the various categories of treatment
212. Check up
214. Non surgical Periodontal
217. Simple restorative

Average Time Estimation for Treatment
229. Non Interventive care

Knowledge, Attitude Questions on Sealants by Dentists:
232. Sealants are of great value in preventing caries

Level of satisfaction with the remuneration provided for:
238. Prosthetic services
239. Orthodontic services

CLASS 3, USE OF SERVICES AND RISK BEHAVIOUR

USE OF SERVICES

Dental visits
3. Proportion of long-term care residents who use the oral health care system each year
4. Proportion of low-income children and adolescents who received any preventive dental service during the past year
5. Visit to the dentist for a check up in the last 2 years
6. How long to the last visit to dental practice
7. Individual based control interval
8. Occlusal caries control during tooth eruption.
9. Percentage of people who had a teeth cleaning within the past year

Reason of the last visit to the dentist
13. Emergency appointment

Main reason dentist not visited in the last 2 years
24. Couldn’t afford it
34. I am too afraid of the dentist

Treatment received at the most recent visit
46. Emergency
47. Instruction in taking care of teeth and gums

Use of Dental Services by Children
100. New Caries Among Caries-active Children (proportion of all caries active child enrolles who receive treatment for caries-related reasons within the reporting year)
101. New Caries Among Caries-inactive Children (proportion of all previously caries inactive child enrolled who receive treatment for caries-related reasons within the reporting year)
102. Preventive Treatment for Caries-active Children (percentage of all caries active child enrolled who receive a dental sealant or a fluoride treatment within the reporting year)
104. Children who have received dental sealants on their molar teeth

ORAL HYGIENE AND HEALTH STATUS

Mothers opinions and attitudes
209. Topical fluoride is important in preventing tooth decay for children"

Compliance
211. Brushing one’s teeth prevent tooth decay
215. Tobacco is bad for teeth and mouth
218. Using fluoride is a harmless way of preventing tooth decay

Beliefs on dental health (Schoolchildren)
231. Brushing my teeth can prevent tooth decay
TOBACCO, DIET, ALCOHOL AND OTHERS RISK FACTORS

Tobacco
236. Former cigarettes smokers
237. Never cigarettes smokers
238. Current cigarettes smoker:<\9 per day, 10-19 per day, 20 per day, 21-30 per
day, >30 per day

Frequency of use of types of tobacco
240. Cigarettes

Diet
248. Snack category

Pregnancy Oral Health related Risk Assessment
262. Is there any referral system for pregnant women
Care of teeth during the most recent pregnancy
266. I went to a dentist or dental clinic for routine care such as teeth cleaning or
regular check-up

CLASS 4, QUALITY OF LIFE AND ORAL HEALTH STATUS

QUALITY OF LIFE
Following problems during the last 12 months
5. Toothache or feel discomfort on account of the teeth
6. Gums often bleed when brushing the teeth
Perception of the removable dentures (Adults)
17. Difficulty to eat
35. Oral Health Impact Profile (OHIP)

DENTAL CARIES
104. Primary Dentition: Incidence and extent of caries
117. Number of teeth with decay
118. Caries of the first permanent molars
119. Occlusal caries in first permanent molars
120. Untreated caries: Percentage of the population with one or more untreated
decayed teeth
121. Percentage with 20 teeth in functional occlusion,
The Oral Health shortlist: Working groups

Four working groups were then formed with two tasks: identification of redundancies and gaps in the "winners" list, and proposals for replacement, merging, or adding from the "potentials" list. The four groups were:

- Oral health status: chaired by Helen Whelton and Denis Bourgeois
- Quality of life: chaired by Erik Skaret and Marie-Hélène Leclercq
- Oral health systems chaired by Ken Eaton
- Determinants and risk behaviour chaired by Jaap Veerkamp

It was asked working groups to consider both lists. Following the recommendation of SANCO, indicators from Class 1 will mainly be used as universal indicators (i.e. they will be generally available to all groups within health care and not just oral health care) and as such did not need to be included in the oral health indicators final list.

After the first phase of the work in group sessions, the task required refocusing on the true objective: a final shortlist of about 40 indicators covering all essential aspects of oral health without unnecessary redundancies and leaving no gaps i.e. areas uncovered.

From the working groups and subsequent discussions, the final shortlist was produced as follows:

N.B. Previous Identification Numbers for each topic are given in brackets (a single digit prefixes e.g. Class 2 – 13- show that the indicator comes from the primary list, a double digit prefix e.g. Class 31 – 24 that it came from the secondary list)
# Oral Health Indicators

## Final Primary list

A selection of important oral health indicators recommended by European Oral Health Development Project

## Oral Health Systems

### Prevention, Protection, Oral Health Promotion

1. (Previously Class 2 – 13) Schools that promote based programs centered on daily toothbrushing with F toothpaste
2. (Class 2 – 7) Children screening coverage (%)
3. (Class 2 – revised wording of No. 50) Access to Primary Oral Health Systematic Care Service

## Administration and Financing

4. (Class 2 – 31) Free oral health care rate paid by government/public insurance
5. (Class 2 – 34) Fluoridation status
6. (Class 2 - 26) Dentists providing advice on tobacco use cessation
7. (Class 2 – 22) Preventive oral health programmes in kindergartens

## Interventions

8. (Class 2 – 104) Cost of oral health services (private and public)
9. (Class 2 – 108 +110) Oral Health Care Providers Rate (Number and Density)
10. (Class 2 – 102) Oral Health Care GNP
11. (Class 2 – reworded 107) Access to oral health care (proportion of population within e.g. 30’ of a dentist)

## Use of Services and Risk Behaviours

### Use of Services

12. (Class 23 – reworded 237 – 239) Satisfaction of dentists with the remuneration provided
13. (Class 23 – reworded 240 - 247) Satisfaction of dentists with the quality of care given

### Risk Behaviours

14. (Class 3 – 1) - Prevalence of dental contact within the previous 12 months
15. (Class 31 – 24) Main reason dentist not visited in the 2 years
16. (Class 31 – modified 13) Reason for the last visit to the dentist
17. (Class 3 – 203) Daily toothbrush prevalence with fluoride toothpaste
18. (Class 32 – modified 238) Prevalence of tobacco usage
19. (Class 3 – 247) Intake of food and drink per diem prevalence
20. (Class 32 – 262) Care-seeking for pregnant women
21. (Class 32 – 209) Mothers' opinions and attitudes for bi-diary F-tooth brushing in preventing tooth decay for children
... Final Primary list

Quality of life and Oral health

Quality of life
22. (Class 41 - 25) Prevented from eating foods because of teeth or dentures
23. (Class 41 – 27) Pain or discomfort from teeth or dentures prevented normal daily activities
24. (Class 41 – 35) Oral health impact (OHIP-14)

Oral Health
27. (Class 4 – 101 reworded) No obvious decay prevalence
28. (Class 4 – 136) Edentulous prevalence
29. (Class 4 – 108) DMFT 1st permanent molars
30. (Class 4 – 128) Loss of attachment
31. (Class 4 – 144 and 145) Cancer of the oral cavity and pharynx
32. (Class 4 – 107) DMFT / dft (D/d, M, F/f)
33. (Class 4 - 105) Early Childhood Caries
34. (Class 4 – 129) Community Periodontal Index (CPI)
35. (Class 4 - new) Fluorosis prevalence

Optional Recommendations for Core Indicators to Facilitate Integration in Health Systems Data Bases

It was decided that this “fine tuning” should be done by exchange of e-mail along the same lines as the initial voting process to select the original shortlist. Once finalised, the final shortlist of 40 or so, indicators will be sent to all participants, for them to select the four key indicators or to sort the whole list by hierarchical order. A final vote will then take place using a methodology to be defined by the team from the University of Lyon. The methodology will provide the necessary guidance.
Catalogue of Indicators

Marie-Hélène Leclercq presented a format to explain and catalogue the indicators. The format has been developed by the Lyon project team. In the proposed format, each indicator would be described in one or two pages under eight headings. The information given should be action oriented and restricted to what is useful to the target user (mainly public health administrators). A discussion which followed was largely concerned with the question of data quality, a feature that is not included in the proposal. The importance of the issue was acknowledged. The consensus was that, when drafting each indicator description, efforts should be made to try to ensure an acceptable quality level for the data concerned. This approach would be more effective for the user than just a simple statement on data quality.

In addition, a future project on methodological developments for data collection will address comprehensively the issue of data quality and comparability. The proposal was accepted and the format is now described.

Indicator Description

Indicators relating to socio-economic, cultural and demographic factors of general nature, i.e. not specifically related to oral health will be used as stratifying variables so as to highlight and monitor inequalities in determinant, process and outcomes of the health system.

Each indicator description includes the following categories:

1. Title
   It may be interesting with respect to the potential use of the indicator to specify to which section of the healthcare production system it belongs: determinant, process or outcome

2. Rationale
   Provides a brief description of the reasons why the indicator has been selected, for example DMFT is globally accepted as a standardized measure of one of the most common oral diseases.

3. Definition of the indicator textually or, in the case of proportions, rates and ratios, by specifying the numerator and the denominator. The definition should be complete and leave no room for interpretation.

4. Definition of important terms, which may have specific meaning in the context of the indicator. Each term in the title of the indicator and its textual definition should be clear to administrative or technical staff not necessarily qualified oral health personnel. Clinical criteria, pathological terms may be defined under this section.

5. Data sources which could be either routine data collection, special survey or other sources. There may be a need to identify various types of data sources. This section could /should give an indication on how to collect the data (for example as part of community surveys) or where to find already existing information (for example access to databases, review of registers, of patient records etc).

6. Use of the indicator, which is an indication of how the indicator should be used at the facility level, and other levels of the health system. For example: to identify high-risk groups for implementation of preventive programme.

7. Recommended formats of presentation:
   For some indicators, recommended forms of presentation are provided indicating:
   i) Stratification by (geographic, rural/urban, age, sex);
   ii) Levels of severity (e.g. indicator of goitre);
   iii) Units of measurements (including choice of population base 100,1000,10000 etc for the expression or rates).

8. References providing primary sources of additional information about this and possibly other related indicators (which may not be included in the Catalogue). A maximum of four references should be provided. The criterion for selection is their relevance to the indicator definition.

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Completion of the Catalogue: Initial Step

It was agreed that the finalised format proposal will be sent to the whole group by the project secretariat. Professor Bourgeois called for an active contribution whereby some participants would volunteer to draft descriptions of the selected indicators within the agreed format. The following participants volunteered:

**For Class 2 Indicators** (to be co-ordinated by Ken Eaton)
1. (previously Class 2 – 13) – A. Borutta, H. Senkel
2. (previously Class 2 – 7) – P. Batchelor
3. (previously Class 2 – 50) – P. Batchelor
4. (previously Class 2 – 31) – A. Ekman
5. (previously Class 2 – 34) – J.C Llodra
6. (previously Class 2 – 26) – D. Bourgeois
7. (previously Class 2 – 22) – D. Bourgeois
8. (previously Class 2 – 104) – K. Eaton
9. (previously Class 2 – 108/110) – K. Eaton
10. (previously Class 2 – 102) – K. Eaton
11. (previously Class 2 – 107) – K. Eaton
12. (previously Class 23 – 237/239 – MH. Leclercq, D. Bourgeois
13. (previously Class 23 – new indicator) – MH. Leclercq, D. Bourgeois

**For Class 3 Indicators – Use of Services and Risk Behaviours** (to be co-ordinated by Jaap Veerkamp)
14. (previously Class 3 – 1) – P. Batchelor
15. (previously Class 31 – 24) – J. Veerkamp
16. (previously Class 31- modified 13)- J. Veerkamp
17. (previously Class 3 – 203) – G. Sax
18. (previously Class 32 – 238) – E. Snakola
19. (previously Class 3 – 247) – S. Chartron
20. (previously Class 32 – 262) – G. Sax
21. (previously Class 32 – 209) – P. Batchelor

**For Class 4 Indicators on Quality of Life** (to be co-ordinated by Erik Skaret, with contributions from Anne Nordblad, Lise Boge Christensen, Benedetta Paololetti, and Marie-Héléne Leclercq. Erik Skaret will ask each member to write one of these five descriptions.

**For Class 4 Indicators on Oral Health Status** (to be co-ordinated by Juan Carlos Llodra and Nigel Pitts)
22. (previously Class 4 – 101) – N. Pitts
23. (previously Class 4 - 136) – D. Bourgeois
24. (previously Class 4 – 108 – JC Llodra, N. Pitts, M. Muller-Bolla
25. (previously Class 4 – 128) – D. Bourgeois
26. (previously Class 4 – 144 and 145) – D. Bourgeois
27. (previously Class 4 – 107) – JC Llodra, N. Pitts, M. Muller-Bolla
28. (previously Class 4 – 105) – AM Nihtila
29. (previously Class 4 – 129) – D. Bourgeois
30. (previously Class 4 - new) – H. Whelton
31. (previously Class 4 – 120) – N. Pitts
32. (previously Class 4 – 121) – D. Bourgeois
33. (previously Class 4 – 13 reworded) – H. Whelton
34. (previously Class 4 – 15) – L. B. Christensen
35. (Orthodontic coverage: new indicator) - A. Nordblad

The deadline of 7 January 2005 was agreed as the deadline by which volunteers must send drafts to their working group co-ordinators, with a copy to the project Secretariat, so as to prepare the first draft of the catalogue by the end of January 2005.
Future Developments

Professor Bourgeois mentioned the possibility for future developments (a second phase) of the project within the 2003-2008 EC Public Health Programme. It would require new participants from the countries that have recently joined the European Union and answers on their individual commitment from existing participants. A future project could address four aspects: 1) availability of indicators in countries 2) information collection: methodologies and data quality 3) translation of user's manual into some 20 languages 4) pilot studies.

The suggestion was welcome by the participants and it was agreed that the topic will be on the agenda of the final meeting of the current project.

The communication strategy to make the current work known internationally was then discussed. It was agreed that the strategy will need to maximise the use of existing structures and bodies.

The project will be advertised at the next IADR meeting, through the EADPH and the CDOs acting as advisers to the Ministers of Health will inform their ministries.

The next meeting will take place in Paris. It will be dedicated to the presentation and finalisation of the catalogue of essential Oral Health Indicators and to the organisation of the next project. The dates are 17-18 March 2005.

Warm thanks and congratulations were addressed to Professor Michele Muller-Bolla and her team for the impeccable organisation of this meeting, the perfect management of the logistics and the warmth of the social and personnel contacts throughout the meeting.
List of Participants

Dr Paul Bachelor  
2nd Floor Management Division  
Eastman Dental Hospital  
256 Grays Inn Road  
UK. London WC1X 8BT  
E-mail :paulb@public-health.ucl.ac.uk

Dr. Lisa Boge Christensen  
WHO Collaborating Centre for Community Oral Health Programmes and Research, Department of Periodontology, School of Dentistry, University of Copenhagen, 20 Nørre Allé, 2200 Copenhagen, Denmark  
Tel: +45 35 32 66 94 - Fax: +45 35 32 66 99  
E-mail: lbc@odont.ku.dk

Professor Denis Bourgeois  
EU Project Leader, Department of Public Health, Faculty of Odontology, University Lyon I, Rue G. Paradin, Lyon, France  
Tel: +33 4 78 78 86 81 - Fax: +33 4 78 78 86 89  
E-mail: bourgeoisdm@wanadoo.fr

Professor Annerose Borutta  
WHO CC for Prevention Oral Diseases, Department of Preventive Dentistry, Dental School of Erfurt, Friedrich-Schiller University of Jena, Nordhäuser Strasse 78 99089 Erfurt, Germany  
Tel: +49 361 741 1309 - Fax: +49 361 741 1109  
E-mail: borutta@zmkh.ef.uni-jena.de

Dr. Joana Carvalho  
Professeur Associée, Université Catholique de Louvain, Cliniques Universitaires Saint Luc, Département de Médecine Dentaire et de Stomatologie, Avenue Hippocrates 10, 1200 Bruxelles, Belgique  
Tel: +32 2 764 5748 - Fax: +32 2 764 5727  
E-mail: joana.carvalho@patd.ucl.ac.be

Mrs Sylvie Chartron  
Scientific Affairs Manager, Masterfoods, BP 100036, 67501 Haguenau cedex, France  
Tel: +33 3 88 05 10 83 - Fax: +33 3 88 05 10 07  
E-mail: sylvie.chartron@eu.effem.com

Dr. Jacques Desfontaine  
Centre Collaborateur de l’Organisation Mondiale de la Santé pour le développement de nouveaux concepts d’éducation et de pratiques bucco-dentaire, Union Française pour la Santé Bucco-dentaire, 7 rue Mariotte, 75017 Paris, France  
Tel: +33 1 44 90 72 80 - Fax: +33 1 44 90 96 73  
E-mail: ufsbd@ufsbd.fr

Professor Gérard Duru  
Director of Research CNRS, Laboratoire d’Analyse des Systèmes de Santé UMR 5823 CNRS Bât 101, Université Lyon I, 27, Bd du 11 novembre 1918, 69622 Villeurbanne, France  
Tel: +33 4 72448139 - Fax: +33 4 72440573  
Email: gduru@univ-lyon1.fr

Dr Agneta Ekman  
Chief Dental Officer, Health Care and Medical Services Department, The National Board of Health and Welfare, Socialstyrelsen, SE - 106 30 Stockholm, Sweden.  
Tel: +46 8 55553350 - Fax: +46 8 55553446  
E-mail: Agneta.Ekman@sos.se

Dr. Kenneth A. Eaton  
Old Saddlers, Kempe’s Corner, Canterbury Road, Boughton Aluph, Ashford Kent, TN254EW, U.K.  
Tel: +44 1 233 813855 - Fax: +44 1 233 813858  
E-mail: K.Eaton@eastman.ucl.ac.uk

Professor Roswitha Heinrich-Weltzien  
Friedrich-Schiller-University of Jena Dental School, Department of Preventive Dentistry, Nordhäuser Strasse 78 D-99089 Erfurt, Germany  
Tel: +49 361 741 1389 - Fax: +49 361 741 1386  
E-mail: heinrich@zmkh.ef.uni-jena.de

Dr. Vera Hubkova  
Head Department of Dentistry, Faculty Hospital, 500 05 Hradec Kralove, Czech Republic  
Tel: +420 495 833 375 - Fax: +420 495 832 024  
E-mail: hubkovav@fhk.cuni.cz

Mrs Marie Hélène Leclercq  
Laboratoire d’Analyse des Systèmes de Santé, UMR 5823 CNRS, Bât 101 Université Lyon I, 27, Bd du 11 novembre 1918 69622 Villeurbanne, France  
Tel: +33 4 72448139 - Fax: +33 4 72440573  
E-mail: mhl.henri@wanadoo.fr

Professor Juan Carlos Llodra Calvo  
Facultad Odontologica, Universidad de Granada, Campus Universitario Cartuja, Colegio Maximo, 18071 Granada, Spain  
Tel: +34 958 243801 - Fax: +34 958 243795  
E-mail: jllodra@hotmail.com

Professor Cesar Mexia de Almeida  
Facultade de Medicina Dentaria, Citade Universitaria, P-1600-214 Lisboa, Portugal  
Tel: +351 21 7922660 - Fax: +351 21 7922660  
E-mail: calmeida@fmd.ul.pt
European Global Oral Health Indicators Development
Project of the EU Health Monitoring Programme (SPC 2002472)

Meeting of Health SANCO Monitoring Programme
2nd Consensus Workshops for Selecting Essential Oral Health Indicators

TECHNICAL AGENDA

Nice, 5 – 6 November 2004

1. Registration/Welcome (8:30)
2. Opening session (8:45)
3. Approval of the agenda
4. Update on European Commission Project
   a. Update on Morbidity and Mortality Task Forces
   b. Objectives and priorities of the Development on the European health Survey Systems (EHSS)
   c. State of the play of ECHI short list Project for morbidity and mortality
5. EGOHIDP: Conceptual framework of the Consensus Method
6. The ORH Short list: Logic and motivations applied to the vote
   a. Some examples
   b. Finnish experience in drafting of basic principles and indicators for oral health and dental care within reasonable time starting 1st of March 2005
7. The ORH short list: Results, comments and discussion
   a. General presentation
      Primary list of selected indicators:
      Secondary list of selected indicators
   b. Redundancies and gaps: Working groups
8. Optional recommendations for core indicators to facilitate integration in health systems data bases
   a. How best to use the WHO Steps model as a way of offering European data users 3 Steps, and approved core, enhanced and optional methods/indicators for different purposes
   b. Individual contribution using voting procedure
9. Harmonisation of indicators: Catalogue and data sheet
   a. Models of reference
   b. Design of the framework: Comments, discussion and proposition
10. Completion of the catalogue: Initial step
11. Any other business
   b. The role of EADPH and the European CDOs Group
      The international developments with the ICDAS system
   c. Other
12. Further working process and next meeting
13. Closure
Chapter 4

Health Surveillance in Europe

European Global Oral Health Indicators Development Project

2005 Report Proceedings

Consensus Workshop for Guidelines in Oral Health Information

National Assembly
Paris, France

17-18 March 2005
Health and Consumer Protection Directorate-General
Health Monitoring Programme
European Global Oral Health Project

Health Surveillance in Europe
European Global Oral Health Indicators Development Project

Selecting Essential Oral Health Indicators in Europe

Project Closure Meeting
Report of the Consensus Workshop for Guidelines in Oral Heath Information

National Assembly
Paris, France
17-18 March 2005
Acknowledgement

The European Group wishes to acknowledge the support for the realisation of the workshop received from the Professor Jean Michel Dubernard, Deputy, President of the Commission of Social’s Affairs, National Assembly, Paris, France.

Special thanks are due to Dr Andre Prost, Former WHO representative European Union, Brussels, WHO Director Government, Civil Society and Private Sector Relations for their outstanding contributions in scientific role throughout the workshop.

Thanks also due to Mr Emmanuel Hamelin, Deputy, National Assembly, Paris, France, for his warm welcome and kind hospitality.

This project received a financial support of the European Commission, Health and Consumer Protection Directorate-General contract n° SPC 2002472.

Report prepared by Professor Denis Bourgeois, University of Lyon, France and Professor Juan Carlos Llodra Calvo, University of Grenada, Spain.

Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use which might be made of the following information.

The authors alone are responsible for the views expressed in this document.

For further information about the European Oral Health Global Indicators Development Project, please contact:
Professor Denis Bourgeois
EU Project Leader
Department of Public Health
Faculty of Odontology
University Lyon 1
Rue G. Paradin
69372 Lyon cedex 08
France
Tel: +33 4 78 77 86 81
Fax: +33 4 78 77 86 89
E-mail: bourgeoisdm@wanadoo.fr
Selecting Essential Oral Health Indicators in Europe

Consensus Workshop for Guidelines in Oral Heath Information

Project Closure Meeting

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National Assembly
Paris, France

17-18 March 2005

This project received a financial support of the European Commission, Health and Consumer Protection Directorate-General contract n° SPC 2002472.
Executive Summary

The meeting took place in Paris in the vicinity of the National Assembly. The list of participants and the agenda are attached.

Professor Bourgeois, Project leader, welcomed all participants and presented the proposed agenda:
The first day of the meeting was entirely devoted to reviewing the draft catalogue of the indicators descriptions.
The major point of the second day was the conference debate to address the issue of how to promote the project outcomes, how to link the scientific and the associative bodies and the political world so as to implement the technical recommendations made and the set of indicators selected. An important objective of this agenda item was to provide an example of the kind of dialogue and discussion that should be promoted at national levels after the closure of this project phase;

The proposed agenda was adopted, as well as the report of the Nice meeting.

Before reviewing each indicator, Professor Bourgeois summarised comments received prior to the meeting and stressed the following points:

- Users of the catalogue will not be specialised oral health personnel therefore. The section "rationale" should be written to convince decision-makers.
- References, should be chosen preferably in the context of contributions made by institutions such as Eurostat, WHO etc…., because of their scientific credibility. Web references should be excluded, as well as individual publications.
- We should keep in mind that we are not reinventing the wheel as was agreed in the first meeting held in Lyon two years ago.
- While reviewing the catalogue, we will concentrate on the content, the focus of the messages, the clarity of the explanation given, not on editorial aspects.
- This catalogue is not addressing the issue of methods for data collection. This will be the object of the phase II of the project.
- After this meeting, a second draft will be circulated. This second round will be the ultimate opportunity given for comments and possible amendments. Within three or four weeks, the final catalogue will be produced meetings.

This intervention was followed by the detailed review of the indicators descriptions which covered the whole day work. All discussions took place in plenary sessions.
Conference Debate: “Promotion of Health Policies: from the Recommendation to the Decision Making”

The second day of the meeting opened by Professor Bourgeois was honoured by the presence of Dr Michèle Aerden, President elect of the Fédération dentaire internationale, Dr Bedossa member of the European Social and Economic Council, Dr André Prost, former EC Liaison Officer of the World Health Organization, Dr Antonni Montserrat Moliner, DG Sanco, Dr Patrick Hescot, President elect of the European Regional Organisation, Professor Benque, Adviser to the Ministry of Health of France.

The major objective of this debate is to address issues relating to the promotion of public health recommendations, the catalogue of oral health indicators being a tool among others to serve as a basis for reflection, discussion and decision-making. How to reach key health policy actors, identification of political and/or technical obstacles, institutional networks, possible ways to outreach within and outside the health system, communication strategies and techniques, is a non-exhaustive list of issues that need to be addressed, if not fully answered, so as to support our next task: the promotion of recommendations on oral health to make them an integrated and unavoidable dimension of public health programmes at national and European Community levels.

Dr Prost, facilitator, give introductory remarks to position the debate;

"What use is a technical recommendation? What is its impact on the actual policy" Knowing that the political decision is often at the cross-roads of conflicting interests, private, public, societal etc.. Political decisions demand evidence, certitudes, scientists have a natural culture of questioning. Politicians have to rely on specialized analysis in domains beyond their competence. Aware of this context, in order to be able to promote our recommendations, we need to know how we can convince politicians to make use of the report. What are the channels? The mechanisms?

Dr Bedossa gave a clear insight on how the Commission works on health related matters. Until recently public health issues were not in the terms of reference of the Commission per se. Some aspects of health were scattered under different DGs and were dealt with as a component of Research, or Information systems etc. The situation will dramatically change when Mr Kaprianou will launch the first European Community health programme on 6th April.

An important result of this initiative is that national health policies will have access to Community structural funds. According to art. 95, public health should be linked to consumer’s rights, needs and demand. SANCO is acting as the coordinator of technical recommendations. Because of this approach, it is necessary to associate consumer networks to health projects; experts can influence politicians to support technical recommendations provided they have access to the information long before actual directives come into force. Networking, lobbying are the key leverages if we want expert groups recommendations to be applied.

Dr Montserrat described how the place of health progressed within the work and projects of the European Commission with the conscious of the need to develop information systems that will provide standardised and comparable information throughout all European countries. Information Systems are covering health indicators, health determinants. Major developments are taking place regarding important health threats for example the creation of the European Centre for infection diseases. We need to enter into a second developmental phase with the development of influencing networks able to promote tools and recommendations on the codification of health information, its harmonization.
As mentioned by Dr Aerden, the European Oral health Liaison Committee could and should play a key role in this respect as mechanisms and contacts have already been established between this health sector and the European Commission.

How does the professional sector influence the politics?
In respect of the role of the professional associations and its impact on policies, Dr Aerden explained the role of the FDI, its various links with research institutions, educational bodies, international organisations and its longstanding history of collaboration with WHO in oral public health.

Dr Hescot explained how the ORE was promoting the concept of preventive care to become a major activity of the provision of care, and the integration of prevention at community level and practice level.

Health policies and sciences
Regarding the role of experts in influencing health policies, Professor Pitts underlined the need for experts to agree and to provide up-to-date information. Despite the recognition of evidence-based approaches, dissemination of information directed to policy makers remains poor and insufficient. Harmonization of evidence-based information is necessary. In the area of prevention there is a need to update the tools to measure prevention rather than established disease.

Advising the Ministries of Health
The oral health profession has built a network of Chief dental Officers (CDOs), each of them acts as an adviser to the Minister of Health on oral health matters. Dr Pavi explained how the European CDO's coordinate their approaches and are directly influencing the national policies on oral health. She insisted on the necessity to speak the language of the politician to promote efficiently public oral health messages. Professor Benque's intervention gave an illustration of the role of the technical expert in advising the Minister.

On the issue of the broadening of the European Community, the positive role of the new incoming countries, their enthusiasm, competence and energy was perceived by all experts on the panel as a chance for Europe. As for the eventual next phase of the project, it would be recommended to include other participating countries selected in the group of the most recent members.
Finalization of the Catalogue and Further Project Development

The afternoon of the second day was devoted to finalise the discussion on the catalogue content and to address prospective aspects.

Dr Montserrat gave a very positive appreciation of the work achieved and expressed his wishes to see the development of methods for data collection. Several participants expressed their concerns about the need to clarify what the catalogue is, what is not, how it should be used and its limitation. This could be done in an introductory section before the descriptive section. It was agreed that 10 to 15 pages presentation will be prepare to introduce this list of indicators; most of the narrative will be taken from intermediary reports of the project. Lay persons should read the final draft to see if it is clear enough for non oral health specialists.

The group had been asked to classify the 39 indicators in priority order so as to come up with a selection of priority indicators to be included in international Health data bases such as the WHO data base. Because of the time constraints, results of the vote could not be presented. They will be transmitted to all participants individually.

Professor Bourgeois then described what could be the content of the Phase II of the project and invited all interested participants to provide comments and proposals so as to prepare a submission to SANCO. Contacts will also be made with potential new partners.

The main objective of Phase II will be to develop a standardised protocol for information collection in all European countries.

Because of the varying nature of the indicators, clinical/sociological, very different tools will have to be developed and used and participants will necessarily expand from oral health expertise towards, sociologists, opinion pool institutions etc.

- The first step, similarly as for phase 1 will be to evaluate the existing situation/ what is available, what has been tested, used, validated etc; What indicators are currently used in the various European countries? Is the information technically and ethically available?
- Additional methods will be developed together with a standard protocol
- A pre-test will take place in a small number of countries followed by a critical analysis of the methods proposed.
- Feasibility and cost evaluation should also be part of the evaluation
- Development of the standard protocol
- The final step will be the translation in some European languages of the documentation produced.

Proposed teams could participate on one or more modules of activity. They could be involved as associate or collaborating partners.

The deadline for the submission to be sent to SANCO is 16 April. Therefore, comments and proposals should be sent to Professor Bourgeois as soon as possible.

Participants expressed warm thanks to the Project Secretariat, Professor Bourgeois and his team for the work achieved and the conduct of the project.

Closure of the meeting and end of Project phase I.
Conference Debate

“Promotion of Health Policies: from the Recommendation to the Decision Making”

18 March 2005

Assemblée Nationale Paris

126 rue de l’Université, 75017 Paris
Room 6243

List of Participants

Dr. Michèle Aerden
President Elect, Fédération Dentaire Internationale
17 Ave. De la Sapinière 1180 Bruxelles Belgium
E-mail : aerden.m@biz.tiscali.be

Mme Sylvie Azogui-Levy
Associate Professor, Department of Public Health, Faculty of Odontology University Paris 7
5 rue Garancière 75006 Paris, France

Mr Gérard Badeyan
Chargé de mission auprès du Haut comité de santé publique, représentant français au sein du réseau des autorités compétentes, Ministère de la Santé et de la Protection Sociale, 8 avenue de Ségur, 75350 Paris 07
E-mail : gerard.badeyan@sante.gouv.fr

Professor Pierre Bachni
Fédération Européenne de Parodontologie, Section de Médecine dentaire, Division de Médecine Dentaire préventive, Université de Genève, Rue B. Menn 19, CH. 1205 Genève, Suisse
E-mail : pierre.bachni@medecine.unige.ch

Dr. Paul Batchelor
2nd Floor Management Division, Eastman Dental Hospital, 256 Grays Inn Road, London, WC1X 8BT, United Kingdom
E-mail: paulb@public-health.ucl.ac.uk

Mr Adrien Bedossa
European Economic and Social Committee
European Economic and Social Committee, 99, rue Belliard B-1040 Bruxelles

Professor E.P. Benque
Conseiller du Ministre, Ministère de la Santé et de la Protection Sociale, 8 avenue de Ségur, 75350 Paris 07, France

Professor Annerose Borutta
WHO CC for Prevention Oral Diseases, Department of Preventive Dentistry, Dental School of Erfurt, Friedrich-Schiller University of Jena, Nordhäuser Strasse 78, 99089 Erfurt, Germany
E-mail: borutta@zmkh.ef.uni-jena.de

Dr. Claude Bouchet
Secrétaire Général, Association dentaire française, 7 rue Mariotte, F. 750017 Paris
E-mail : cjbouchet@wanadoo.fr

Professor Denis Bourgeois
EU Project Co-ordinator, Department of Public Health, Faculty of Odontology, University Lyon I, Rue G. Paradin, Lyon, France
E-mail: bourgeoisdm@wanadoo.fr

Professor ML. Boy Lefebvre
Dean, Faculty of Odontology, University Paris 7, 5 rue Garancière 75006 Paris, France

Dr. Joana Carvalho
Université Catholique de Louvain, Cliniques Universitaires Saint Luc, Département de Médecine Dentaire et de Stomatologie, Avenue Hippocrate 15, 1200 Bruxelles, Belgium
E-mail: joana.carvalho@patd.ucl.ac.be
Dr Philippe Calfon  
Commission des Affaires Internationales,  
Association Dentaire Francaise, 7 rue Mariotte,  
75017 Paris France  
E-mail : p_calfon@club-internet.fr

Dr. Lisa Boghe Christensen  
WHO Collaborating Centre for Community Oral Health Programmes and Research, Department of Periodontology, School of Dentistry, University of Copenhagen, 20 Nørre Allé, 2200 Copenhagen, Denmark  
E-mail: lbc@odont.ku.dk

Dr. Frédérique Cohen  
Chirurgien dentiste conseil, GROUPAMA, Paris, France

Dr. Jacques Desfontaine  
Centre Collaborateur de l’Organisation mondiale de la Santé pour le développement de nouveaux concepts d’éducation et de pratiques bucco-dentaire, Union Française pour la Santé Bucco-dentaire, 7 rue Mariotte, 75017 Paris, France  
email: ufsbd@ufsbd.fr

Dr. Pierre-Olivier Donnat  
Président Départemental CNSD, 2A rue 8 Mai 1945  
89210 Briennon sur Armancon  
E-mail : podonnat@netmedicom.com

Dr. Martine Dorin  
Echelon local du service médical des Yvelines,  
Association ANASYS  
E-mail : martine.dorin@elsm-versailles.cnamts.fr

Mr Marc Duriez  
Chargé de mission auprès du Haut comité de santé publique, Ministère de la Santé et de la Protection Sociale, 8 avenue de Ségur, 75350 Paris 07  
E-mail : marc.duriez@sante.gouv.fr

Professor Gérard Duru  
Director of Research CNRS, Laboratoire d’Analyse des Systèmes de Santé UMR 5823 CNRS Bât 101,Université Lyon I, 27, Bd du 11 novembre 1918, 69622 Villeurbanne, France  
E-mail: gduru@univ-lyon1.fr

Dr. Kenneth A. Eaton  
Adviser to the Council of European Chief Dental Officers, Old Saddlers, Kempe's Corner, Boughton Aluph, TN 25 4EW Ashford Kent, U.K.  
E-mail: K.Eaton@eastman.ucl.ac.uk

Dr. Vera Hubkova  
Head Department of Dentistry, Faculty Hospital,  
50005 Hradec Kralove, République Tchèque  
E-mail: hubkovav@lfhk.cuni.cz

Dr. Carina Källestål  
Head of Unit, National Institute of Public Health, Unit for Intervention Research, Olof Palmes gata 17, SE-103 52 Stockholm, Sweden  
E-mail : Carina.Kallestal@fhi.se

Dr. Paul Karsenty  
Direction Générale de la Santé, Ministère de la Santé et de la Protection Sociale, 8 avenue de Ségur, 75350 Paris 07

Mrs Marie Héliane Leclercq  
Laboratoire d’Analyse des Systèmes de Santé,  
UMR 5823 CNRS, Bât 101 Université Lyon I, 27,  
Bd du 11 novembre 1918 69622 Villeurbanne,  
France  
E-mail: mhl.henri@wanadoo.fr

Dr. Xavier Limonne  
GABA Laboratoires  
E-mail : xlimonne@gaba.fr
Professor Juan Carlos Llodra Calvo  
Facultad Odontologica, Universisas Granada, Campus Universitario La Cartusa, Granada, Spain,  
E-mail: jllodra@hotmail.com

Professor Cesar Mexia de Almeida  
Facultade de Medicina Dentaria, Citade Universitaria, P-1600-214 Lisboa, Portugal  
E-mail: calmeida@fmd.ul.pt

Dr. J.C. Michel  
Président, Confédération Nationale des Syndicats Dentaires, 7 avenue de Villiers, 75017 Paris

Dr. Antonni Montserrat Moliner  
E-mail: Antoni.Montserrat@cec.eu.int

Dr. Gianluigi Morciano  
Dipartimento di Scienze Sanitarie Applicate e Psicocomportamentali, Biostatistica e Metodologia Epidemiologica, Universita Degli Studi di Pavia, Via A. Bassi, 21 – 27100 Pavia, Italia  
E-mail: gianluigi.morciano@tin.it

Professor Michelle Muller-Bolla  
Associate Dean, Oral Public Health Department, Faculty of Odontology, University of Nice, Sophia Antipolis, 24 Avenue des diables bleus, 06357 Nice, France  
E-mail: muller@unice.fr

Dr. Annamari Nihtilii  
Sepontie 1 V, Espoo, Finland  
E-mail: annamari.nihtila@espoo.fi

Dr. Anne Nordblad  
Head of Development (oral health), Docent, Ministry of Social Affairs and Health, Health Departement, P.O Box 33, FIN-00023 Government, Finland  
E-mail: Anne.Nordblad@stm.fi

Professor Denis O'Mullane  
Oral Health Services Research, University Dental School and Hospital, Wilton, Cork, Ireland  
E-mail: D.OMullane@ucc.ie

Dr. Benedetta Paoletti  
Dental Building, Via Beldiletto 1/3, 20142 Milano, Italia  
E-mail: rainydesert@hotmail.com

Dr. Elpida Pavi  
Chief Dental Officer, Hellenic Ministry of Health, 32 Hippocrates Street, 106 80 Athens, Greece  
E-mail: e-pavi@ath.forthnet.gr

Professor Nigel. B. Pitts  
European Association of Dental Public Health, Dental Health Services Research Unit, Dundee Dental Hospital and School, Park Place, DD1 4HR Dundee Scotland, U.K.  
E-mail: n.b.pitts@dundee.ac.uk

Dr. André Prost  
Former WHO representative European Union, Brussels, WHO Director Government, Civil Society and Private Sector Relations, CH.1211 Geneva

Mrs Claire Rigaud-Bully  
Logistic Manager EGOHID Project, Laboratory of Analysis in Health System, UMR 5823 CNRS, Bât 101, Université Lyon I, 27 Bd du 11 novembre 1918, 69622 Villeurbanne, France  
E-mail: crbully@univ-lyon1.fr

Professor Paul Riordan  
UFR d'Odontologie, 11, Bd Ch. de Gaulle, 63000 Clermont Ferrand, France  
E-mail: paul.riordan@u-clermont1.fr

Dr. Jean-Denis Roche  
Vice-Président Union des Jeunes Chirurgiens Dentistes (UJCD-UD), 14 r Etex 75018 Paris France

Dr. Edith Rolland  
Centre Technique d’Appui et de Formation des Centres d’Examens de Santé ( CETAFF ), 67-69 avenue de Rochetaillée BP 167, 42012 Saint-Etienne cedex 02 France

Mrs Gabrielle Sax  
Magister, Chief Dental Officers, Österreichisches Bundesinstitut fuuf Gesundheitswesen (OBIG), Austrian Health Institute, Stubenring 6, Wien, Austria  
E-mail: sax@oebig.at

Dr. Françoise Saint-Pierre  
Chef de projet Haute Autorité de la Santé, Service Evaluation des Actes Professionnels  
E-mail: f.saintpierre@has-sante.fr

Dr. Egita Senakola  
Riga Stradins University, Docent, Head of Oral Health Centre, Institute of Stomatology, 20 Dzirciema Street, LV1007 Riga, Latvia  
E-mail: esenakol@latnet.lv

Dr. Helga Senkel  
Kreisverwaltung Ennepe-Ruhr-Kreis, Gesundheitsamt Hauptstr. 92, 58332 Schwelm, Germany  
E-mail: h.senkel@en-kreis.de

Dr. Erik Skaret  
Associate Professor, University of Bergen, Center for Odontophobia, Aastradveien 17, N-5009 Bergen, Norway  
E-mail: erik.skaret@odont.uib.no
Dr. Christiane Spiegelhalder
GABA International, Emil Frey-Strasse 100, CH-4142 Münchenstein
E-mail : c.spiegelhalder@gaba.com

Professor Laura Strohmenger
WHO Collaborating Centre for Epidemiology and Community Dentistry, Clinica Odontostomatologica, Istituto Scienze Biomediche San Paulo, University of Milan, Via Beldiletto 1/3, 20142 Milan, Italy
E-mail : laura.strohmenger@unimi.it

Dr. Judit Szoke
Associate Professor, Semmelweis University Budapest, Faculty of Dentistry, Huba u 10, 1134 Budapest, Hungary
E-mail: szoke@fok.usn.hu

Dr. Marie-Laure Tchéré Yavo
Directeur coordonnateur du Programme National de Promotion de la Santé Bucco-dentaire, Ministère d'Etat, Ministère de la Santé et de la Population, République de Côte d'Ivoire
E-mail : tchere_ml@yahoo.fr

Dr. Paul Tramini
Associate Professor, Department of Public Heath, Faculty of Odontology, University of Montpellier, 545 Avenue du Professeur Jean Louis VIALA 34193 – Montpellier Cedex 5 France
E-mail : paul.tramini@wanadoo.fr

Dr. Jaap Veerkamp
Department Pediatric Dentistry, ACTA, Louwesweg 1, NL 1066 EA Amsterdam, Netherlands
E-mail: J.Veerkamp@acta.nl

Dr. Gernot Wimmer
Universitätsklinik für Zähn,Mund- und Kieferheilkunde, Auenbruggerplatz12, A-8036 Graz, Austria
E-mail: gernot.wimmer@nextra.at
European Global Oral Health Indicators Development
Meeting of Health SANCO Monitoring Programme
Final Workshop for Selecting Essential Oral Health Indicators

Technical Agenda

Thursday, 17 March 2005

1. Registration/Welcome (9:30)
2. Opening session (10:00)
3. Approval of the agenda
4. Presentation of the EGOHIPD project results
5. Review of the draft catalogue
   a. Review of the indicators descriptions
   b. Harmonisation of the format and layout
   c. General overview
   d. Finalization: editing, publication, distribution.
6. Presentations of other projects funded by the Health Monitoring Programme
7. Communication strategy

Friday, 18 March 2005

8. Closure Open Conference Debate (9:30-12:00)
   “Promotion of Health Policies: from the recommendation to the decision making”

   Conference Debate animated by Dr André Prost
   Former WHO representative European Union, Brussels, WHO Director Government, Civil Society
   and Private Sector Relations

   With the participation
   Dr Michele Aerden
   President Elect, Fédération Dentaire Internationale

   Mr Adrien Bedossa
   European Council Economic and Social

   Professor Edmond Benque
   Adviser, Ministry of Health, France

   Professor Denis Bourgeois
   Project Leader, EU SANCO Health Monitoring Programme

   Mr Emmanuel Hamelin
   Deputy

   Dr Patrick Hescot
   President Elect European Regional Organisation

   Dr Antoni Montserrat Moliner
   European Commission, General Directorate Health and Consumer Protection Directorate-General

   Dr Elpida Pavi
   President Council European Chief Dental Officer

   Professor Nigel Pitts
   President European Association of Public Dental Health

9. Project evaluation (2:00)
   Round 1 : European institutions point of view
   Round 2 : Local institutions point of view

10. Further working process within the framework of the 2005-2007 research programmes

11. Closure (4:00)
Chapter 5

Health Surveillance in Europe

European Global Oral Health Indicators Development Project

2005
A Selection of Essential Oral Health Indicators Recommended by European Global Oral Health Indicators Development Project
Health Surveillance in Europe

A Selection of Essential Oral Health Indicators
Recommended by European Global Oral Health Indicators Development Project

2005 CATALOGUE
Health Surveillance in Europe

A Selection of Essential Oral Health Indicators

Recommended by
European Global Oral Health Indicators Development Project

2005 CATALOGUE

Edited by

Denis M. Bourgeois
Department of Public Health, Dental Faculty, University of Lyon, France

Juan Carlos Llodra
Department of Preventive Dentistry, Dental Faculty, University of Granada, Spain

Anne Norblad
Ministry of Social Affairs and Health, Finland

Nigel B. Pitts
Dental Health Services Research Unit, University of Dundee, United Kingdom

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Health and Consumer Protection Directorate-General
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The authors alone are responsible for the views expressed in this document.
Special Acknowledgments to the Contributors

Dr. Michèle Aerden  
Federation Dentaire Internationale, Bruxelles, Belgium

Mr Gérard Badeyan  
Ministry of Health and Welfare, Paris, France

Professor Pierre C. Baehni  
European Federation of Periodontology, Geneva, Switzerland

Dr. Paul Batchelor  
Eastman Dental Institute for Oral Health Care Sciences, London, United Kingdom

Dr. Ruth Bonita  
World Health Organization, Geneva, Switzerland

Professor Annerose Borutta  
Friedrich-Schiller University of Jena, Erfurt, Germany

Professor Denis M. Bourgeois  
Project Leader, University of Lyon, France

Dr. Joana Carvalho  
Université Catholique de Louvain, Belgique

Dr. Alejandro Ceballos  
University of Granada, Spain

Dr. Lisa Boge Christensen  
University of Copenhagen, Denmark

Dr. Jacques Desfontaine  
French Union for Oral Health (UFSBD), Paris, France

Professor Gérard Duru  
National Center for Scientific Research, Lyon, France

Dr. Kenneth A. Eaton  
Eastman Dental Institute for Oral Health Care Sciences, London, United Kingdom

Dr. Agneta Ekman  
The National Board of Health and Welfare, Stockholm, Sweden

Professor Roswitha Heinrich-Weltzien  
Friedrich-Schiller University of Jena, Erfurt, Germany

Professor Thomas Hoffmann  
University of Technology of Dresden, Germany

Dr. Vera Hubkova  
Faculty Hospital, Hradec Kralove, Czech Republic

Dr. Carina Källestälibäck  
National Institute of Public Health, Stockholm, Sweden

Dr. Paul Karsenty  
Ministry of Health and Welfare, Paris, France

Professor Denis F. Kinane  
University of Glasgow, United Kingdom

Mrs Marie Hélène Leclercq  
Project coordinator, University of Lyon, France

Professor Juan Carlos Llodra  
University of Granada, Spain

Professor Cesar Mexia de Almeida  
Facultade de Medicina Dentaria, Lisboa, Portugal
Dr. Henri Michelet  
Conseil National de l’Ordre des Chirurgiens Dentistes, Paris, France

Dr. Antonni Montserrat Moliner  
European Commission, General Directorate Health and Consumer Protection, Luxembourg

Dr. Gianluigi Morciano  
Università Degli Studi di Pavia, Italy

Professor Michèle Muller-Bolla  
University of Nice Sophia Antipolis, France

Dr. Annamari Nihtilä  
Espoo, Finland

Dr. Anne Nordblad  
Ministry of Social Affairs and Health, Finland

Professor Denis O’Mullane  
University of Cork, Ireland

Dr. Livia Ottolenghi  
University of Rome, Italy

Dr. Benedetta Paoletti  
University of Parma, Italy

Dr. Elpida Pavi  
Ministry of Health, Athens, Greece

Dr. Poul Erik Petersen  
World Health Organization, Geneva, Switzerland

Professor Nigel. B. Pitts  
Dental Health Services Research Unit, Dundee, United Kingdom

Mrs Claire Rigaud-Bully  
University of Lyon, France

Professor Paul Riordan  
Dental Health Services, Bentley, Australia

Mrs Gabrielle Sax  
Österreichisches Bundeinstitut fur Gesundheitswesen (OBIG), Wien, Austria

Dr. Egita Senakola  
Riga Stradins University, Riga, Latvia

Dr. Helga Senkel  
Kreisverwaltung Ennepe-Ruhr-Kreis, Schwelm, Germany

Dr. Erik Skaret  
University of Bergen, Norway

Professor Laura Strohmenger  
University of Milan, Italy

Dr. Judit Szőke  
Semmelweis University, Budapest, Hungary

Professor Jean-Pierre Van Neuwenhuysen  
Université Catholique de Louvain, Belgique

Dr. Jaap Veerkamp  
Academic Centre for Dentistry Amsterdam, Amsterdam, Netherlands

Dr. Alfonso Villa Vigil  
Consejo General de Odontologos y Estomatologos de Espana, Madrid, Spain

Dr. Helen Whelton  
University of Cork, Ireland

Dr. Gernot Wimmer  
Universitätsklinik für Zähn, Mund und Kieferheilkunde, Graz, Austria
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Preface

Over the past few decades the burden of oral disease and the needs of populations have been changing rapidly and oral health systems are required to adjust to the transition process. In order to meet these challenges effectively, public health care administrators and decision-makers need the tools, capacity and information to assess and monitor health needs, choose intervention strategies, design policy options appropriate to their own circumstances, and improve the performance of the oral health system. Oral health systems play an important role in establishing optimum oral health by integrating oral health promotion and oral disease prevention into oral health services. Interdisciplinary and intersectoral approaches to promotion of oral health have the potential reorienting oral health services towards primary oral health care and that services may better diminish oral disease burdens.

The WHO/FDI goals for oral health by the year 2000 urged Member States to establish oral health information systems, and this remains a challenge for most countries of the world. The WHO Oral Health Programme is prepared to assist countries in their efforts to develop comprehensive oral health information systems which include data additional to epidemiological indicators.

The WHO Oral Health Programme at headquarters and regional levels recently assessed the accomplishment of the WHO/FDI goals for oral health by the year 2000. The formulation of new oral health goals has been initiated. The WHO Regional Office for Europe specified oral health targets for the year 2020 as part of the Health21 policy. The WHO, FDI and IADR have jointly prepared new goals for the year 2020. The objectives and targets have been expanded in order to cover significant indicators related to the broadened scope of oral health and care of population groups.

In this context, the report on Selecting Essential Oral Health Indicators in Europe issued from the European Global Oral Health Indicators Project, supported by the Health and Consumer Protection Directorate-General, European Commission, called upon policy-makers, community leaders, private industry, health professionals, the media, and the public at large to affirm that oral health is essential to general health and well-being and to take action. Particular attention is given to the negative implications to health of changing diet, nutrition and unhealthy lifestyles related to tobacco and excessive use of alcohol. Moreover, priority should be given to the problems emerging within deprived communities or disadvantaged populations in Europe.

With the support from the European Commission, the expert contribution of the ministries of health, universities, regional and national dental associations, health professionals in the european member states, the Global Oral Health Indicators Project will be instrumental to achieving the goals of improved performance of health systems and that oral health services in Europe may effectively match the needs of all population groups.

This catalogue highlights important priority areas for the European Oral Health Information Systems and provides an operational framework for implementation at national and subnational levels.

Dr Poul Erik Petersen
Chief, Oral Health Programme,
Department of Chronic Diseases and Health Promotion
World Health Organization, Geneva, Switzerland
Introduction

Numerous projects have been proposed by different teams from European countries within the framework of the Community Action Programme in the area of health surveillance. The European Commission Health Monitoring Programme has as its main objectives to monitor the trends in the European community, to evaluate community programmes and actions and to provide Member States with appropriate health information to make international comparisons and to support their national health policies.

The development of national and international health surveillance systems has resulted in a deluge of indicators overwhelming health services personnel in charge of epidemiological surveillance and evaluation of care programmes. The oral health sector is no exception. Within a context of a profusion of health indicators, operating a selection is not an easy task. The need for the necessary integration of the oral health sector within the national and European health information systems is an added challenge, considering that this should be done at all levels of the reference system. A challenge that this European public health project will contribute to meet with practical and decisive recommendations.

The European project titled “European Global Oral Health Indicators Development” (SPC 2002472) has been developed under the auspices of this Programme. The purpose was to establish priorities for a specifically European context in coordination with the existing programme and to make recommendations for improving health system information performance by the establishment of the major indicators of reference.

It was therefore to support the exchange of expectations and experiences among experts of oral health and their audience, policy makers in particular. The terms of reference were also to conduct a systematic review and to outline a process for identifying a set of indicators of reference for oral health that will help national oral health public professionals and services to promote, improve and organize the global oral health promotion, quality of care and surveillance of people in Europe. Overall objective were listed i.e. (i) to support European Member States in their efforts to reduce the toll of morbidity, disability related to oral health diseases and especially to strengthen the ability at the local, national, regional levels to measure, compare and determine the effects of oral health services and use of resources on oral health; (ii) to identify indicators of oral health – problems, determinants and risk factors related to lifestyle – of critical oral health care, its quality of care and of essential health resources and to (iii) identify the types of data generation and management problems within the health information system.

The purpose of the catalogue is to promote systematic and brief identification and technical specifications of oral health indicators of reference through the use of an oral health outcome framework including information on the level of development of existing indicators and issues where indicators are lacking and require research. This catalogue is edited to facilitate comparisons of indicator data by promoting the harmonisation of the information systems and to improve the capacity of area health services to monitor their oral health improvement activities in a standardized manner. It is therefore indicated to facilitate, in the medium term, service specifications across area health services with a view to maintaining and improving performance and to enhance the capacity to analyse the social, economic, behavioural and political determinants with particular reference to disadvantaged populations.
**Principles for Guiding the Selection and Use of Oral Health Indicators**

The major objective of this programme was to contribute to establish a community system for health surveillance\(^1\). It embodied three specific objectives:

1. To develop community health indicators through a critical review of existing data and indicators;
2. To enable the realisation of a reliable communication system for data and health indicators transfer and sharing;
3. To define the necessary methods and instruments for analysis of activities and the production of reports on health status, trends, and policies’ impact on health.

A high priority to identify indicators of reference was to encourage the development of standards for the design and implementation of computerized systems for the management of oral health systems. A goal was to seek a level of agreement sufficient to allow comparability of data that are conceptually equivalent and permit clear delineation of data.

The major principles for guiding the selection and use of oral health indicators focused on: 1 – the identification of a list of priority oral health problems, populations and high risk group; 2 – the definition of a table of essential indicators in the following areas: indicators of priority oral health problem, indicators of service delivery, quality of care and indicators of critical health resources; 3 – the validation of the final long list of oral health indicators, 4 – a common understanding of terms and criteria for selection of indicators and 5 – the recommendation of a short list of essential oral health indicators through a consultation process.

**The Issue Relating to the Guiding Criteria for the Selection of Oral Health Indicators**

Before even starting to develop a list of existing indicators – a list that should be as comprehensive as possible – the following question should be raised “which of those indicators are we going to collectively retain on the final list?”

As soon as a selection process is engaged, a consensus should be reached on: “what will be the sorting criteria and their hierarchical order?” The methodological aspects relating to these questions will be the object of specific working sessions during the course of the meeting. This introduction is restricted to underline the main characteristics for a selection, in relation to the various reference areas: European Community health policies needs, scientific definition, usefulness and feasibility, ethical demand.

**European Community Health Policy Requirements**

On this basis we may refer to the basic criteria proposed by the Group in charge of the European Community Health Indicators project which recommends that the indicator set should be:

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1. Coherent in the sense of conceptual consistency, this implies that a shortlist should nevertheless cover the multidimensional aspect of oral public health surveillance, all areas usually included in the field of oral public health. This is indeed the fact for the long list already developed which is structured in the four main domains of reference;
2. Respond to oral health policy priorities, acknowledging the fact that these will be defined by each Member State and adjusted at local or regional levels;
3. Indicators should be scientifically valid, reliable and relevant.

Conceptual Consistency

A set of indicators in oral public health, even restricted to a minimal essential list, has a time dimension and should cover the four major following dimensions:

- Health status, morbidity and oral function status;
- Determinants (behaviour, life habits);
- Oral health system/promotion, prevention, access to care, quality care and system performance;
- Outcomes and oral health quality of life.

The number of indicators in each area will vary mainly in relation to health policy priorities and to feasibility aspects of data collection and processing.

Methods Used

Project members used the following procedure to select the indicators: a long list of over 600 possible indicators was drawn up after consultations within the group and with a wide range of relevant European clinical and scientific oral health organisations. Thirty two group members were then asked to grade the possible indicators in order of importance. again they were asked to confer widely before making their selections. A statistician then applied the Arrow Theorm (Arrow, 1951) to the selections to aggrate the preferences and select 40, which were then discussed by the group.

Descriptions for all the indicators were then written using the structure described on page 10 of this report. These descriptions were discussed during the final meeting of the project members and edited, within the constraints of the principles described in this introduction.

Strengths and Limitations of the Descriptions of the Indicators

The resulting indicators have been selected and described by a process of consensus between a group of decision-makers, clinicians, scientists, administrators and others. All contributors of the group can claim to be “experts” in some areas of oral health but none can claim to be “expert” in all areas. As the evidence base develops in the future and demography and epidemiology change, some of the selected indicators and descriptions will need amendment. However, within the constraints of terms of reference of the European project, of time and other resources, the indicators and descriptions do provide a list which should aid health planners in the future.
The Issue of Health Policies

Increasingly European Member States or regions within Members States have formulated health priority areas or targets for health policies. There is a noticeable trend to broaden the spectrum of health objectives moving from simple morbidity measurements, or prevalence of specific diseases to objectives expressed in terms of quality of life improvements, reduction of health inequalities with reference to social policies enabling goals. For example health promotion and prevention tend to focus on specific population groups according to specific life-styles – specifically children or elderly –, goals are formulated for quality of care and access to care, or in terms of social life involvement of entire groups of population such as the aging population. For the oral health sector, this evolution implies a broader concept of the role of oral health professions and their contribution to general health. In addition, special attention should be given to the systematic integration of oral health indicators in any health surveillance system so that trends and changes in life-style and quality of life behaviour in relation to oral health can be monitored effectively. If there is a general move of health strategies towards health promotion and prevention, consideration should nevertheless be given to the fact that the situation varies considerably from country to country. There will be situations for example, where the information priority will be given to the organisation or the reorganisation of the health system for a better quality of care. Clearly health priorities are considerably variable in time and from country to country.

Scientific Value, Reliability and Relevance of Selected Indicators

As short as the list may be, nevertheless, all selected indicators should have the four basic scientific qualities universally accepted. It was proposed to stick to the definitions given by the WHO health statistics programme:

• **Validity**: it is a true expression of the phenomena it is;
• **Objectivity**: it is able to provide the same result if measured by different people under similar circumstances;
• **Sensitivity**: it is capable of reflecting changes in the phenomena of interest;
• **Specificity**: it reflects changes in only the specific phenomena of interest.

If the WHO recommendations respond to the necessity of the scientific requirements it is also associated to a deep sense of pragmatism. An indicator that would be qualified “impeccable” scientifically but too expansive to collect or even impossible to use in a given practical situation would be totally useless. Therefore additional criteria should be considered relating to the actual use of the indicator and to the methodology used to collect the data:

• The data required for the indicator are **useful** for case management or taking action in the community by the staff who originally recorded the data or the service unit from which the data originated;
• It should be **feasible to obtain** as far as possible through routine service processes or through easily and rapidly executable surveys;
• It should be **simple and understandable**, measuring one health condition or aspect of the service;
• The indicator and the process of collecting and processing the relevant data are **ethical**.
Lastly, in the elaboration of the indicators selection process, quantitative principles should be considered as important criteria such as: the frequency of a given health problem, its total costs, its avoidable characteristic (prevention, promotion). This is particularly relevant for indicators of high oral health morbidity and indicators in the field or oral health determinants.

A Flexible Approach to a Shortlist of Oral Health Indicators

“Stepwise” approach developed by the WHO is a practical example of a dynamic, multi-dimensional health data collection system, highly adaptable to the objectives and priority information required. In the same spirit, the European Community Health Indicators (ECHI) group proposed the concept of “user-windows” based on the selection of subsets of indicators taken from the comprehensive list of indicators developed. The specific user's perspective for selecting user-window could be (i) specific areas of health policy interest (prevention oriented, services oriented, intersectoral policies), (ii) specific thematic entries such as age-groups, (iii) specific disease groups with their determinants and costs, etc. This concept offers a more “natural” approach than that of the “core” as the number of possible windows is countless with expansion of information at any level.

Indicators and Health Objectives

Indicators are markers for health status, system performance and process or available resources. They are usually established to ensure follow-up and evaluation of progression towards health targets formulated by strategic programmes. They should not be confused with public health objectives expressed in terms of disease reduction or public health improvements. These are quantitative measurable achievements reached within a specific time-frame. It should be noted that oral health is broadly integrated within the health sector in the formulation of general targets as well as reflected in the list of proposed indicators. Oral health is considered as a full participative health sector, contributing not only to the promotion of oral health but also as a key actor to the promotion of general health.

In conclusion, it should keep in mind that beside their scientific qualities, the selected indicators should: respond to the priority needs of the community health strategies, national, local or regional, strategies for disease reduction and health promotion, be practically useful and easy to collect, be part of a highly adaptable information system, adaptable to the variety of needs and resources ant to the evolution of scientific and economic contexts.
Structure of the Catalogue

The 40 indicators are described in 4 categories. Part A. is indicators for monitoring the oral health of children and adolescents; Part B. is indicators for monitoring the oral health of general population; Part C. is indicators for monitoring the oral health systems and Part D. concerns indicators for monitoring the oral health quality of life. Indicators for monitoring the oral health of children and adolescents contain a priority list of these indicators which are specific to children and adolescents. It must be appreciated that there are also a range of indicators in “Part B. Indicators for monitoring the oral health of general population” which may also be used to assess oral health in children.

As described in the WHO Catalogue of Health Indicators (1996), each indicator description includes the following sections:

1. **Title.**
2. **Rationale.**
   Provides a brief description of the reasons why the indicator has been selected.
3. **Definition of indicator** textually or, in the case of proportions, rates and ratios, by specifying the numerator and the denominator. *The definition should be complete and leave no room for interpretation.*
4. **Definition of important terms,** which may have specific meaning in the context of the indicator. *Each term in the title of the indicator and its textual definition should be clear to administrative or technical staff not necessarily qualified oral health personnel. Clinical criteria, pathological terms may be defined under this section.*
5. **Common data sources** which could be either routine data collection, special survey or other sources. *There may be a need to identify various types of data sources. This section could/should give an indication on how to collect the data (for example as part of community surveys) or where to find already existing information (for example access to databases, review of registers, of patient records etc.)*
6. **Recommended data collection methods** which, for some indicators, are specially designed for the needs of the specific indicators.
7. **Use of the indicator,** which is an indication of how the indicator should be used at the facility level, and other levels of the health system. *For example: to identify high-risk groups for implementation of preventive programme.*
8. **Recommended formats of presentation.**
9. **References providing** primary sources of additional information about this and possibly other related indicators.
General References


Part A

Indicators for Monitoring
the Oral Health of Children
and Adolescents
Daily Toothbrushing with Fluoride Toothpaste

Rationale
Promotion of oral health requires self-care and professional care as well as population-based initiatives. A major factor in preventing caries may be the emergence towards the end of the last century of an important oral hygiene-based economic sector. Almost all the experts highlight the benefits of the effect to reduce the incidence and the severity of caries of the spread of fluoride-containing toothpaste, which accounts for 98% of the market in Europe. As might be expected, increased consumption and use of oral hygiene products was associated with improved oral hygiene. International publications from comparable industrialised campaigns and countries in Europe focus on socially and economically underprivileged high risk groups to whom integrated prevention programmes to promote good oral hygiene practice. Strategies for improving the performance of the European dental health system could target the reduction of disease inequalities. International recommendations for oral health prevention and prophylaxis include daily tooth brushing with affordable fluoridated toothpaste.

Definition of indicator
Proportion of daily toothbrushing with fluoride toothpaste in children 3-6 and 6-12 years, adolescents aged 13-17 years.

Numerator: Number of children 3-6 and 6-12 years, adolescents aged 13-17 years reporting use of daily fluoride toothpaste.

Denominator: Number of children and adolescents persons in the surveyed population.

Definition of important terms
Daily use of toothpaste which contains fluoride (250-750 ppm for children 3-6 years) is an effective method of preventing caries in permanent teeth of children and adolescents. There is a plenty to suggest that use of low dose fluoride (250 ppm) will have a lesser effect on caries than higher dose toothpaste. The effects are dose-related, i.e., toothpaste with a higher concentration of fluoride, 1,500 ppm, yields a better effect than toothpaste with 1,000 ppm. Although the scientific literature does not evaluate the preventive effects of fluoride toothpaste in adult and elderly individuals, however, nothing would suggest that preventive effects would not be found in these age groups as well. The benefits of fluoride toothpaste are firmly established. Taken together, the trials, which included more than 42,000 children, provide clear evidence that fluoride toothpastes used at least once a day are efficacious in preventing dental caries in permanent teeth. The caries preventive effect of fluoride toothpaste increased with higher initial levels of decayed, missing, and filled permanent teeth, higher fluoride concentration, and supervised brushing, but was not influenced by exposure to water fluoridation.
Common data source

Data are obtainable from children based surveys and from a non institutionalized sample, which may include children not in school. However, estimates from self-reports are similar. Information available through national health public and private systems could also be used.

Recommended data collection methods

National and/or local basic oral health surveys of children and/or oral health households interviews.

Use of the indicator

To provide planners of prevention activities with an insight into the attitudes of the population concerning their oral hygiene behaviour.

Recommended formats of presentation

Percentage of the indicator by age group, gender, location, household income, social and education status.

References


Preventive Care-Seeking for Pregnant Women

Rationale

The integrated management of pregnancy and childbirth (IMPAC) is the technical component of the Making Pregnancy Safer (MPS) global strategy promote in Europe. The region has in oral health still wide differences between and within countries in mother and newborn care and outcomes, as well as in access to and quality of care. The key to oral health promotion and disease prevention lies in anticipatory guidance and education of the parent, early detection and timely referral for appropriate intervention. As an integral component of overall health, this is accomplished best by the dentist to whom many women entrust their own health during pregnancy and their newborn’s health during infancy and early childhood. Pregnancy is a period to motivate them to transmit accurate infant oral health information to the focus population – pregnant women and new mothers. The anticipated outcomes are that dentists will have a higher level of knowledge about oral health issues of pregnancy and early childhood and will be able to transmit these concepts effectively to their patients as part of their healthcare education programs. Otherwise, physical and emotional changes during pregnancy affect the oral health of women. Recent research establishes clear and strong linkages between oral health – especially periodontal disease – in pregnancy and premature and low birth weight infants.

Definition of indicator

Proportion of women aged 15-39 years who had a preventive dental visit during their last pregnancy.

Numerator: Number of women aged 15-39 years with children under 1 year of age who mention at least one preventive dental visit during their last pregnancy.

Denominator: Number of women aged 15-39 years with children under 1 year of age surveyed.

Definition of important terms

Visit: Appointment leading to a consultation/treatment by the dentist.

Dentist: A member of the dental team, licensed to see or treat a patient.

Preventive care: Care designed to prevent oral disease, to detect and treat it early, or to manage its course. Examples of preventive care include dental cleaning and regular screenings. Mothers should be advised to avoid feeding practices that may lead to Early Childhood Caries, and should be counselled about the appropriate use of fluoride and other preventive measures.

Pregnant women: A group of women at differing stages of pregnancy.
Common data sources
State-specific population based data on maternal attitudes and experiences prior to, during, and immediately following pregnancy.
Secondary data available from national or regional health surveys.

Recommended data collection methods
National and/or local basic oral health surveys of children and/or oral health household interviews and specific national surveys i.e. birth clinics.

Use of the indicator
The indicator is use to raise the awareness of women and dental team. It is use to improve the health of mothers and infants. It allows the states to monitor changes in maternal and child health indicators (e.g., prenatal care, fluoride administration, infant care seeking, infant oral health, breastfeeding). It provides planners with an insight into the attitudes of the pregnant women. It gives information on health education and promotion of activities that improve family and community attitudes and practices in relation to pregnancy and childbirth.

Recommended formats of presentation
The indicator should be disaggregated by age, household income, education level, household incomes, disability status, social deprivation, ethnicity and geographic location.

References
Mother’s Knowledge of Fluoride Toothpaste for Child Caries Prevention

Rationale
Child population are likely to be heavily influenced by the parental behaviour. The increased usage of fluoride containing toothpaste in children has been strongly correlated with the decline in the prevalence and severity of dental caries. The frequency of brushing is important with the current recommendation for optimal effect being twice daily. However, there are profound disparities in children’s oral health in various countries and among different regions within a given country. Those differences may be related to environmental conditions, to a variety of behaviours related to oral hygiene or linked to socio-economic situations. It is possible to develop public knowledge and practices on health promotion and prevention by implementing community health programmes. Even if the most common oral diseases are preventable, a large proportion of the community still lacks sound information or do not benefit from appropriate oral health promoting actions. Informing mothers on the benefit of appropriate promoting oral health behaviours can significantly improve their confidence in managing oral health of children.

Definition of indicator
Proportion of mothers with children under 7 years age old who know the role that the usage of fluoride containing toothpaste twice a day is in preventing tooth decay in children.

Numerator: Number of mothers with children under 7 years age old who know the role that the usage of fluoride containing toothpaste twice a day is in preventing tooth decay in children.

Denominator: Number of mothers with children under 7 years age surveyed.

Definition of important terms
Knowledge of fluoride toothpaste: Ability to respond to an ended question including a five point scale ranging from no importance to very important.

Fluoride containing toothpaste: Any toothpaste that contains more than 250 ppm fluoride. Daily use of toothpaste which contains fluoride (250-750 ppm for children 3-6 years) is an effective method of preventing caries in permanent teeth of children.

Common data sources
Data derived from national or local consumer and/or health surveys, household’s surveys. Other secondary data issue from regulatory information and from public and/or private documents.
Recommended data collection methods
National, regional and/or local basic interview health surveys.

Use of the indicator
The indicator is useful as:
- An information for decision makers in order to plan appropriate preventive strategies in oral health promotion;
- Measure of mothers’ knowledge on how to prevent children’s oral health;
- Tool to evaluate educational programmes for mothers;
- Help to decision making in the evaluation of caries risk for children.

Recommended formats of presentation
The indicators should be presented for each of the categories used on the scale cross tabulated by mother’s education, socio-economic status and geographical area.

References
Fluoridation Exposure Rates

Rationale
Public oral health policymakers have long recognized the need to facilitate access to fluoride exposure. Fluoridation of community drinking water is not only effective in reducing dental decay in children, but also contributes to reducing socioeconomic inequalities in oral health status. However, the decision whether or not to fluoridate a public water supply raises a number of issues of an ethical and moral nature, including such questions as whether fluoridation represents mass medication with an uncontrolled dose, and whether it is an infringement of the rights of the individual. Equally it can be argued that a failure to fluoridate deprives those in the community at most risk of dental decay of a health benefit. If the state has an ethical obligation to protect the welfare of its citizens, and may be justified in interfering with individual liberty in order to promote a fundamental benefit like health, however, self-determination and the right of parents to choose for their children were values which should not be lightly overridden. Alternatives to water fluoridation need to be considered in more and less small communities where water fluoridation is not feasible. Potential alternatives include fluoridation of salt and milk, topical applications of fluoride. Available and affordable fluoride-containing toothpastes are considered a good population-based preventive strategy on the prevention of caries in the permanent teeth of children and young adults. Fluoridation exposure is globally accepted as an important indicator of dental caries protection of the populations, both in permanent and deciduous dentitions. WHO recommend that to determine when it is appropriate to fluoridate is a matter that requires the prior determination of prevailing fluoride intake from all sources including drinking water, food and the general environment.

Definition of indicator
The number and rates (per 1,000 population) of the population – preferably 0-13 years – daily exposed to water or alternative fluoride sources.

Numerator: Number of population daily exposed to fluoride contained in water, salt, toothpastes or other in the entire country, among those surveyed x 1,000.

Denominator: Number of population in the surveyed population.

Definition of important terms
Fluoridation: The addition of a chemical to increase the concentration of fluoride ions in drinking water, salt, milk and toothpaste to a predetermined optimum limit to reduce the amount of tooth decay in children and adults.

Naturally Fluoridated Water: Water systems are considered to be naturally fluoridated if they contain naturally occurring fluoride at 0.7 ppm or more.

Nonfluoridated water systems are considered to be nonfluoridated if they contain less than 0.7 ppm fluoride.
Adequately fluoridate: Most water contains some amount of natural fluoride. Fluoridation involves adjusting fluoride in the water to the level optimal for the prevention of dental caries. The recommended amount of fluoride in water systems is 0.7-1.2 ppm (parts per million), which is equivalent to 0.7-1.2 mg/L (milligrams per liter).

Common data sources

- Databases for water fluoridated consumption;
- National and/or regional social surveys reports for fluoridated salt consumption,
  fluoridated toothpaste consumption and other.

Recommended data collection methods

Household interview surveys, analysis non clinical secondary data from national or regional oral health surveys and from regulatory information.

Use of the indicator

The indicator should be used:

- To establish the public health importance of the intervention programme;
- To identify risk area for intervention;
- To provide an opportunity to increase the number of communities with fluoridated water supplies;
- To compare oral health status between different fluoridation status European situations.

Recommended formats of presentation

The total number of persons receiving fluoridated exposure should be presented as well as the rate per 1,000 population aged 0-6 months, 6-12 months, 1-3 years, 4-8, 9-13, 14-17, and adults 18 and over.

Data on type of exposure (Public water supply systems, public salt supply systems, fluoridated toothpaste supply systems and other) should be disaggregated by age group, location (urban, rural), sex (14-17 and adults 18 and over) and socioeconomic status.

References

Preventive Oral Health Programmes in Kindergartens

Rationale
The development of appropriate oral health promotion strategies is urgently needed to improve oral health behaviour and attitudes especially for children from some ethnic minorities and for children from a poor socio-economic background. Stronger links in preschool health programs for oral health education and services should be created and maintained. The establishment of preventive oral health programs, which mainly include supervised daily tooth brushing with a fluoride toothpaste, in kindergartens on a regular basis, has the potential to close the oral health gap in early childhood between advantaged and disadvantaged communities. In so doing it addresses a source of inequality. It is an educational principle that in kindergartens young children develop their own abilities through playing and exercise. They are encouraged to enhance their knowledge through the completion of simple everyday tasks and are supported by teachers to plan, do and review such activities. In so doing it is expected that children will develop in three important ways: physically, emotionally and academically. In this context a wide range of teaching oral health behaviour and tooth brushing exercises can be easily included in different teaching regimes e.g. those based on: the Waldorf Principle, Whole language Principles, Montessori Principles, Reggio Emilia Principles and High/Scope Principles.

Definition of indicator
Percentage of kindergartens where a preventive oral health program in which particular supervised tooth brushing with fluoride containing toothpaste takes place.

Numerator: Number of kindergartens undergoing a preventive oral health programme in which particular supervised tooth brushing with fluoride containing toothpaste takes place.

Denominator: Total number of kindergartens.

Definition of important terms
Preventive oral health programmes in kindergartens centred on supervised tooth brushing are generally started by dental professionals. Suitably trained staff members at the kindergartens then continue the programme of training and monitoring children for effective brushing with regular support through further visits from dental professionals. The programmes may be financed either by the public health sector, or by insurance companies or through private sponsorship.

Common data sources
Access to databases of the public health service or other providers. If the indicator is not available a self-reported questionnaire can be completed by the kindergartens involved in preventive oral health programmes.
**Recommended data collection methods**

Administrative surveys, population-based surveys.

**Use of the indicator**

The indicator is used to monitor the level of oral health system in terms of oral health promotion and prevention for children attending kindergartens. When linked to the oral health of children, that promote based programmes centred on daily tooth brushing with fluoride containing toothpaste, this indicator provides important information for health and policy makers. It facilitates the introduction of an appropriate strategic intervention programme based on group-instruction in preventive oral health procedures. It enables comparisons to be made between countries and systems that provide preventive oral health programmes in kindergartens and those where oral health instruction is solely a parental responsibility. It influences both oral health status and the related quality of life.

**Recommended formats of presentation**

Percentage of kindergartens with oral health preventive programmes should be calculated by area (urban, rural).

An indication should be given of the number of children attending the kindergartens. Percentage of all children attending kindergartens and of those within the programmes should calculated for each year group (i.e. 3 year-olds, 4-year-olds, etc.) and related to their socio-economic groups.

**References**

Schools with Based Programmes Centred on Daily Brushing with Fluoride Toothpaste

Rationale
The oral health of children is a significant public health issue. Oral disease is one of the most costly diseases and is diet and behaviour related. Schools provide an ideal setting for promoting oral health. The school years are an influential stage in people’s life for the development of a lifelong oral health related behaviour as well as beliefs and attitudes. Schools are also the only place where economically and socially disadvantaged children, who are at risk, can access oral health services. Although meticulous oral hygiene and appropriate dietary practices contribute to caries prevention and control the most effective approaches include fluoride use. The use of fluorides has been demonstrated to be one of the most successful measures in public health history. Fluoride has been recognized as the central component in strategies to prevent dental caries, a disease that had major health, economic, and social effects on communities worldwide. Fluoride reduces the incidence of dental caries and slows or reverses the progression of existing lesions. Dramatic reduction in dental caries in children has been experienced where fluoride has been available from different sources. Since the introduction of fluoride toothpastes in the late 1960s a general caries decline has been observed in all developed countries. Although this decline is a major public health achievement, the burden of disease is still considerable in all age groups. In particular, children of deprived socio-economic status still have a high risk of caries. Fluoride school based programmes are effective especially for children with high risk of dental caries and can help to minimize the inequalities in oral health within the schools. There is therefore strong evidence for the caries preventing effect of daily supervised tooth brushing with fluoride containing toothpaste in the schools. Targets should be defined in each country using the high risk groups approach.

Definition of indicator
Proportion of schools with based oral health promotion programmes in which daily supervised tooth brushing with fluoride containing toothpaste takes place.

Numerator: Number of schools with based oral health promotion programmes in which daily supervised tooth brushing with fluoride containing toothpaste takes place.

Denominator: Number of schools surveyed.

Proportion of schoolchildren (over 5 years of age) involved in daily tooth brushing exercises with fluoride containing toothpaste.

Numerator: Number of schoolchildren (over 5 years of age) involved in daily tooth brushing exercises with fluoride containing toothpaste.

Denominator: Number of schoolchildren (over 5 years of age) surveyed.
Definition of important terms

School based programmes centred on daily tooth brushing with fluoride containing toothpaste are normally introduced by oral health professionals in close cooperation with the school administrators and teaching staff. They are financed either by the public health sector or by third parties, such as health insurance companies, or sponsored by private organisations. Usually a policy document that covers all elements and activities of the program is developed. The utilities (tooth brush, toothpaste, tooth brushing cup) might be delivered to each pupil and remain in the hygiene room or in the oral health corner of the class room where daily tooth brushing is performed.

Daily tooth brushing should be performed in groups under the supervision of a responsible and skilled person from the teaching staff mostly, or by dental professionals (dental hygienist, nurse, etc.)

Common data sources

Access to databases of public health service/school administrative reports. If the indicator is not available in an existing and accessible database, a new system, probably based on a questionnaire, will be required.

Recommended data collection methods

Administrative surveys; Population-based surveys.

Use of the indicator

The indicator is used to monitor the extent of oral health promotion and prevention for schoolchildren within a locality, region or country.

Recommended formats of presentation

- Percentage of schools should be calculated by school type (elementary school, secondary school), area (urban, rural);
- Percentage of children, involved in the programme should be calculated for different age groups and socio-economic characteristics.

References


Screening Oral Health Programme Coverage

Rationale

Policies and practices for screening for oral diseases have profound implications for individuals, health systems and society as a whole. Early identification of children with asymptomatic and longstanding, latent oral disease is important in the primary oral care setting and is an essential component of an oral health programme. As a substantial proportion of people have undiagnosed caries, the emphasis on earlier identification creates the opportunity to provide the benefits of early intervention. Screening using an oral health examination combined with adequate follow-up therapy can achieve major reductions in morbidity especially in high risk groups or individual children. Depending on the organisation of the educational and care system in each country, screening programmes may be carried out in schools or in other settings where children population can be easily reachable. It is therefore critical to support health school promotion or other community-based programs that focus on early signs and symptoms of oral diseases.

Definition of indicator

Rates (per 1,000 population) of children and adolescents aged 3-16 examined at least once for the early detection of non-symptomatic disease covered by a screening programme.

Numerator: Number of children and adolescents aged 3-16 examined at least once in the last 12 months for the early detection of non-symptomatic disease covered by a screening programme x 1000.

Denominator: Number of children and adolescents aged 3-16 in the surveyed population.

Definition of important terms

Screening: The use of a brief assessment procedure designed to identify, from within a large population of children, who should receive more intensive diagnosis or assessment to verify developmental and/or health risks. Given that dental caries affects primarily younger individuals, it follows that screening intervals should increase with age according to the prevalence of caries disease. The optimal interval between examinations was 10 to 12 months for those aged 5 to 9, and close to two years for those aged 10 to 19. In the United States, the American Dental Association and the Food and Drug Administration recommend a dental examination every six months. However, 14-year-olds in England who received dental examinations at intervals greater than six months did not display more advanced caries than those who were examined every six months. Indeed, increased intervals between caries screening may even be beneficial, especially in areas supplied with fluoridated water, as both patient costs and the risk of iatrogenic interventions would be reduced. The balance of evidence suggests that recall intervals should be individualized.

Oral diseases: For the purposes of this indicator: dental caries, periodontal diseases, orthodontic malocclusions but not including conditions of the oral mucosa.
Common data sources
Access to databases of public health service/school administrative reports, government-
tal sources; Private or public registry systems collecting health information; Secondary
data from national or regional health surveys.

Recommended data collection methods
Administrative resources analysis, population-based surveys, household surveys.

Use of the indicator
The indicator is use to monitor the coverage of children and adolescents in the age range
3-16 by the early detection of non-symptomatic oral disease. It provides an indication
of the percentage of the child population who have active disease and some indication
of treatment needs. The data can also be used to give an indication of the usage of treat-
ment services and can be linked to other indicators in this programme to give a more
detailed picture. It provides data to evaluate or develop a strategy to provide periodic
screening in the context of office-based primary care and integrated school health service
programs.

Recommended formats of presentation
The indicator should be disaggregated by geographical area, urbanization, age (prefer-
ably age 3, 6, 12, 15), gender, ethnic group, social deprivation, ethnicity and oral dis-
ease category.
The following table should be included:

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Caries</th>
<th>Periodontal diseases</th>
<th>Orthodontic malocclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children 3-6 years</td>
<td></td>
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<tr>
<td>Children 6-8 years</td>
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<tr>
<td>Children 9-13 years</td>
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<tr>
<td>Boys 14-16 years</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Girls 14-16 years</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

References
1. American Academy of Pediatrics. Developmental surveillance and screening of
infants and young children. Committee on Children with Disabilities. Paediatrics
between routine dental examinations. London: National Institute for Clinical
Protective Sealants Prevalence

Rationale

As part of a child’s total preventive dental care, widespread acceptance of sealants as a preventive measure has been slow in Europe. Children receive the greatest benefit from dental sealants when they have newly erupted, permanent teeth. When properly placed, dental sealants are almost 90% after one year effective in preventing caries on the chewing surfaces of first and second permanent molar teeth. The appropriate use of pit and fissure sealants could reduce substantially the majority of occlusal caries among school-aged children. However, sealants remain underused, particularly among children from low-income families and from minority groups. Uninsured children and adolescents covered by “Medicaid” have greater levels of untreated dental disease and less access to dental care. Sealants are helpful for persons at increased risk for tooth decay such as those with medical conditions associated with higher caries rates, children who have experienced extensive caries in their primary teeth, and children and adolescents who already have incipient caries in a permanent molar tooth. Dental sealant programs have been proven effective in reducing oral health disparities in prevalence of dental sealants for socially disadvantaged.

Definition of indicator

Proportion of children aged 6-8 years and adolescents aged 12-14 years with dental sealants on at least one permanent molar tooth.

Numerator: Number of children aged 6-8 years and adolescents aged 12-14 years with clinical evidence of dental sealant on at least one permanent molar tooth.

Denominator: Number of children aged 6-8 years and adolescents aged 12-14 years surveyed.

Definition of important terms

Dental sealants: Clear protective or tooth-coloured coatings that cover tooth surfaces and prevent bacteria and food particles from settling into the pits and grooves. Dental sealants are usually applied after a child reaches the age of six when the first permanent molars come in. Dental sealants can be reapplied when they wear off. Sealants provide a physical barrier that prevents debris and decay-causing bacteria from collecting in the pits and fissures of vulnerable teeth (mainly molars). These areas are often the first and most frequent sites to be affected by tooth decay in children and adolescents. National estimates show that as much as 90% of all dental caries in schoolchildren occurs in pits and fissures. The permanent first and second molars are at the highest risk for tooth decay.

Common data sources

Data are obtainable from children based surveys and from a non institutionalized sample, which may include children not in school. However, estimates from self-reports are similar. Information available through health insurance systems could also be used.
Recommended data collection methods

National and/or local oral health surveys of children and/or oral health interviews.

Use of the indicator

The indicator is used to monitor status of sealants for 6-8 year-olds’ first molars and 12-14 year-olds’ first and second molars. It gives the opportunity to evaluate the impact of preventive services on low-income children and adolescents.

Recommended formats of presentation

Proportion of children and adolescents according to gender, location, income families and from minority groups. To allow international comparisons, 8 and 14 years age is preferably presented.

References


Orthodontic Treatment Coverage

Rationale

The organization of orthodontic care within Europe underlines a variety and a disparity in the provision of orthodontic services. Extent and provision of orthodontic services has been studied mainly in countries with public orthodontic services. The percentage of children needing orthodontic treatment varies most often between 30 and 40, even though also lower and higher percentages have been found. In the same way, there are only a few studies on financial aspects of orthodontic care. Little information measures the global burden of orthodontic in terms of accessibility and equity of access of orthodontic treatment in the children and adolescent in Europe. Any tooth/jaw positional problems that present significant aesthetic, functional, physiologic, or emotional dysfunction are potential difficulties especially for the adolescent. Despite a falling general rate of tooth decay among children, widespread disparities exist in the provision of orthodontic care to poor and minority populations because of a cluster of access and financial issues. Availability of coverage and provider reimbursement rates seems to make a difference in access to care and in quality of care. A surveillance system will contribute to enhance the standards of orthodontic treatment throughout Europe.

Definition of indicator

Proportion of children and adolescents aged 5-17-years who claims to wear an orthodontic appliance.

Numerator: Number of children and adolescents aged 5-17-years who claims to wear an orthodontic appliance.

Denominator: Number of children and adolescents aged 5-17-years interviewed.

Definition of important terms

Orthodontic treatment: Science of the movement of teeth in the correction of malocclusion.

Orthodontic fixed appliances:

- Appliances fixed to teeth with braces or rings including active or passive palatal bars and lingual bars;
- Removable appliances i.e. removable plates, functional appliances, extra oral appliances.

Common data sources

Data are obtainable from children oral health based surveys and from a non institution-alized sample, which may include children not in school.

Dental expenditure panel survey, data derived from national care service organisations, health insurance companies – public and private – or questionnaires used in interviews surveys.
Recommended data collection methods

National and/or local oral health surveys of children and/or oral health interviews.

Use of the indicator

The indicator allows comparing accessibility of orthodontic services in Europe. It needs assessment findings, planning guide, and recommendations for improving access to oral health services for children and adolescents. Also, it needs drew attention to the question of adequacy of health services for the vulnerable communities.

Recommended formats of presentation

- Levels of severity: No grading by the severity of malocclusion;
- Units of measurement: The percentage of 5-17-year-old population wearing an orthodontic appliance during one year;
- Cross tabulation of the variable by age group, gender, education level, disability status, income/social economic status and location.

References

Early Childhood Caries

Rationale

Early Childhood Caries (ECC), a distinctive pattern of severe tooth decay in infants and young children, is one of the most common diseases in this age group. By conservative estimates, it affects more than one out of seven preschoolers. It is more prevalent in low-income families, who generally have limited access to dental services. Early childhood caries is an infectious disease which continues to evolve. It is a significant public health problem in selected populations and is also found throughout the general population. Child’s teeth are susceptible to decay as soon as they begin to erupt. There are many aspects of early childhood caries; baby bottle tooth decay is recognized as one of the more severe manifestations of this syndrome. As Early Childhood Caries is preventable, surveillance must encourage research activities to study risk factors and to promote preventive practices and should continue to seek a cure for early childhood caries. Similarly, it is necessary to promote an integrated approach of oral health in relation to behavioural and nutritional habits of the young infant.

Definition of indicator

Proportion of early childhood caries – preferably 1-3 years – in the age group 1-5 years.

Numerator: Number of children with early childhood caries in the age group 1-5 years.

Denominator: Total number of children examined in the age group 1-5 years.

Definition of important terms

Early Childhood Caries (ECC): Presence of one or more decayed (non-cavitated or cavi
tated lesions), missing (due to caries) or filled tooth surfaces in any primary tooth in a preschool-age child between birth and 60 months of age. The term “Severe Early Childhood Caries” refers to “atypical” or “progressive” or “acute” or “rampant” patterns of dental caries.

“Nursing caries” (or “bottle mouth caries” or “baby bottle syndrome” or “baby bottle tooth decay”) is the most commonly presenting pattern of ECC. They have a typical defined pattern where the upper primary incisors and upper first primary molars are usually carious but the lower incisors are usually spared. A prime aetiological factor is frequent consumption of a sweetened or fruit-based drink from a bottle of dinky feeder.

“Rampant caries” are presented by slightly older (3 or 4 years of age). They correspond to extensive caries that does not follow the “nursing caries” pattern: they affect almost all primary teeth even the lower incisors. It is related to systemic problems. Enamel defects as enamel hypoplasia may also play a role.

Classification: In children younger than 3 years of age, any sign of smooth-surface caries is indicative of severe early childhood caries (S-ECC). From ages 3 through 5, 1 or more cavitated, missing (due to caries), or filled smooth surfaces in primary maxillary anterior teeth, or a decayed, missing, or filled score of >4 (age 3), >5 (age 4), or >6 (age 5) surfaces constitutes S-ECC.
**Common data sources**

Data are obtainable from national and or local preschool children survey data. Sample registration systems, surveillance systems, national survey data, literature review; WHO Global Oral Data Bank.

**Recommended data collection methods**

Oral health basic screening surveys of preschool children, specific and local basic health surveys.
Oral health care provider surveys.

**Use of the indicator**

Indicator is use to monitor status and trends in oral health of preschool children and identify caries risk in older children. It gives the opportunity to implement and evaluate the impact of the strategies for preventing early childhood caries of the public health programme.

**Recommended formats of presentation**

Stratification according to age – preferably 1-3 years and 1, 2, 3, 4, 5 years – or socio-economic groups, gender according to the classification of severity.

**References**


Decay Experience in 1st Permanent Molars in Children

Rationale

Although carious lesions affect a relatively small portion of the population in some European countries, in others prevalence is still substantial. It is necessary to sustain the effort which has led to good progress over the past 20 years with improving oral health in some parts of Europe and to extend and build on these to reduce the prevalence and severity of dental caries in those countries and subsets of populations who still suffer a burden from this preventable disease. At the same time the issues associated with managing the problems of contracting most appropriately with dental health care professionals and limiting treatment costs have to be taken into account. Children are part of the most vulnerable groups affected and within this age group further difficulties arise for those affected by specific systemic conditions, those with developmental disturbances of tooth structure, the socio-economically deprived and the handicapped. It is therefore necessary to focus preventive efforts on these special groups of populations. This will optimize the cost-effectiveness ratio of the health programmes implemented within the framework of a policy aiming at reducing inequalities in health. However, surveillance programmes are somewhat lacking in Europe, complicating the identification of these groups and the decision making process. In addition to the more well established indicators for dental caries, such as mean decay experience, which require a full dental examination, a rapid partial recording system which looks only at decay experience on the four most vulnerable permanent molars teeth in children provides an efficient alternative in some circumstances.

Definition of indicator

Mean number of decayed, missing and filled first permanent molars present per children at 6 and 12 years of age.

**Numerator:** Total number of decayed (specify diagnostic threshold), missing and filled permanent first molars present per children at 6 and 12 years of age.

**Denominator:** Total number of children at 6 and 12 years of age surveyed.

Definition of important terms

As with overall decay experience, this measure can be used at both the early (the *enamel and dentine caries – D1 level*, as in the ICDAS Method) and/or later (*dentine only caries – D3 level*, as in WHO Basic Methods) stages of caries severity.

**WHO Basic Method:** Mean number of D3 decayed (into dentine), M missing and F filled permanent molars (D3MFT-M1) present per children at 6 and 12 years of age.

**ICDAS Advanced Method:** Mean number of D1 decayed, M missing and F filled permanent molars (D1MFT-M1) present per children at 6 and 12 years of age.

For clarity decay experience data at the *enamel and dentine caries* threshold should be reported with the subscript D1 as reporting DMFT without reference to the diagnostic threshold (level) used is to be avoided as it has led to confusion in the past. Similarly, decay experience data recorded at the dentine only caries threshold should be reported with the subscript D3 to differentiate them those including from earlier stages of dis-
ease. In the ICDAS system, to allow ready comparison with other studies, a subset of data meeting the dentine only criteria can also be reported separately at the $D_3$ threshold. $D_3$MFT in first permanent molars ($D_3$MFT-M1) is globally accepted as a cheap and reliable measure of caries in permanent dentition for population between 6 and 12 year-old. It is easier than DMFT index and could be recorded in few seconds. In children, one survey showed that in 35% of cases, first molars alone accounted for three quarters of the decay experience for the entire mouth (WHO Basic Method).

$D_1$MFT in first permanent molars ($D_1$MFT-M1) has the potential to be equally valuable over shorter time periods when assessing preventive programmes at early stages of the disease process and estimating caries risk (ICDAS Advanced Method).

**Common data sources**
Sample registration systems, surveillance systems, national survey data, literature review; WHO Global Oral Data Bank.

**Recommended data collection methods**
- National and/or regional school oral health clinical surveys;
- Data on this indicator are normally collected as part of community surveys as detailed clinical examination of the teeth by examiners trained and calibrated in a standardised method are required. In the future, if the sampling, training and calibration issues can be overcome, there is the possibility of collecting these data from routine dental clinics using appropriate primary care based informatic technologies and databases.

**Use of the indicator**
- To provide information on variations of profiles of dental caries for population groups with different socioeconomic levels and environmental conditions;
- To determine the resources needed to establish, maintain, expand or reduce an oral health care programme;
- To describe the nature and extent of required preventive, curative and restorative services;
- To monitor trends in dental caries among populations groups.

**Recommended formats of presentation**
Decay experience in first permanent molars in children should be presented by gender, geographical area, socioeconomic status, and by minority groups.

**References**
2. Pitts NB. “ICDAS” – an international system for caries detection and assessment being developed to facilitate caries epidemiology, research and appropriate clinical management. Community Dental Health 2004; 21: 193-198.
Dental Fluorosis

Rationale
Dental fluorosis is a condition that results from the intake of too much fluoride during the period of tooth development, usually from birth to approximately 6-8 years of age. Dental fluorosis is a specific disturbance of tooth formation caused by excessive fluoride intake during the development of teeth. It is characterized by opaque white patches in the dental enamel. These patches may become stained yellow to a darker colour and in more severe cases normal tooth structure may be destroyed. When mild or more severe dental fluorosis is found to a significant extent in a community, steps should be taken to reduce fluoride ingestion during the ages of tooth development. The type of fluorosis seen today remains largely limited to the very mild and mild categories, although the prevalence of enamel fluorosis in both fluoridated and nonfluoridated communities in the United States is higher than it was when original epidemiological studies were done approximately 60 years ago. There is a variety of sources of both topical and systemic fluoride in Europe including natural water fluoridation. Because fluoride intake from water and the diet appears not to have increased since that time, the additional intake by children at risk for dental fluorosis is believed to be caused by consumer’s inappropriate use of fluoride-containing dental products. As the WHO has recommended, the risk of fluorosis can be greatly reduced by following label directions for the use of these fluoride products.

Definition of indicator
Proportion of 12-year-old children according to fluorosis Dean’s index score.

Numerator: Number of 12-year-old children according to fluorosis Dean’s index score.

Denominator: Total number of 12-year-old children examined.

Definition of important terms
Opacity is defined as a qualitative defect of enamel identified visually as an abnormality in the translucency of enamel. It is characterised by a white or discoloured (cream, brown, yellow) area but in all cases the enamel surface is smooth and the thickness of enamel is normal, except in some instances when associated with hypoplasia.

Dean’s index score
- Normal: The enamel represents the usual translucent semi vitriform type of structure. The surface is smooth, glossy and usually of pale creamy white colour.
- Questionable: The enamel discloses slight aberrations from the translucency of normal enamel, ranging from a few white flecks to occasional white spots. This classification is utilised in those instances where a definite diagnosis is not warranted and a classification of “normal” not justified.
- Very Mild: Small, opaque, paper white areas scattered irregularly over the tooth but not involving as much as approximately 25 per cent of the tooth surface. Frequently included in this classification are teeth showing no more than about 1-2 mm of white opacity at the tip of the summit of the cusps, of the bicuspid or second molars.
• **Mild:** The white opaque areas in the enamel of the teeth are more extensive but do involve as much as 50 percent of the tooth.
• **Moderate:** All enamel surfaces of the teeth are affected and surfaces subject to attrition show wear. Brown stain is frequently a disfiguring feature.
• **Severe:** All enamel surfaces are affected and hypoplasia is so marked that the general form of the tooth may be affected. The major diagnostic sign of this classification is discrete or confluent pitting. Brown stains are widespread and teeth often present a corroded-like appearance.

**Common data sources**
Sample registration systems, surveillance systems, national survey data, literature review; WHO Global Oral Data Bank.

**Recommended data collection methods**
- National, regional and/or local oral health surveys of 12-year-old children;
- Household interview surveys, analysis clinical secondary data from national or regional oral health surveys;
- Oral Health Clinical Providers surveys.

**Use of the indicator**
Dean’s Index of fluorosis is the oldest index of fluorosis. It is widely used and provides a basis for current and historical comparisons of fluorosis. It is uncomplicated and provides a whole mouth score in one code. It is important to monitor fluorosis to detect changes in levels of fluoride ingestion. It is necessary to monitor impact and trends in the ingestion of fluoride among populations of 12-year-old children.

**Recommended formats of presentation**
Stratification according to exposure to fluoride e.g. fluoridation of domestic water supply since birth vs no domestic water fluoridation, salt available in region is fluoridated vs. no fluoridated salt.
Stratification by age, gender, geographic location, education level, household incomes, disability status, social deprivation and ethnicity with varying levels of fluorosis according to Dean’s Index is recommended.
Where caries levels in fluoridated and non fluoridated populations are being compared, fluorosis levels should also be compared.

**References**
Indicators for Monitoring the Oral Health of General Population
Daily Intake of Food and Drink

Rationale
Market globalization within Europe has a significant impact on dietary excess leading to chronic diseases such as obesity, diabetes, cardiovascular diseases, cancer, osteoporosis and oral diseases. Oral health is an integral part of systemic and nutritional health. Oral health and nutrition have a synergistic relationship. Dental diseases related to diet include dental caries, developmental defects of enamel, dental erosion and periodontal disease. Children and adolescent can benefit from diet analysis and modification. Diet analysis, along with professionally determined recommendations for maximal general and dental health, may be a part of an adolescent’s dental health management. Nutrition education by dental professionals must address dietary risk factors associated with oral disease.

The effects of nutritional changes demonstrate how common risks influence public health, including oral health. The public health community involved with oral health should gain an understanding of the health effects of these complex developments in order to prevent or control oral diseases. WHO/FAO recently based on analysis of the best available evidence on the relationship between diet and physical activity patterns and the major nutrition-related chronic diseases.

Definition of indicator
Frequency of daily intake of food and drink of people aged 5 to 60 and older.

Numerator: Number of people aged 5 to 60 and older who claim frequency of daily intake of food and drink.

Denominator: Number of people aged 5 to 60 and older surveyed.

Definition of important terms
Frequency of intake: The number of separate occasions within 24 hours that the individual consumes food or drink. All drinks except water, tea/coffee without sugar are containing fermentable carbohydrates or are acidic (soft drinks, fruit juices, milk, etc.). Most of the foods contain fermentable carbohydrates (bread, pasta, rice, fruit, milk sweets...). The exceptions (oil, meat...) are generally eaten with food containing carbohydrates (bread, vegetable), so it is easier to ask the global eating/drinking frequency – fermentable carbohydrates: all carbohydrates from monosaccharide (glucose, fructose, lactose), disaccharides (i.e. sucrose) to large polymers like cooked starches that could be metabolised in the oral cavity by the bacteria.

Levels of severity: Below 3 occasions low risk; between 3 and 5 occasions, normal risk; between 5 to 10 occasions, increased risk; above 10 occasions: very high risk.

Common data sources
Information available through national health information public and private systems could also be used.
Recommended data collection methods

National studies and/or individual localised dietary surveys conducted as part of other integrated health related surveys may also produce useful data, as well as simple questionnaire during a dental visit. National basic screening oral health surveys and interview surveys.

Use of the indicator

This indicator provides simple information useful to support the development of appropriate preventive programmes in these major challenges (i) to implement nutritional counselling covering the aspects directly linked to oral health; (ii) to inform the young mothers about the risk of breastfeeding or bottle on demand in order to avoid nursing bottle caries; (iii) to advise on the benefits of decreasing the consumption frequency of soft drinks to limit the erosion process; (iv) to promote rational and healthy eating and drinking patterns that could be also useful for the prevention of other non communicable diseases like obesity; (v) to evaluate the proportion of consumers who are at risk to develop dental diseases (those who eat/drink more than 5 times a day without adapted oral hygiene. High-risk groups can be identified.

Recommended formats of presentation

Mean number (plus standard deviation) of daily food and drink intake frequency broken down should be disaggregated by age (5 to 12, 13 to 17, 18 to 59, 60 and older), gender, family household income, select populations, disability status, ethnicity, socio-economic, education level and geographical location. The frequency of daily food and drink intake by levels of severity is also reported. Additional presentation is recommended to present followed key food safety practices.

References


Tobacco Usage Prevalence

Rationale

The smoking of tobacco has a number of well documented side-effects on the oral cavity as a clear association between smoking and both the existence and severity of periodontal diseases and oral cancer. Tobacco is the second major course of death in the world. Tobacco is the fourth most common risk factor for disease worldwide and that’s why prevalence of tobacco usage is a public health priority and determinant of the health care production system. Accurate data on the prevalence of tobacco use in the total population, among men and women, and among specific subgroups are the most important and useful measures of the tobacco epidemic in a given population. High-risk groups can be identified, and interventions targeting these groups developed. Gaps in tobacco control policy can be highlighted, guiding advocacy efforts. Periodic prevalence data also form the backbone for evaluating the effectiveness of campaigns and policy interventions within a given population. Based on evidence of effectiveness, surveillance systems and programmes of evaluation are important to support the role of the dentist in assisting dental patients interested in tobacco cessation.

Definition of indicator

Proportion of children and adolescents (12-17-years of age) and adults (18 years of age and more) who are using tobacco at a point in time.

Numerator: Number of children and adolescents (12-17 years of age) and adults (18 years of age and more) who are using tobacco in the population being surveyed.

Denominator: Total size of survey population.

Note: While cigarette smoking is the most common type of tobacco use, in countries where different types of tobacco use are present, the prevalence of different methods of tobacco consumption should be assessed.

Definition of important terms

Tobacco use (WHO, 1996): A person who is either a smoker or a smokeless tobacco user or both types of tobacco products:

- Cigarettes: manufactured cigarettes, roll-your-own cigarettes, tobacco rolls, kreteks (clove-flavoured cigarettes), sticks (made of sun-cured tobacco known as brus and wrapped in cigarette paper), bidis (tobacco wrapped in temburni leaf);
- Cigars (air cured and fermented tobaccos, with a tobacco wrapper);
- Pipes: briar, slate and clay pipes; water pipes;
- Chewing tobacco: plug, loose-leaf and twist; pan;
- Snuff.

All definitions, regarding smoking status are recommended by the WHO publication Guidelines for controlling and monitoring the tobacco epidemic. According to these guidelines any population can be divided into two categories, smokers and non-smokers.
A *smoker* is someone who at the time of the survey smokes any tobacco product either daily or occasionally. Smokers may be further subdivided into two categories:

- A daily smoker is someone who smokes any tobacco product at least once a day;
- An occasional smoker (non-daily smoker) is someone who smokes, but not every day.

A *non-smoker* is someone who, at the time of the survey, does not smoke at all. Non-smokers can be divided into three categories:

- *Ex-smokers* are people who were formerly daily smokers but currently do not smoke at all;
- *Never smokers* are those who either have never smoked at all or have never been daily smokers and have smoked less than 100 cigarettes in their lifetime;
- *Ex-occasional smokers* are those who were formerly occasional (but never daily) smokers and who smoked 100 or more cigarettes (or the equivalent amount of tobacco) in their lifetime.

**Common data sources**

Social and economic survey reports; National and/or local oral health care providers survey data.

**Recommended data collection methods**

Collection of a questionnaire on the tobacco user’s status and socio-demographic variables such as age, sex and socio-economic status.

**Use of the indicator**

The indicator is used to monitor levels and habits of smoking and for guiding policy on controlling tobacco epidemic. High-risk groups can be identified.

**Recommended formats of presentation**

Prevalence estimates should always be calculated separately for males and females, different age groups (12-17; 18-24 years of age and more), socio-economic characteristics such as education level, deprived community, ethnicity and linguistic groups. If diverse types uses are present, it is possible to calculate prevalence of different methods of tobacco consumption.

**References**

Geographic Access to Oral Health Care

Rationale

Financial, structural, and personal barriers can limit access to oral health care and contribute to inadequate access to preventive dental care. As structural component, geographical variations of human resources for health (HRH) can have a critical impact in terms of equity of access to health services, source of social injustice. Imbalance in the distribution of human resources for health, eventually leading to inequities in health services delivery and population health outcomes, is an issue of social and political concern in many countries. Despite the undoubted importance of monitoring the distribution of HRH and the impacts on health system performance, empirical evidence to support policy formulation is often fragmented. It has been suggested that virtually all European countries – especially in new members countries – suffer to some extent from an unequal distribution of HRH except, perhaps, certain countries that are geographically small. It is widely speculated that oral health workers are more likely to prefer settling in selected – usually more urban and affluent – areas, which may offer greater opportunities for professional development, education and other amenities for their families. In that context, surveillance based on the access to oral health care in terms of travelling time to a dentist is a useful indicator.

Definition of indicator

Proportion of population aged 18 years and over with access to a dentist within a convenient distance from their place of work or residence.

Numerator: Number of subjects aged 18 years and over who claims to access a dentist within 30 minutes from their place of work or residence.

Denominator: Total number of subjects aged 18 years and over surveyed.

Definition of important terms

Accessibility of health care: A measure of the proportion of a population that reaches appropriate health services (WHO, 1998). Geographical accessibility measures the extent to which services are available and accessible to the population. It is, of course, linked to the distribution of infrastructure in a given region but also to the actual offering of these services at these facilities. Geographical accessibility will vary according to local means of transportation, as well as the local topography.

Access to and convenient distance: Convenient distance and access are distinct in the sense that there may be access to dentist but it is not necessarily convenient to fetch the dentist due to distance. A 30 minutes travelling time from home or workplace may be considered reasonable access. Levels of acceptability can differ from country to country and hence should be defined by the countries themselves. If no definition is available, the above definitions may be used.

Availability: Identifies the presence or absence of needed health care services (USAID, 1999).
**Equity:** Principle of being fair to all, with reference to a defined and recognized set of values (WHO, 2000). Equity in health implies that ideally everyone should have a fair opportunity to attain their full health potential and more pragmatically, that no one should be disadvantaged from achieving this potential, i.e. everyone should have geographical and financial access to available resources in health care (WHO, 1998; Witter, 1997).

**Equality:** Principle by which all persons or things under consideration are treated in the same way (WHO, 2000).

**Common data sources**

Household-based censuses can be a key source for statistics describing human resources for health, providing precise information on the total stock and composition of the health workforce as well as distribution by spatial units and socio-demographic characteristics.

**Recommended data collection methods**

Population-based interview surveys, household surveys. A one year period is advised for the collection of information at national level.

**Use of the indicator**

The indicator should be extremely useful to health care planners and to identify risk areas to establish practice. It focuses on geographical imbalance in the health workforce, which can be defined as observed differences in the supply of health personnel across spatial units. It provides information to analyse the impact of policies (increased supply, area inducements and entry regulation) on inequality and to measure specific aspects of the level of HRH as an input to improving the provision of health services.

**Recommended formats of presentation**

Distribution of the population by age, gender and geographical areas. Tabulated data by uninsured, migrant, homeless, nursing home residents, residents of institutions and disabled populations are recommended.

**References**

Access to Primary Oral Care Services

Rationale

Serious disparities exist in access to oral health care across Europe, especially for low-income populations. Poor children are more than twice as likely as their peers to have dental decay and their disease is more likely to go untreated. Low-income people often have difficulty finding a dental provider who will treat them, even if they have insurance coverage or qualify for the oral health insurance program. Residents of institutions face several barriers to obtaining needed dental services. Countries of the European Union have undertaken a number of strategies to address access problems, such as providing incentives to dentists to serve people enrolled in primary oral care services, expanding the scope of practice for dental hygienists and other providers, and supporting education and prevention activities. Primary care services need to be accessible to all, including those with mobility, sensory or mental impairments. Surveillance to evaluate best practices for expanding oral health service care services for vulnerable and underserved populations is necessary to provide those populations with access to necessary preventive and restorative primary oral health care.

Definition of indicator

Proportion of adults aged 18 years and over who feel that they have a need for oral health care which can be addressed within a primary care setting.

Numerator: Number of adults aged 18 years and over who claim to access to primary oral health care services.

Denominator: Number of adults aged 18 years and over in the surveyed population.

Definition of important terms

Access: The ability to obtain services based on oral health care needs. Structural barriers include the lack of primary care providers, medical specialists, or other health care professionals to meet special needs or the lack of health care facilities. Personal barriers include cultural or spiritual differences, language barriers, not knowing what to do or when to seek care, or concerns about confidentiality or discrimination.

Primary care: Primary care services emphasize a patient’s general health needs such as preventive services, treatment of minor illnesses and injuries, or identification of problems that require referral to specialists. In oral health, it can concern a core service model described as: (i) Provide access to emergency dental care; (ii) Provide preventive care including fluoride therapy to adults and children; (iii) Provide comprehensive examinations; (iv) Provide comprehensive dental services. In general, it includes acute dental care, comprehensive examination services, restorative dental care, hygiene and preventive services, routine general service including root canal, denture, complex oral surgery, treatment of sick people.

Disability: Physical or mental impairment that has a substantial and long-term adverse effect on a person’s ability to carry out normal day-to-day activities.
Common data sources

Government and non-government health service, national insurance databases. Data derived from national care service organisations, health insurance companies or questionnaires used in interviews surveys are recommended.

Recommended data collection methods

Population-based interview surveys, household surveys.
A one year period is advised for the collection of information at national level.

Use of the indicator

The indicator provides an evaluation of the appropriateness and availability of care services especially for uninsured, migrant, homeless, elderly population, disabled populations. Access to primary care services gives an indication of three possible factors: health service availability, utilisation or outcomes. It underline knowledge of the issue is important for ensuring that equity issues are addressed and for the planning of appropriate care arrangements. Measuring increase or decrease access to oral health care, access to primary oral health care strategies will be developed to amelior these differences, enhance the quality of life, and improve the oral health of unserved and underserved population.

Recommended formats of presentation

Tabulated data by age, sex, uninsured, migrant, homeless, nursing home residents, residents of institutions and disabled populations are recommended.

References


Dental Contact within the Previous Twelve Months

Rationale

Although population-based prevention is essential, professional care also is necessary to maintain optimal oral health. Regular dental visits provide an opportunity for the early diagnosis, prevention, and treatment of oral diseases and conditions for persons of all ages, as well as for the assessment of self-care practices. Attendance at the dentist provides an indication of the service usage within a population and has value in helping in the development of appropriate care arrangements. Several national surveys show that the proportion of the population that annually makes at least one dental visit and the average number of visits made vary significantly by age, race, dental status, level of education, and family income. Current researches indicate that children from low-income households have higher caries rates and more unmet dental treatment needs than their higher income counterparts. Public policymakers have long recognized the need for programs to facilitate access to dental services for children from low-income households and to improve the oral health of the elderly persons and persons with disabilities who reside in long-term care facilities through an access to oral health assessment and treatment.

Definition of indicator

Proportion of population aged 2 and over who visited the dentist or dental clinic within the past year.

Numerator: Number of subjects aged 2 and over who visited a dentist or dental clinic within the past year.

Denominator: Total number of subjects aged 2 and over surveyed.

The question to be asked should be: When did you last visit a dental professional about your teeth, dentures or gums?

Definition of important terms

Primary dental clinic: Non-hospital setting.

Visit: Appointment leading to a consultation/treatment by the dentist.

Dentist: A member of the dental team, licensed to see or treat a patient.

Complete dental examination: Should include the following: (1) a soft tissue examination, (2) a screening and examination for periodontal diseases, and (3) a detailed charting of cavities, existing restorations (fillings and crowns), and other tooth conditions.

Common data sources

Data derived from national care service organisations, health insurance companies, household surveys.
Recommended data collection methods

National and/or local oral health surveys of children, adolescents and adults and/or oral health interviews.

Use of the indicator

To provide planners with an insight into the behaviours of the population, in particular to help identify potential problems in the development of a positive dental status.

Recommended formats of presentation

Cross tabulation of the variable by age group (children, adolescents and young adults aged 2 to 17, children at first school experience – aged 5 years –, adults aged 18 years and older, adults aged 65 years and older), gender, dental status, level of education, family income, disabilities status.

Discrimination of dental contacts between individually based check-up intervals, yearly regular checking and only in case of pain or discomfort should be presented.

References


Reason for the Last Visit to the Dentist

Rationale
The reason for seeking service use influences the type of care that they are likely to receive, and may reflect the level of untreated problems present at any time. A concern among public health policy makers is that some special groups are disadvantaged in terms of untreated disease and less desirable patterns of dental care. Individuals who contact a dental professional for the purpose of a dental check-up are most likely to benefit from early detection and treatment of oral disease, and to receive ongoing preventive care. In contrast, those who only seek care when they are experiencing a dental problem, may receive less desirable treatment, and may be less likely to receive preventive services. Reason for visiting the dentist provides an indication of the attitudes and beliefs of the population and has value in helping in the development of appropriate care arrangements. Any values found in the child population are likely to be heavily influenced with the parents’ value system, except when used as an indicator for treatment acceptance. Information on patterns of access to oral health care in Europe will assist in identifying disadvantaged groups and will contribute to the performance of oral health policy development.

Definition of indicator
Proportion of children 5 to 11 years, adolescents 12 to 17 and adults aged 18 years and over visiting the dentist for the last visits for a check-up, routine or emergency treatment.

Numerator: Number of children 5 to 11 years, adolescents 12 to 17 and adults aged 18 years and over visiting the dentist for the last visits for a check-up, routine or emergency treatment.

Denominator: Number of people children 5 to 11 years, adolescents 12 to 17 and adults aged 18 years and over surveyed.

Definition of important terms
Reason: Main contents of the cause of the dental appointment.
Visit: Appointment leading to a consultation/treatment by the dentist.
Check-up: Visit to ask advice or control on an individual’s dental health.
Routine treatment: Treatment to optimise oral health.
Emergency treatment: Care for patients with severe or life-threatening conditions that require immediate intervention.

Common data sources
Secondary data derived from national care service organisations, health insurance companies or questionnaires used in interviews surveys.
Secondary data from national or regional oral health surveys.
Recommended data collection methods
National and/or local oral health surveys of adolescents and adults and/or oral health interviews surveys.

Use of the indicator
The indicator provides decision makers with an insight into the attitudes of the population, in particular to help identify potential problems in the development of a positive oral health status. It contributes to (i) the need for reinforcement of preventive behaviour and services; (ii) the effectiveness of regulated contact between consumer and provider in meeting treatment needs; (iii) the need to concentrate on quality as well as volume of care in providing adequately for the needs of child, adolescent and adult populations.

Recommended formats of presentation
Cross tabulation of the variable by age group, sex, disease level and income/social economic status, labor force category, level of education, socioeconomic status.

References
Reason for not Visiting the Dentist in the last Two Years

Rationale

Children, adolescents and adults are sensitive to changes in access to oral health care services and the quality of care provided. Previous research on the likelihood of any use of health services has documented barriers to use among children in families with scarce financial resources, less education, and with psychological problems; however, the volume of services used is related to family size, health insurance status, and maternal use patterns, as well as perceived health status and health problems of the child. Social inequalities in oral health care services utilisation are particularly evident in countries, where the health care system does not provide universal coverage, and a high percentage of the population is uninsured. In such countries barriers limiting equitable access and use of health care services are encountered by members of disadvantaged social classes. In some other countries, even where national health services provide universal access to care, disadvantaged social classes often utilise health services less, especially when their poorer health status is taken into account, and more often they show much less use of preventive services. Providing equitable access and use of health care services in relation to need as well as identifying unmet needs, regardless of the type of insurance and social class of the children and families, should be a priority for oral health care systems.

Definition of indicator

Reasons of children 5 to 11 years, adolescents 12 to 17 and adults aged 18 years and over for not visited the dentist in the last 2 years.

Numerator: Children 5 to 11 years, adolescents 12 to 17 and adults aged 18 years and over who did not visit a dental professional in the last 2 years.

Denominator: Number of children 5 to 11 years, adolescents 12 to 17 and adults aged 18 years and over surveyed.

The question to be asked should be: What is the main reason for not visiting the dentist in the previous 24 months?

Definition of important terms

Main reason: Subjective argument of an individual for not attending to a dental caretaker mainly including no need, fear, cost, too far, long waiting lists, other.

Visit to the dentist: An appointment with the dentist leading to a visit with the intention to check and eventually treat the oral cavity and natural dentition including removable denture.

Dentist: A person who has completed studies in dentistry at the university level. To be legally licensed for practice independent of medicine (WHO, 2000). In some countries it includes stomatologists defined as those who have a full medical degree and have then taken a diploma in dentistry, odontologists and medical doctors who qualified before 1980 when formal dental courses were started (Italy).

Paramedical staff: Personnel including all types of professions related to oral health medicine, e.g. personnel in the fields of dental hygiene, therapists, clinical dental technicians, etc. (USAID, 1999).
Common data sources

National reports of dental schools and research institutions; Production data oral health insurance institutions; Reports of national dental societies. Results are in generally presented in stratification reports of community dental health programs including the percentages of groups of people with the different behaviours. Normative data for most countries exist.

Recommended data collection methods

It could be routine data collection, household surveys, special survey or other sources. National and/or local oral health surveys of children, adolescents and adults and/or oral health interviews.

Use of the indicator

- To identify groups with an increased risk of oral diseases to develop preventive- and treatment programs for vulnerable groups;
- To assess the risk of oral diseases in individuals to outline the importance of changing a personnel’s attitude;
- The indicator can especially be used as an indicator for oral health problems in vulnerable children.

Recommended formats of presentation

Cross tabulation of the variable by age group (children, adolescents and young adults aged 5 to 17, children at first school experience – aged 5 years –, adults aged 18 years and older, adults aged 65 years and older), gender, level of education, family income, private dental insurance status, disabilities status.

Reasons for not visiting the dentist for adults aged 18 and more without natural teeth should be presented.

References


Tobacco Use Cessation

Rationale
The clear link between oral diseases and tobacco use – cancer, periodontal diseases, tooth loss and congenital defects – provides an ideal opportunity for oral health professionals to partake in tobacco control initiatives and cessation programmes. The goal of the WHO Oral Health Programme, shared and supported by the FDI World Dental Federation is “to ensure that oral health teams and oral health organizations are directly, appropriately and routinely involved in influencing patients and the public to avoid and discontinue the use of all forms of tobacco.” In Europe where the majority of the population visits regularly their dental team, the dental services can be a useful arena for tobacco prevention. Smoking cessation is one of the most powerful methods of gaining health and also one of the most cost effective, even if tobacco cessation is not currently a routine part of dental practice. Dentists themselves should be encouraged to attend training courses to update their knowledge on the subject and set up an effective tobacco-free-initiatives strategy with fully integrated oral health-related programmes.

Definition of indicator
Proportion of dentists providing advice on tobacco use cessation.

Numerator: Number of dentists who claims providing advice on tobacco use cessation to theirs patients.

Denominator: Total number of dentists surveyed.

Definition of important terms
Contributions to tobacco-cessation programmes: There are several ethical, moral, and practical reasons why oral health professionals should strengthen their, for example:

- They are especially concerned about the adverse effects in the oropharyngeal area of the body that are caused by tobacco practices;
- They meet, on a regular basis, children, youth and their caregivers, thus providing opportunities to influence individuals to entirely avoid, postponed initiation or quit using tobacco before they become strongly dependent;
- They often have more time with patients than many other clinicians, providing opportunities to integrate education and intervention;
- They often treat women of childbearing age, thus are able to inform such patients about the potential harm to their babies from tobacco use;
- They are as effective as other clinicians in helping tobacco users quit and results are improved when more than one discipline assists individuals during the quitting process.

Common data sources
None.
Recommended data collection methods

Oral health care providers surveys; Households surveys; National interview surveys and national screening oral health surveys.

Use of the indicator

The indicator is used to monitor the impact of non tobacco advice by dentists to reduce smokeless among specific population. It produces information on the capacity and the contribution of the profession to decrease the burden of periodontal diseases, tooth loss and oral cancer. It assists decision-makers in the policy on controlling tobacco epidemic.

Recommended formats of presentation

Percent of dentists by age, sex and location cross by number of persons (12-17; 18-24 years of age and more) and by special population.

References


Untreated Caries Prevalence

Rationale

Public policymakers have long recognized the need for programs to facilitate access to dental services for children and adults especially from low-income households. Despite the potential for improved oral health status, the level of untreated dental caries tends to vary in Europe on the basis of sociodemographic factors. To avoid pain and discomfort, decayed primary teeth need to be restored, particularly molars in children aged 6 to 8 years. Retention of primary molars until they fall out normally – age 10 to 12 years – allows adequate dental arch space for the eruption of succeeding permanent premolars and avoids the tipping forward of first permanent molars, possibly creating serious orthodontic problems. Carious permanent teeth should be repaired promptly so that fillings may be kept small and as much natural tooth as possible conserved. Often, fillings have to be replaced several times during life; each time, additional tooth structure has to be removed, weakening the tooth. Current research also indicates that children from low-income households have higher caries rates and more unmet dental treatment needs than their higher income counterparts. A concern among public health policy makers is that some special groups are disadvantaged in terms of untreated disease and less desirable patterns of dental care. Information from the surveys on patterns of untreated dental care in Europe will assist in identifying disadvantaged groups, and will contribute to oral health policy development.

Definition of indicator

Proportion of children, adolescents, and adults – preferably 2-4; 6-8, 12, 15, 35-44 years old – with one or more untreated dentine decay teeth.

Numerator: Number of children, adolescents, and adults – preferably 2-4; 6-8, 12, 15, 35-44 years old – with one or more untreated dentine decay teeth.

Denominator: Total number of individuals examined.

Definition of important terms

Decay severity – $D_3$MFT/$d_3$mft – index is used where decay (caries) is assessed for each adult or child using a count of the Decayed (into dentine only) Missing and Filled Teeth (DMFT). Capital letters are used for the permanent dentition, lower case decayed missing and filled teeth ($d_3$mft) are used for the primary dentition.

Untreated dentine decay teeth: In recent years the criteria for scoring dentine caries has evolved. Whilst formerly Decay ($D_3$ or $d_3$) caries was scored only when obvious cavitation into the dentine was seen and checked with a probe of specified dimensions, over the last 15 years many criteria now recognise the clear shadowing of visual caries into dentine ($D_{3v}$ or $d_{3v}$) in addition to cavitated dentine caries $D_{3c}$ or $d_{3c}$. Clarity about which criteria to use and report is essential if meaningful comparison of results is to be achieved.

Common data sources

Sample registration systems, surveillance systems, national survey data, literature review; WHO Global Oral Data Bank.
**Recommended data collection methods**

National, regional and/or local basic oral health surveys of children, adolescents and adults.

Data on this indicator are normally collected as part of community surveys as detailed clinical examination of the teeth by examiners trained and calibrated in a standardised method are required. In the future, if the sampling, training and calibration issues can be overcome, there is the possibility of collecting these data from routine dental clinics using appropriate primary care based informatic technologies and databases.

**Use of the indicator**

- Traditionally manipulation of the decay severity – DMFT/dmft – index has provided a useful way of estimating restorative treatment need and to inform the planning of oral health care services. The results of surveys expressed at the caries into dentine (the D3/d3 diagnostic level) can be used to assess the proportion of individuals who have teeth which are clearly decayed far enough into the tooth tissue to warrant both restorative and preventive interventions;
- To assess mean levels of untreated dentinal dental caries and to help estimate dental treatment requirements among populations of children and adults via oral health surveys;
- To contribute to identify disadvantaged groups;
- To measure the extent to which oral health care services intervene to treat caries restoratively.

**Recommended formats of presentation**

Percentage of the population with one or more untreated dentine decayed teeth by age (preferably 2-4; 6-8, 12, 15, 35-44 years old), gender, geographic location, education level, household income, disability status, social deprivation and ethnicity. Presentation of results by type of service provision and service coverage can also be useful.

**References**


Periodontal Health Assessment

Rationale

Although gingivitis is not serious and its importance has been questioned, it should be prevented and controlled by personal oral hygiene in adults and children because it affects quality of life and social functioning, especially by causing bleeding during eating or toothbrushing. Gingival inflammation is a necessary but not sufficient prerequisite for periodontitis. Periodontitis is considered one of the most prevalent chronic diseases in humans. Untreated, severe periodontal disease is a potential risk for general health and well-being, and has been implicated as a co-factor in the progression of diabetes, some cardiovascular diseases and risk of premature birth. Periodontal health disparities are associated with the burden of these diseases and disorders, falling disproportionately upon adults from particular underrepresented minorities, and lower socioeconomic classes. It is therefore essential to detect from the point of view of oral health planning, the percentage of such people in the population as a whole. Proper diagnosis and risk assessment are prerequisites for prevention. Knowledge of periodontal health assessment is an essential component of decision-making and would reduce the cost of care for periodontal disease and shift more professional time and health care funds to patients who need more intensive and frequent professional management because of severe periodontal destruction.

Definition of indicator

Proportion of population in the age group 12, 15, 18 and 35-44 and 65-74 years in the four categories: healthy periodontium, gingivitis only, periodontal pockets of from 4mm - 6 mm, periodontal pockets of 6 mm or deeper.

**Numerator:** Number of individuals in the age group 12, 15, 18 and 35-74 years in each of the four categories.

**Denominator:** Number of individuals in the age group 12, 15, 18 and 35-74 years examined.

Only bleeding status is recommended at age 12 and 15.

Definition of important terms

*Periodontal health:* Currently accepted clinical signs of a healthy periodontium include the absence of inflammatory signs of disease such as redness, swelling, suppuration, and bleeding on probing; maintenance of a functional periodontal attachment level; minimal or no recession in the absence of interproximal bone loss; and functional dental implants. Periodontal therapies will be evaluated as to whether or not, and to what degree they meet periodontal health goals.

*Bleeding:* The bacteria cause an inflammation of the gums which is called “gingivitis”. In gingivitis, the gums become red, swollen and can bleed easily. Gingivitis is a mild form of gum disease that can usually be reversed. This form of gum disease does not include any loss of bone and tissue that holds teeth in place.

*Plaque* is the deposit on teeth and around the teeth which can be removed by oral hygiene.
**Periodontal pockets:** When gingivitis is not treated, it can advance to “periodontitis” which means “inflammation around the tooth.” In periodontitis, gums pull away from the teeth and form “pockets” that are infected. The body’s immune system fights the bacteria as the plaque spreads and grows below the gum line. Bacterial toxins and the body’s enzymes fighting the infection actually start to break down the bone and connective tissue that hold teeth in place.

**Community Periodontal Index:** Codes for examination and data recording: 0–Healthy gingiva; 1–Bleeding detected on exploration; 2–Calculus detected during exploration (record is not recommended); 3–4-5 mm pocket; 4–6 mm pocket or greater. It would therefore be inappropriate to include a category for calculus in the definition of the indicator.

**Common data sources**

Sample registration systems, surveillance systems, national survey data, literature review; WHO Global Oral Data Bank.

**Recommended data collection methods**

The reference method uses WHO recommendations with an exploratory-type sampling method. Such exploratory surveys may be classified as national, regional or local pilot studies.

**Use of the indicator**

- Assessment of the scale of periodontal problems at national, regional and local levels;
- Identification of population needs with regard to prevention and treatment for periodontal problems;
- Identification of high-risk sub-groups;
- Assessment of how far existing dental health care services meet current needs;
- Assessment of type and scale of prevention and/or cure services required;
- Resources needed to set up, maintain and extend or reduce dental health programmes, including an estimate of the number and type of personnel required.

**Recommended formats of presentation**

Data should be presented by tables including age and sex. The distribution should be presented among:

- The percentage of subjects showing healthy periodontal tissue; percentage of subjects showing bleeding only; percentage of subjects showing 4-5mm pockets; percentage of subjects showing deep (at least 6 mm) pockets;
- Mean number of sextants with healthy periodontal tissue, bleeding or higher value, 4-5 mm pockets or higher value, and number of sextants excluded from examination.

**References**


Removable Denture Prevalence

Rationale
Access to oral health services is limited by such factors as the availability of providers. However, persons without health insurance, aging people, deprived community not only less likely to receive health coverage; they are also less likely to get needed dental care. More directed efforts are needed to assure adequate oral health care for indigent, institutionalized and homebound older adults. Some efforts have been made to accommodate the service delivery system to the needs of the older adults, but more consistent attention needs to be given to reaching out and meeting. The overall quality of life of any individual particularly an older one, can be enhanced through oral diseases prevention and health promotion. In oral health, an important cornerstone in maintaining a healthy smile is to replace missing teeth. Prosthetic treatment is not uniquely limited to technical aspects. Indeed, it includes multidimensional aspects of patient perceived needs, desires and expectations. A surveillance system based on a sociodental approach to help determine patient’s needs to assure safe and effective practice in dentistry and treatment decision making.

Definition of indicator
Proportion of 20-65 year and more old adults who claim to wear a removable denture.

Numerator: Number of 20-65 year and more old adults who claim to wear a removable denture.

Denominator: Number of 20-65 year and more old adults interviewed.

Definition of important terms

Denture: An artificial substitute for natural teeth and adjacent tissues. A removable denture can restore aesthetics and function to properly chew food of the mouth and stabilize the remaining teeth. In addition, a denture may improve speech and prevent a sagging face by providing support for lips and cheeks.

Removable partial denture: A removable partial denture is a prosthetic replacement of one or more missing teeth that can be removed by the patient. Partials can be made of different materials, including acrylics, a metal/acrylic combination or flexible thermoplastics.

Removable full denture: Removable dental prosthesis replacing all upper or lower teeth.

Common data sources
Sample registration systems, surveillance systems, WHO Global Oral Data Bank.
**Recommended data collection methods**

Cross-sectional national survey data should be done every five years; Household’s surveys; Oral health care surveys.

**Use of the indicator**

This indicator gives a broader perspective than indicators measuring the presence or absence of removable denture. It provides information about the actual adequacy, safety, efficacy and effectiveness of most of removable prosthetic interventions. It develops information targeted to older people – especially homebound, minorities to implement strategies to promote oral health and health. It is an indicator to evaluate the impact of program to reduce the burden of dental caries especially in relation to oral health in aging. Beside aesthetic consideration, it is a tool for planning current and future prosthetic needs for adults and evaluates the provision of services in institutions.

**Recommended formats of presentation**

Percentage of adults aged 20 and older with removable denture by type of prosthesis and by jaw. Additional information should be provided on gender and to be related to social and economic factors – such as lower level of education, rural residence, and inability to pay-which. Special attention is focused on aging and other special care populations i.e. long term care resident, nursing home, homebound and institutionalized older people.  
To facilitate interpretation, additional information should be provided on gender, disability status, grade education and poverty level.

**References**

No Obvious Decay Experience

Rationale

Oral health decision-makers need to have a headline value for a population or sub-group giving an indication of those who are reasonably healthy and do not have established or severe disease in need of surgical intervention. Classically, the measure used has been the proportion of a population with a value of 0 for dentine decay (caries) assessed using the Decayed Missing and Filled Teeth (DMFT) index at the dentine only caries – D₃ level, as in WHO Basic Methods. For age groups with primary teeth, the corresponding value is the proportion with d₃mft = 0. This measure also provides an overall outcome indicator which assesses the effectiveness of self care and oral health care services in maintaining health and/or in controlling caries sufficiently for it to remain limited to the early stage of decay.

Definition of indicator

Proportion of subjects aged 5-74 with no obvious decay experience.

Numerator: Number of subject aged 5-74 without decay into dentine and missing teeth due to caries and filling (D₃MFT) = 0/d₃mft = 0 (is known as the percentage with no obvious decay experience).

Denominator: Number of subjects aged 5-74 examined.

Whatever diagnostic threshold is used in caries surveys, this indicator is calculated only with reference to decay into dentine (indicated by the convention D₃ or d₃).

Definition of important terms

No obvious decay experience: (D₃MFT = 0/d₃mft = 0).
No obvious decay. Decay into dentine = 0/d₃ = 0.

There is a need to adhere to the specific caries criteria and conventions in the WHO Basic Methods (and where appropriate the ICDAS Advanced Methods). This is because practical experience in national studies has shown that seemingly small changes in criteria can have a significant impact on the measured values for this indicator, particularly when defining the cut off which determines when dentine decay is or is not scored by an examiner.

It should also be appreciated that many traditional epidemiological methods of examination will tend to produce a systematic overestimation of the percentage with no obvious decay when compared to clinical examinations in the dental practice setting, which may take place with better lighting, saliva control and with the use of additional diagnostic aids. This tendency combined with the convention at this level which regards all enamel caries as sound is why the term obvious is used and the term “caries free” is to be avoided.

Inadvertent abuse of the term “caries free” has led to confusion among planners, administrators, dentists and politicians as many in the groups assessed by this indicator were
not in fact free of all decay. An increased evidence base on the pathogenesis and natural history of caries has led to a clearer understanding of the totality of caries, which in turn has led to more precise modern terminology.

Common data sources
Sample registration systems, surveillance systems, national survey data, literature review; WHO Global Oral Data Bank.

Recommended data collection methods
National, regional and/or local basic oral health surveys of children, adolescents and adults.
Data on this indicator are normally collected as part of community surveys involving detailed clinical examination of the teeth.
Collecting these data from routine dental clinics using appropriate primary care based informatic technologies and databases may be feasible in the future if training and standardisation issues can be overcome.

Use of the indicator
- To assess overall levels of oral health and to monitor trends in oral health over time among populations of children and adults via oral health surveys;
- To contribute to measuring the effectiveness of self care and oral health care services in maintaining health and/or controlling caries to remain limited to the early stage of decay.

Recommended formats of presentation
Stratification by age, gender, geographic location, education level, household incomes, disability status, social deprivation and ethnicity is recommended.

References
2. Pitts NB (Editorial). “ICDAS” – an international system for caries detection and assessment being developed to facilitate caries epidemiology, research and appropriate clinical management. Community Dental Health 2004; 21: 193-198
Dental Caries Severity

Rationale
Decay experience at early and/or later stages of severity assessed by variations of the severity of caries index is accepted globally as a standardized measure of one of the most common oral diseases. Internationally, dentistry is moving towards preventive and minimally invasive care. As the focus of public health planning embraces evidence based healthcare, moves away from providing only restorative interventions (fillings) and moves towards the delivery and evaluation of preventive programmes and services, indicators are needed which can be used to document the need for and the degree of success achieved in controlling early stage decay through prevention and the need for and the pattern of restorative care which is provided for decay which has progressed to the more severe stages of the disease process. In a manner analogous to the WHO Stepwise approach, this indicator provides the necessary flexibility to record at different stages of the caries process, according to the public health and clinical need.

Definition of indicator
Mean number of decayed, missing and filled primary or permanent teeth present per person in age group 5-74 years.

Numerator: Total number of decayed, missing and filled primary or permanent teeth present per person in age group 5-74 years.

Denominator: Total number of subjects surveyed in age group 5-74 years.

The missing component comprises teeth missing due to caries in subjects under 30 years of age, and teeth missing due to caries and any other reasons for subjects 30 years and older.

Definition of important terms
In a number of centres in Europe, in order to assess caries prevention, oral health data from clinical visual examinations of the teeth have been collated reliably and reproducibly for some years at the early stage of decay (the enamel and dentine caries – $D_1$ level, as in the ICDAS Method). However, there are still some instances where it is sensible to collect data which records only the later stages of decay (using the dentine only caries – $D_3$ level, as in WHO Basic Methods). In this index decay is assessed for each individual using a count of the number of Decayed Missing and Filled Teeth (DMFT). Capital letters are used for the permanent dentition and lower case dmft are used for decayed, missing and filled primary teeth.

For clarity decay experience data at the enamel and dentine caries threshold should be reported with the subscript $D_1$ as reporting DMFT/dmft without reference to the diagnostic threshold (level) used is to be avoided as it has led to confusion in the past amongst planners, administrators, dentists and politicians. Similarly, decay experience data recorded at the dentine only caries threshold should be reported with the subscript $D_3$ to differentiate them those including from earlier stages of disease. In the ICDAS system, to allow ready comparison with other studies, a subset of data meeting the dentine only criteria can also be reported separately at the $D_3$ threshold.
Common data sources

Sample registration systems, surveillance systems, national survey data, literature review; WHO Global Oral Data Bank.

Recommended data collection methods

National and/or regional oral health clinical surveys. Data on this indicator are normally collected as part of community surveys as detailed clinical examination of the teeth by examiners trained and calibrated in a standardised method are required. In the future, if the sampling, training and calibration issues can be overcome, there is the possibility of collecting these data from routine dental clinics using appropriate primary care based informatic technologies and databases.

Use of the indicator

This is an outcome indicator for dental decay (caries) which can be used, as appropriate, to record either the combined estimate of early and later stage decay or just later stage decay. This well established indicator can be used to assess mean levels of dental caries at diagnostic thresholds appropriate to assessing both preventive and operative dental treatment and to monitor trends in oral health over time among populations of children and adults via oral health surveys. The ICDAS method seeks to allow comparability of datasets between public health, clinical practice, research and educational domains. This indicator is used to measure the effectiveness of preventive self care and oral health care services in controlling the decay process, as well as to document more traditional operative interventions. It may be used in either the permanent or the primary teeth as an aggregate measure, or can be reported separately by its individual components.

Recommended formats of presentation

Provided sample sizes have been calculated appropriately, stratification by age (preferably 5-7 for dmft, 12, 18, 35-44, 65-74 years), gender, geographic area, rural/urban, social deprivation and ethnicity is often helpful. Reporting the individual components of D/d, M/m and F/f can be very valuable in some instances.

References

3. Pitts NB. “ICDAS” – an international system for caries detection and assessment being developed to facilitate caries epidemiology, research and appropriate clinical management. Community Dental Health 2004; 21: 193-198.
Periodontal Diseases Severity

Rationale

Periodontal diseases are usually seen as a multifactorial chronic inflammatory disease initially caused by bacterial infection with the destruction of the supporting tissue of the teeth. One consequence of periodontal diseases can be loss of attachment. This manifestation of periodontal diseases is a major cause of tooth loss after the age of 40-45 years. Epidemiology has further enabled the distribution of periodontitis in various populations to be assessed and certain risk factors to be identified. It has recently been suggested that untreated periodontal disease constitutes a risk for general well-being and health, especially with respect to cardiovascular and respiratory disorder, pre-term birth, and diabetes. European Union has not been in a position to estimate the impact and burden of periodontal diseases and its determinants and risk factors on the morbidity rates and quality of life of the population. The prevalence of moderate to severe attachment loss in the general population remains unclear in many countries. There is therefore a need to address this deficiency and to quantify loss of attachment when it has been detected. Surveillance of periodontal diseases condition should encourage dental professionals, consumers, private and public health care financing agencies, and decision-makers authorities to adopt an evidence-based approach to periodontal services, in order to rationally control costs, help assure quality and favourable outcomes, and extend more affordable dental care to a wider public.

Definition of indicator

Proportion of adults aged 35-74 years with periodontal diseases cases of any grade.

Numerator: Number of adults aged 35-74 years with periodontal diseases cases of any grade.

Denominator: Total number of adults aged 35-74 years examined.

Definition of important terms

Clinical attachment level is the point (point C on the diagram) at which the gingiva attaches to a root surface.

Loss of attachment (point B – point C on the diagram) is measured by clinical probing.

Lifetime cumulative attachment loss is the measurement (in mm) from the cemento-enamel junction (point B) to the clinical attachment level at a given point in time.

Cemento-Enamel Junction (point B) is the anatomical point where the root and crown of a tooth meet. For convenience (and reproducibility), it is used as a fixed point from which to measure attachment loss. However, even at healthy sites the attaching fibres are rarely found at this point. Hence the threshold for attachment loss is usually set at 1 or 2 mm as measurements of less than these figures do not represent true clinical attachment loss.
**Proposed classification for periodontal diseases**

Attachment loss was defined as the apical migration of the periodontal attachment from a reference point, which was supposed to be the normality. Severity is characterized on the basis of the degree of attachment loss recorded in terms of the following codes:

- **Health**: Periodontal attachment loss 0 mm;
- **Slight**: Periodontal attachment loss 1 or 2 mm;
- **Moderate**: Periodontal attachment loss 3 or 4 mm;
- **Severe**: Periodontal attachment loss +5 mm or more.

Extend is characterized as “Localized = ≤ 30 % of teeth involved”, and “Generalized = > 30% of teeth involved”.

**Common data sources**

Data on loss of attachment are not routinely available. They are obtainable from special population based surveys. However, they have been included in the most recent national oral health surveys in some countries, including France and the United Kingdom.

**Recommended data collection methods**

Sample registration systems, surveillance systems, and national survey data. The reference method uses WHO recommendations with an exploratory-type sampling method. Such exploratory surveys may be classified as national or regional pilot studies.

**Use of the indicator**

- Assessment of the scale of periodontal problems at national and regional levels;
- Providing information on severity and development of disease, and an idea of whether it is increasing or diminishing;
- Identification of high-risk sub-groups;
- Assessment of how far existing dental health care services meet current needs.

**Recommended format of presentation**

Data should be presented by age and gender. The distribution should be presented among the periodontal diseases by severity and extent categories. To facilitate interpretation, additional information should be provided on location, grade education, poverty level and tobacco habits.

**References**

Cancer of the Oral Cavity

Rationale
Active involvement of oral health professionals in oral cancer prevention through control of risk factors such as tobacco, alcohol and diet is supported by the WHO Crete declaration (2005). Regular oral cancer examinations afford an opportunity for practitioners to discuss with patients primary prevention of these lesions. Oral cancer represents about 4 percent of all cancers and 2.2 percent of all cancer deaths. The incidence of squamous cell carcinomas of the oral cavity differs widely in various parts of the world and ranges from approximately 2 to 10 per 100,000 population per year. The average five-year survival rate of patients with oral cancer is about 50 percent. This is primarily due to late detection of the disease. Health promotion and early detection and prevention are the key to fighting this deadly disease. For preventive purposes, it is significant that oral cancer is largely a “lifestyle” disease, meaning the majority of cases are related to tobacco and alcohol use. This usage can be affected by proper education, counselling and treatment. Provision of systematic epidemiological information, integration of oral cancer information into national health surveillance systems which record chronic diseases and common risk factors and dissemination of information should be strengthened.

Definition of indicator
Incidence annual of oral cancer in adults aged 35-64 years per 100,000 population.

Numerator: Number of new cases of cancer of the oral cavity in adults aged 35-64 years population during one year x 100,000.

Denominator: Mid-year population in the age group 35-64 years.

Definition of important terms
We refer to head and neck cancers as those arising in the anatomical sites coded in ICD-2 with C00-C14 (cancer of the lip, oral cavity and pharynx).

Health promotion includes 1) promoting oral cancer awareness that tobacco smoking and heavy alcohol consumption causes oral cancer, and promoting a healthy diet, and 2) persuading cigarette smokers, and heavy alcohol drinkers to stop the habit.

Diagnosis and staging of oral cancer: Biopsy of the lesion is performed to get an accurate diagnosis. After initial diagnosis of oral cancer, the stage of cancer will be determined. This will define the size of the tumour, how deeply the tumour has invaded tissues at the site of origin, and the extent of any invasion into surrounding organs or lymph nodes. Determining the cancer’s stage is an important factor as it directs treatment planning. The 1993 American Joint Committee on Cancer TMN classification and staging of oral cancer is commonly used.
**Classification of oral cancer**

### Primary tumour
- T0 No primary tumour;
- Tis Carcinoma in situ;
- T1 Tumour 2 cm or less;
- T2 Tumour 4 cm or less;
- T3 Tumour > 4 cm;
- T4 Tumour > 4 cm and deep invasion into muscle, bone, deep structures.

### Tumour metastasis
- M0 No metastasis;
- M1 Metastasis noted.

### Staging of oral cancer

#### Stage I
- T1, N0, M0;

#### Stage II
- T2, N0, M0;
- T3, N0, M0;

#### Stage III
- T1, T2, T3, N1, M0;
- T4, N0, M0;

#### Stage IV
- Any T, N2 or N3, M0;
- Any T, any N, any M.

### Lymphatic node involvement
- N0 No node;
- N1 Single homolateral node < 3 cm;
- N2 Node(s) homolateral < 6 cm;
- N3 Node(s) > 6 cm and/or bilateral.

**Common data sources**

Reports of special screening programmes.

**Recommended data collection methods**

Register.

**Use of the indicator**

The indicator is use:
- To promote professional and public education about oral cancer needs;
- To improve dentists to emphasize the need for and perform routine oral cancer examinations;
- To promote health promotion and early diagnosis in oral health and treatment based;
- To assist oral health’s decision makers.

**Recommended format of presentation**

Incidence should be presented by categories of oral cancer, age, gender, socio-economic status, geographical area and risk factors habits (alcohol, tobacco).

**References**

Functional Occlusion Prevalence

Rationale

Oral diseases affect the most basic human needs: the ability to eat and drink, swallow, maintain proper nutrition, smile, and communicate. Oral diseases affect not only the health of the oral cavity, but can be detrimental to the overall health and well-being of individuals. Vast improvements in tooth retention have taken place over the past three decades. There is evidence that people with impaired dentitions due to missing teeth must choose foods that do not provide optimal nutrition; in the elderly, poor oral health can lead to significant weight loss that can affect overall health. Early tooth loss has been shown to be a predictor of eventual edentulism. Subsequent population based oral health studies have frequently referred to the presence of a minimum of 20 teeth or sometimes a certain number of contacting posterior pairs of teeth, as a simple way of defining “satisfactory” oral health. In a same way, reports illustrate profound disparities that affect those without the knowledge or resources to achieve good oral care. While continuing efforts to prevent tooth loss, there is a need to evaluate the appropriate replacement of tooth function.

Definition of indicator

Proportion of adults aged 18 and older with 21 teeth or more natural teeth in functional occlusion.

**Numerator:** Number of cases of adults aged 18 and older with 21 teeth or more natural teeth in functional occlusion.

**Denominator:** Total number of adults aged 18 and older examined.

Definition of important terms

*Permanent teeth* refer to (usually) thirty-two adult teeth in a complete, permanent dentition. It comprises of thirty-two teeth in the two dental arches: maxillary teeth and mandibular teeth. The thirty-two teeth are comprised of twelve anterior or incisor teeth, eight bicuspid teeth (premolars), and twelve posterior or molar teeth.

*Functional occlusion:* The presence of 21 or more natural teeth has been used internationally as a marker for a functional dentition, or one which provides the ability to eat, speak, and socialize without active disease, discomfort, or embarrassment presence without the need for full or partial dentures.

*Dentate:* A condition characterized by having one or more natural teeth. A full dentition in adults is defined as the presence of all 28 natural teeth, not including third molars and teeth removed for orthodontic treatment.

Common data sources

National sources, sentinel monitoring through oral health individual patient records, sample registration systems, surveillance systems and special studies.
**Recommended data collection methods**

Cross-sectional national survey data should be done every five years; household’s interview surveys; oral health care provider surveys.

**Use of the indicator**

This indicator gives a broader perspective than indicators measuring the presence or absence of all teeth. It is an indicator to evaluate the progressive impact of preventive program to reduce the incidence and the severity of dental caries. Beside aesthetic consideration, it is a tool for planning current and future prosthetic needs for adults.

**Recommended formats of presentation**

Percentage of adults aged 18 and older – particularly 35 to 44 and 65 to 74 – with 21 or more natural teeth by age.

To facilitate interpretation, additional information should be provided on gender, disability status, grade education and poverty level.

**References**


Number of Natural Teeth Present

Rationale
Tooth retention is an important goal in oral public health. During the past several decades, the percentage of older adults who have retained their natural teeth has increased steadily. This trend is expected to continue, resulting in improved oral function and quality of life. With tooth retention, older adults remain at risk for dental caries (i.e., tooth decay) and periodontal disease. To help adults maintain healthy teeth for life, community-based strategies should promote healthy behaviours, optimal use of fluoride, timely examinations and clinical services, and increased research into preventing oral diseases and promoting oral health among adults. The wide variation in rates of tooth loss and retention among states and by selected characteristics suggests that many older adults have not benefited fully from improvements in the prevention and control of oral diseases. Differences in tooth retention by education, income, and race/ethnicity reflect disparities in unmet dental needs (e.g., untreated caries and advanced periodontal diseases) among persons with limited education and income.

Definition of indicator
Percentage of adults aged 18 and more with no natural teeth.

Numerator: Number of adults aged 18 and more who claims to have natural teeth present.

Denominator: Total number of adults aged 18 and more surveyed.

Definition of important terms
Natural teeth: Includes teeth which erupted into the mouth and exclude artificial teeth, implants, pontics and dentures.

Common data sources
- Data collected from national, regional or local oral health surveys or in specific communities including sample registration systems, surveillance systems, national survey data, literature review; WHO Global Oral Data Bank;
- Data collected by health insurance authorities/companies (public or private).

Recommended data collection methods
- Oral Health Clinical Surveys;
- Household Interview Surveys;
- Oral Health Care Providers Surveys.
Use of the indicator

- To monitor trends in tooth retention among populations of adults;
- To assist decision-makers to manage oral care services including health insurance systems.

Recommended formats of presentation

- Percentage of adults with no natural teeth;
- Percentage of adults with no natural teeth in different age groups by socio-economic classification of the household reference person, gender, education level, disability status and region. 35-44 and 65-74 age groups are particularly recommended;
- Percentage of adults with some natural teeth missing, all natural teeth missing and no natural teeth missing.

References

Edentulous Prevalence

Rationale

The increase of life expectancy, and the combined effect of technical advances in dentistry and other socio and economic factors, have resulted in more people retaining more of their natural teeth in later life. Loss of all natural teeth can contribute to psychological, social and physical impairment. In some industrialized countries there has been a positive trend in the reduction of tooth loss among adults in recent years, though the proportion of edentulous persons in the elderly population is still high in some countries. A concern among public health policy makers is that some special groups are disadvantaged in terms of untreated disease and less desirable patterns of dental care. Persons with no natural teeth who lack regular dental care may develop soft tissue lesions from medications, systemic conditions, and exposure to tobacco, as well as from prosthetic appliances that are not fully functional or are not maintained properly. People without teeth may be unaware that they are still at risk for oral diseases. Consequently, they may have long intervals between professional examinations. Coordination of care between physicians and dentists is essential for optimal general health and oral health. Surveillance is vital to illustrate profound disparities that affect those without the knowledge or resources to achieve good oral care and to ascertain the differential health risks, differences in health behaviour and patterns of health service utilisation and for planning culturally appropriate and effective health promotion activities and preventive programs. Reducing the number of edentulous persons is one of the WHO global goals for oral health for the year 2020.

Definition of indicator

Proportion of adult population aged more than 35 years who have lost all their natural teeth.

Numerator: Number of adults aged more than 35 years who have lost all their natural teeth.

Denominator: Number of adults surveyed.

Definition of important terms

Edentulous: A condition characterised by not having any natural teeth.

Natural teeth: Includes teeth which erupted into the mouth and excludes artificial teeth, implants, pontics and dentures.

Common data sources

- Data collected from national, regional or local oral health surveys or in specific communities including sample registration systems, surveillance systems, national survey data, literature review; WHO Global Oral Data Bank;
- Data collected by health insurance authorities/companies (public or private).
Recommended data collection methods

- Oral Health Clinical Surveys;
- Household Surveys;
- Oral Health Care Providers Surveys.

Use of the indicator

The indicator is use:

- To provide information of the oral health status and needs of adult and of elderly populations in Europe, particularly for nursing home residents and residents of institutions;
- To assist decision makers to reduce inequality in identifying disadvantaged groups, and to contribute to oral health policy development;
- To increase the performance of oral health care services to assist people to maintain their functional well being in this changing environment.

Recommended formats of presentation

- Percentage of adults edentulous by office region;
- Percentage of adults edentulous in different standard age groups 35-44, 45-54, 55-64, 65-74 and above and by socio-economic classification of the household reference person;
- Percentage of adults edentulous by sex and region;
- Oral health assessment of elderly persons and persons with disabilities who reside in long-term care residence, nursing home and institutions.

References

Part C

Indicators for Monitoring

the Oral Health Systems
Cost of Oral Health Services

Rationale
Cost of oral health services examines the role voluntary health insurance plays in different European member states and covers issues such as the determinants of demand for voluntary health insurance; the structure, conduct and performance of national markets; access, equity and consumer protection in these markets; the impact of voluntary health insurance on the free movement of people and services across the European Union; and recent trends and challenges for voluntary health insurers and policy makers at national and at European levels. In many countries, there is relatively little information available on the health system and the impact of reforms. Due to the lack of a uniform data source, quantitative data on health services are based on a number of different sources. Oral health surveillance as part of the Health System Profiles provide a tool for the dissemination of information on health systems and the exchange of experiences of reform strategies between policy-makers and analysts in different countries. It seeks to provide relevant information to support policy-makers and analysts in the development of health systems in Europe.

Definition of indicator
Total cost – public and private – of oral health services per year.

Definition of important terms
Cost(s): The value of the resources used in an activity, also the benefits sacrificed through a particular event of choice of action rather than another. Total costs of oral health care services do not include the costs of purchasing toothpaste, brushes and other oral health materials from sources other than dentists or other clinical oral health workers.

Total cost of oral health services: The sum of all fees paid to dentists and other clinical oral health providers (including dental hygienists, clinical dental technicians) for the provision of oral health by individual patients or, by either public or private insurance schemes or, other third parties, plus the costs of maintaining public clinics and the salaries of those working in them.

Private health care expenditure: Refers to both private finance and provision of services. That part of total expenditure on health which is not public; it is mainly comprised by out-of-pocket payments and premiums for voluntary health insurance (sometimes by employers on behalf of the individual). Private fees include all fees paid directly to dentists or other clinical oral health workers by patients or by commercial private health insurance companies.

Public health care expenditure: Refers to public finance and provision of health care services. Includes publicly funded health care by both publicly and privately owned providers. Public funds are state, regional and local Government bodies and social security schemes. Public capital formation on health includes publicly-financed investment in health facilities plus capital transfers to the private sector for hospital construction and equipment and subsidies from government to health care service providers. It includes funds for state employees.
Common data sources
Council of European Chief Dental Officers, WHO Regional Office for Europe Health for All database, National Statistical Offices, Insurance; Eurostat, Organization for Economic Cooperation and Development (OECD) Health Data; Household surveys.

Recommended data collection
Analysing secondary data from regulatory information; population-based interview surveys and oral health providers surveys.

Use of the indicator
In counties with publicly funded oral health care, to assist health planners and policy makers in the allocation of resources to oral health care and to target these resources. They can also be used to inform comparative analysis of health systems. As an economic indicator, it informs about different approaches to the organization, financing and delivery of health services and the role of the main actors in health systems. It also provides information on the cost of oral health services, describes the institutional framework and the process, content and implementation of health care reform programs.

Recommended formats of presentation
- Public and private expenditure on health as percentage of total expenditure on health;
- Disaggregated private expenditure, if feasible, in the following categories: formal user charges, informal payments, out-of-pocket payments, private insurance;
- Health expenditure in EUR PPP per capita in the WHO European Region, latest available year;
- Health expenditure by service category (% of total expenditure on health care). Presentation should include data on the following wherever possible:
- Total and public expenditures on X services as a percentage of total expenditure on oral health.

X =
- Oral Health administration and insurance;
- Oral Health education and training;
- Oral Health R & D;
- Public oral health and prevention;
- Outpatient/ambulatory dental services.

References
Gross National Product Spent on Oral Health Care Services

Rationale

Many governments in the European Region are reviewing their oral health care systems and the suitability of their existing approaches to financing, organizing and delivering health care services. Health policy-makers across the European Region are searching for effective ways to reform their health systems. As promoted by the European Observatory on Health Care Systems and especially by the Health care systems in transition profiles, macroeconomic data allow policy-makers and analysts to review different approaches to the financing, organization and delivery of services and to the reform process, and to address common challenges. Gross National Product provides analytical descriptions of the activities of and reforms in the oral health care systems in different Member States of the European Region.

Definition of indicator

Percentage of Gross National Product (GNP) as expressed in Purchasing Power Parities (PPP) spent on the provision of oral health care delivered by oral health care personnel.

Definition of important terms

Gross Domestic Products: The monetary value of all final goods and services produced in a country/an economy during a year. The total money value of all final goods and services produced in an economy over a period of time (usually one year) plus net property income from investments abroad.

Purchasing Power Parities: Rates of currency conversion that equalise the purchasing power of across the full range of goods and services contained in total expenditure and Gross Domestic Product of a country WHO, 1999. PPPs are the rates of currency conversion which eliminate the differences in price levels between countries.

Sickness fund: Third-party payer in social health insurance system, covering the community as a whole or sections of the population. Sickness funds are usually quasi-public bodies. In France and Belgium, they are also called mutuelles/mutualites. Other synonyms are “sick funds” and “health insurance funds”; in OECD’s system of health accounts, sickness funds fall into the category of “social security funds” if they are imposed or controlled by government units.

Common data sources

Council of European Chief Dental Officers, European Regional Organisation of the Federation Dentaire Internationale (ORE), WHO Regional Office for Europe Health for All database, National Statistical Offices, Eurostat, Organization for Economic Cooperation and Development (OECD) Health Data.
Recommended data collection methods

Analysing secondary data from regulatory information.

Use of the indicator

The indicator allows for international comparisons of the relative expenditure made on oral health care between countries. It produces information on the cost effectiveness of different systems for the provision of oral health care to achieve better expenditure control and/or greater productivity and efficiency need. It promotes data to improve the equity with which services are distributed across social classes.

Recommended formats of presentation

• Trends in oral health expenditure in country by year;
  The table should include the following indicators for the years 1980, 1985, 1990, 1995, 2000, latest available year:
  – Total oral health expenditure in per capita EUR PPP (1995 prices) (if not available in EUR, use US PPP);
  – Total oral health expenditure percentage of GDP;
• Mean annual real growth rate in total health expenditure;
• Mean annual real growth rate in GDP;
• Trends in oral health expenditure as a share (%) of GDP in country and selected other countries, 1990-latest available year.

References

Dentists and Other Oral Care Clinical Providers

Rationale

As promoted by the World Health Organisation as a primary function of health care systems, contributing to their performance, the management of health professionals can be considered a key element of effective stewardship and a sine qua non for attainment of health system goals: improving health, responding to the legitimate expectation of the population and fairness of the contribution. Recently in Europe, the roles of oral health professional are changing in a variety of ways. They include imbalances between supply and demand, the creation of new roles in response to changing patterns of disease and emerging technologies, changing professional expectations and changing public expectations. The need for workforce planning in the oral health sector may be considered as an acknowledgement of one aspect of market failure in the health sector, giving rise to the challenge of ensuring sufficient staff with appropriate skills to meet the needs of a labour intensive service with high social utility. The overall aim of workforce planning is the provision of an adequate number of personnel with appropriate competencies to meet the service needs of the population and to ensure that personnel are available and distributed equitably and coherently between geographical regions, establishments, and levels of care. Thus, the importance of reframing regulatory systems to ensure that the health workforce of the future is prepared to meet the changes that must take place in health care delivery cannot be underestimated.

Definition of indicator

The number and rates (per 100,000 population) of active dentists, dental hygienists, oral health therapists and clinical dental technicians.

Numerator: Number of active dentists and other oral care clinical providers (as listed above) per 100,000 population.

Denominator: Mid-year population.

Definition of important terms

Oral health care resources: People who work in the various clinical professions of oral health care. (European Observatory on Health Care Systems, 2001).

Dentist: A person who has completed studies in dentistry at the university level. To be legally licensed for practice independent of medicine (WHO, 2000). Data on the number of dentists should be treated with caution; in both national sources and international sources it is often unclear whether figures (if available at all) refer to all qualified, registered or actually practising physicians. In some countries it includes stomatologists defined as those who have a full medical degree and have then taken a diploma in dentistry, odontologists and medical doctors who qualified before 1980 when formal dental courses were started (Italy).

Paramedical staff: Personnel including all types of professions related to oral health medicine, e.g. personnel in the fields of dental hygiene, therapists, clinical dental technicians, etc. (USAID, 1999).
**Dental Hygienist:** A person who has completed a programme of basic hygienist education and is qualified and authorized in his/her country to practice hygienist in all settings for the promotion of health, prevention of illness, care of the sick and rehabilitation (WHO, 2000). Data on the number of hygienists should be treated with caution; in both national sources and international sources it is often unclear whether figures (if available at all) refer to all qualified, registered or actually practising hygienists.

**Clinical Dental Technician (denturist):** A person who has completed studies in dentistry at the university level. To be legally is legally permitted to provide dentures directly to patients and to perform clinical tasks, such as taking impressions related to fitting dentures.

**Common data sources**

National dental competent authorities register oral health clinicians. Data may come from Eurostat, WHO Global Oral Health Data Bank, OCDE, European Regional Organisation of the Federation Dentaire Internationale and from the Council of European Chief Dental Officers.

**Recommended data collection methods**

Analysing secondary data from regulatory information.

**Use of the indicator**

The indicator is used for workforce planning.

**Recommended formats of presentation**

- Total number
  - Active dentists (& dental specialists) by gender, age;
  - Auxiliaries, dental hygienists, dental nurses/therapists, denturists, others.
- Ratio per 100,000 population
  - Active dentists (& dental specialists) by gender, age;
  - Auxiliaries, dental hygienists, dental nurses/therapists, denturists, others.

**References**

Satisfaction with the Quality of Care Given

Rationale
Reformed health care systems should assure that health care services conform to acceptable standards of care. The dental profession is dedicated to providing high quality, accessible, cost-effective health care to all in need. Such health oral care in Europe is not equally accessible to all, especially for the uninsured, migrants and deprived communities. The scope of basic health care services provided should be determined by public policy, influenced by health care professionals and consumers. In addition, dentists’ satisfaction plays a more central role for primary oral care physicians. It also takes place at office/practice level. Practices that do wish to audit dentist perceptions can acquire customized surveys to identify issues specific to the nuances of their practice, to identify services that they may need to add to the practice, to reinforce areas of excellent performance and to substantiate suspected problems. Data on dentist satisfaction is poorly collected by various entities, for different purposes and at different levels in the health care system – including health plans, and physician practices.

Definition of indicator
Perceived satisfaction of dentists with the quality of care given to the patients by aspect of care – global, preventive, curative, and orthodontics.

Numerator: Number of dentists who claim satisfaction with the quality of care given to the patients by aspect of care – global, curative, preventive and orthodontics.

Denominator: Total number of dentists surveyed.

Definition of terms
Satisfaction: Attitudinal response to value judgments that dentists make about their clinical encounters.
Quality of medical care: The degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge (USAID, 1999). Quality of care is that component of the difference between efficacy and effectiveness that can be attributed to care providers, taking account of the environment in which they work.

Common data sources
None.

Recommended data collection methods
Dentists-based interview surveys. A one year period is advised for the collection of information at national level. They will need to be developed as self administrated
VAS/questionnaire, administered in a routine data collection, non need of specialized personnel to collect data. As they relate to a subjective variable, satisfaction data should be collected from different dentist groups, to make them more representative and to improve validity of the sampling. Special attention has to be paid to the cultural meaning of the words used in the design of the VAS/questionnaire.

Perceived satisfaction of quality of care given by self-rating with a Visual Analog Scale (VAS) with anchors words (completely dissatisfied to completely satisfied) set at each extreme on a scale from 0 to 100. Individual scores are then quantified statistically evaluated. An alternative technique is to use a self-administrated questionnaire with multiple choice standardized questions.

Use of the indicator

This indicator is a subjective variable, useful to assess dentists’ perception of the quality of systems for the provision of dental services, with regards to any clinical specialty. It identifies and measures the attitudes, satisfaction and quality of life related to dental treatments, and to assess the efficacy of a Dental Service System. Satisfaction measurement is still being used primarily to monitor and improve service excellence and to play in planning for health care reform.

Recommended formats of presentation

Tabulated data of the level of satisfaction of dentists by aspect of care (global, curative, preventive and orthodontics) and by age, gender, location are recommended.

References

Satisfaction with the Remuneration Provided

Rationale

Cost-related factors appear to be one of the major determinants of professional mobility in the framework of the reform of health care systems. In the same way, cost related factors appear influenced clinical decision-making in dentistry. Quality insurance and consumer protection are strongly related to the allocation of resources. There are many different payment mechanisms for dentistry in the member states of the European Union. They include: “a la carte” fees and capitation, with or without the reimbursement of third-party payers. One interesting aspect of fee-induced clinical decisions is that including preventive items in the calculation of indices and fees, can lead dental practitioners to preventive-oriented practice. Information on satisfaction of dentists related to remuneration is poorly available in Europe.

Definition

Perceived satisfaction of dentists to their total remuneration and from preventive and restorative care.

Numerator: Number of dentists who claim they are satisfied with their total remuneration and from preventive and restorative care.

Denominator: Total number of dentists.

Definition of important terms

Payment: The allocation of resources (usually money) to health sector organizations and individuals in return for some activity (e.g. delivering services, managing organizations) (World Bank, 2000). Payment encompasses both funding and remuneration (World Bank, 2000). Forms of payment include budgets, capitation, case-based payments, fee-for-service, per-diem charges and salary.

Remuneration: Refers to the activity of compensating health professionals for their time and effort in providing care (World Bank, 2000).

Capitation: A fixed payment to a provider for each listed or enrolled person served per period of time (OECD, 1992). A payment mechanism whereby an organization receives a fixed, pre-specified amount of money per time period (e.g. month, year) for each individual for which it is responsible for meeting defined health needs (e.g. primary care, primary and secondary care), regardless of the volume of services rendered (World Bank, 2000).

Fee-for-service: Payments to a provider for each act or service rendered (OECD, 1992). A payment mechanism whereby a provider or health care organization receives a payment each time a reimbursable service is provided (e.g., office visit, surgical procedure, diagnostic test, etc.) (World Bank, 2000). Refers to a method of reimbursing the provider, the provider is paid for each separate service to a patient according to a list of fees. (WHO, 1998; Alban & Christiansen, 1995).
Satisfaction: Attitudinal response to value judgments that professional make about their remuneration.

Common data sources
National practice survey; Self administrated questionnaire.

Recommended data collection methods
National and/or regional oral health care providers based interview surveys.

Use of the indicator
The indicator may be used to evaluate, to identify and measure the attitudes, satisfaction, decision making related to fee and remuneration, and to assess the efficacy of payment systems for oral health care.

Recommended formats of presentation
Percent of dentists by age, sex and location cross by level of satisfaction and type of practice (global, preventive and restorative care).

References
Part D

Indicators for Monitoring
the Oral Health Quality of Life
Oral Disadvantage due to Functional Limitation

Rationale
Physical functioning together with social functioning is one of the dimensions of oral health related quality of life. Dissatisfaction with ability to chew (subjective measure) and difficulty to chew hard foods (objective measure) have been found to be strongly related to socio-economic level, low income being a strong predictor of dissatisfaction with oral functioning measure. Studies have also shown that large proportions of adults wearing dentures – ranging from 25% to 70% across the seven countries of the WHO International Collaborative II studies – experience difficulty in eating and speaking clearly because of their denture. Difficulty in chewing can lead to nutritional problems and affect general health; this is particularly true with the older population groups. It can also profoundly affect their social life, people avoiding getting together around meals, an important component of social behaviour in aging population. Measures of oral pain and oral functional limitation were more strongly predictive of oral disadvantage than disease and tissue damage antecedents. Surveillance of oral disadvantage due to functional limitation has implications regarding the use of oral disadvantage to assess the long-term effectiveness of dental care.

Definition of indicator
Proportion of subjects aged 8-65 years or older who has experienced difficulties in eating and chewing because of problems with mouth, teeth or dentures of any grade in the past 12 months.

Numerator: Number of subjects aged 8-65 years or older who has experienced difficulties in eating and chewing because of problems with mouth, teeth or dentures of any grade in the past 12 months.

Denominator: Total number of subjects surveyed.

To collect this information every person in the study group should be asked “How often during the past 12 months have you experienced difficulties with eating and chewing food due to mouth and teeth problems?”

Information is recorded on a 5-point scale: never = 0, hardly ever = 1, occasionally = 2, fairly often = 4, very often = 5.

Definition of important terms
Experienced difficulties: A person who has difficulty in chewing hard food or swallowing may discomfort while eating, postpone eating time, take more time to eat and drink, restrict from eating or drinking.

Oral disadvantage can be defined as the avoidance of certain daily activities because of decrements in oral health. These decrements include oral disease and tissue damage, pain, and functional limitation. The incidence of oral disadvantage is substantial and consistent with the notion that oral health has a substantial impact on quality of life.
Common data sources

None.

Recommended data collection methods

Data should be collected by reviewing scientific literature reporting oral health related quality of life research, house-hold surveys, patient records, epidemiological surveys by integration of questions in the clinical questionnaire.

Use of the indicator

Whereas the subjective measure of functional limitation will be captured by the following variable described in this section of the catalogue, “perceived pain or discomfort because of teeth, mouth or dentures” this variable is measuring the objective dimension of the functional limitation. Both variables should be considered for a better understanding of the problem and for the evaluation of the outcome dimension of a given oral care system.

Recommended formats of presentation

Data should be presented by age-group. Standard and preferred recommended age-groups are 12-14, 35-44 and 65 or more. Stratification by gender, socio-economic and education level is recommended.

References

Physical Pain due to Oral Health Status

Rationale
A growing emphasis on subjective health status and quality of life is reflected in national health policies. Clinical signs of disease represent only one aspect of overall health, and increasingly researchers have begun to include subjective evaluations of function and well-being when describing the health of patients or populations. Quality of life is affected in some way by oral health in the majority of people so understanding the relationship between age-related, dental and cultural influences on quality of life has relevance if we wish to measure oral health inequalities within and between populations. Persons who relied solely on public-funded dental care reported increased levels of negative social impact of their oral health, such as experience of toothache, frequency of feeling uncomfortable with their dental appearance and avoiding some foods. At an individual level, an understanding of how age and tooth retention affect the impact of oral health on daily activities may inform the delivery of appropriate oral health services. Results from oral health imply that pain may play a central role in mediating transitions among subcategories of the International Classification of Functioning, Disability and Health. It would suggest that many aspects of diminished oral function are self-limiting in the absence of pain. Surveillance of physical pain due to oral health status has implications for tertiary prevention interventions that target symptomatic conditions to avert disabilities or handicaps as well in children as in adulthood.

Definition of indicator
Proportion of subjects aged 8-65 years or older who have perceived pain or discomfort because of teeth, mouth or dentures of any grade in the past 12 months.

Numerator: Number of subjects aged 8-65 years or older who have perceived pain or discomfort because of teeth, mouth or dentures of any grade in the past 12 months.

Denominator: Total number of subjects surveyed.

The recommended wording of the question to be asked is “How often have you experienced toothache/painful gums/sore spots in the past 12 months?” Information is recorded on a 5-point scale: never = 0, hardly ever = 1, occasionally = 2, fairly often = 4, very often = 5.

Definition of important terms
Pain: The range of unpleasant bodily sensations produced by illness or by harmful physical contact. Chronic or persistent pain is commonly associated with injury, cancer and chronic non-malignant diseases such as arthritis. Regardless of the underlying cause, persistence of pain after treatment is commonly associated with distress, disability, and high rates of health service utilisation.

Discomfort: An uncomfortable feeling in some part of the body.
Common data sources

None.

Recommended data collection methods

Data collected through questionnaire/interview surveys at national, regional or local level and/or from literature review.

Use of the indicator

It contributes to improve the proportion of European with oral illness who reports a satisfactory level of oral health-related quality of life and:

- To measure the perceived (subjective) pain or discomfort because of teeth, mouth or dentures in the population (groups) in European countries;
- To compare perceived pain or discomfort because of teeth, mouth or dentures in the European countries;
- To move beyond classification and quantification in population health surveys to evaluate interventions that may improve health outcomes.

Recommended formats of presentation

Data should be presented by age-group. Standard and preferred recommended age-groups are 12-14, 35-44 and 65 or more. Stratification by gender, socio-economic and education level is recommended.

References

Psychological Discomfort due to Oral Health Status

Rationale
Clinical studies using patient-based outcome measures have shown that they can provide new information about the effectiveness of different treatments. Evaluations based on public’s perceptions and concerns by use of questionnaires, interviews and other related methods are cost-effective compared to oral health evaluations based on dental screenings by professionals. Such measures are now generally accepted as the ultimate outcome of the oral health care system. The concept of OHRQoL has been confirmed and validated cross-culturally by the ICSII study (Comparing Oral Health Care Systems, a second international collaborative study) in the context of a multinational investigation of oral health determinants and outcomes. If possible, a limited set of instruments should be recommended for use, and generally they should be efficient, easy to complete and easy to handle. This indicator is tapping the psychological discomfort dimension according to a conceptual framework derived from the International Classification of Impairments, Disabilities and Handicaps (ICIDH) developed by WHO in 1980. The rationale for the present indicator is to measure to what extent people have felt psychological discomfort because of problems with mouth, teeth or dentures.

Definition of indicator
Proportion of subjects aged 8-65 years or older who has felt tense because of problems with mouth, teeth or dentures of any grade in the past 12 months.

Numerator: Number of subjects aged 8-65 years or older who has felt tense because of problems with mouth, teeth or dentures of any grade in the past 12 months.

Denominator: Total number of subjects surveyed.

The question to be asked should be: How often have you felt tense because of teeth, mouth or denture problems in the past 12 months? , and should be recorded on a 5-point scale (0 = never, 1 = hardly ever, 2 = occasionally, 3 = fairly often and 4 = very often).

Definition of important terms
Feeling tense is an emotional response experienced as an unpleasant feeling of bodily tenseness.

Oral Health Impact Profile (OHIP-14) is a shortened version of the original socio-dental indicator OHIP-49. It is developed to estimate the extent to which dental and oral conditions disrupt an individual’s quality of life. The OHIP-14 is efficient, easy to complete, has been widely tested and found both reliable and valid in many different populations.

Common data sources
None.
Recommended data collection methods

Data should be collected by household surveys, patient records, and epidemiological surveys by integration of questions in the clinical questionnaire.

Use of the indicator

- To compare the effect of problems with teeth, mouth or denture on psychological discomfort in different populations (groups) in Europe;
- To explore changes in psychological discomfort in clinical follow-up studies and evaluative studies;
- To be able to explore multiple dimensions of OHRQoL and compare with already existing data; the OHIP-14 scale is recommended (CHILD-OHIP for children).

Recommended formats of presentation

Data should be presented by age-group. Standard and preferred recommended age-groups are 12-14, 35-44 and 65 or more. Stratification by gender, socio-economic and education level and levels of frequencies: never, hardly ever, occasionally, fairly often, and very often is recommended.

References

Psychological Disability due to Appearance of Teeth or Dentures

Rationale
Oral diseases have a substantial impact on the wellbeing of individuals and populations because of several special features of the structure and function of the mouth. From an early age, the mouth and face have powerful influences on psychological wellbeing and social interactions. Aesthetics, malocclusions, poor periodontal conditions, edentulousness have profound psychological and sociological significance for adolescents, adults and families. Tooth loss was associated with subjective oral health deficits in populations. Evaluations based on public’s perceptions and concerns by use of questionnaires, interviews and other related methods are cost-effective compared to oral health evaluations based on dental screenings by professionals. Patient based outcome measures are now generally accepted as the ultimate outcome of the oral health care system. This indicator is tapping the psychological disability dimension according to a conceptual framework derived from the International Classification of Impairments, Disabilities and Handicaps (ICIDH) developed by WHO in 1980. The rationale for the present indicator is to measure to what extent people have felt psychological disability because of appearance of teeth or dentures.

Definition of indicator
Proportion of subjects aged 8-65 years or older who has felt psychological disability because of appearance of teeth or dentures in the past 12 months.

**Numerator:** Number of subjects aged 8-65 years or older who has felt psychological disability because of appearance of teeth or dentures in the past 12 months.

**Denominator:** Total number of subjects surveyed.

The question to be asked should be: *How often have you felt embarrassed because of the appearance of your teeth or dentures in the past 12 months,* and should be recorded on a 5-point scale (0 = never, 1 = hardly ever, 2 = occasionally, 3 = fairly often and 4 = very often).

Definition of important terms
*Feeling embarrassed* is an emotional response causing avoidance of specific behaviour due to shyness.

*Oral Health Impact Profile (OHIP-14)* is a shortened version of the original socio-dental indicator OHIP-49. It is developed to estimate the extent to which dental and oral conditions disrupt an individual’s quality of life. The OHIP-14 is efficient, easy to complete, has been widely tested and found both reliable and valid in many different populations. To explore multiple dimensions the OHIP-14 scale is recommended among adults. Specific instruments for children are described. Specific instruments for children are described in “Assessing the impact of oral health on the life quality of children: implications for research and practice (2004).”
**Common data sources**

None.

**Recommended data collection methods**

Data should be collected by reviewing scientific literature reporting oral health related quality of life research, household surveys, patient records, epidemiological surveys by integration of questions in the clinical questionnaire.

**Use of the indicator**

- To compare the effect of problems with teeth, mouth or denture on *psychological disability* in different populations (groups) in Europe;
- To explore changes in *psychological disability* in clinical follow-up studies and evaluative studies;
- To be able to explore multiple dimensions of OHRQoL and compare with already existing data.

**Recommended formats of presentation**

Data should be presented by age-group. Standard and preferred recommended age-groups are 12-14, 35-44 and 65 or more. Stratification by gender, socio-economic and education level is recommended.

**References**

Social Disability due to Oral Health Status

Rationale
Interest in the outcome of oral health problems has been the subject of significant public health activity over the past ten or so years. Oral healthcare researchers and policymakers have recognized that assessment of oral health outcomes is vital to planning oral healthcare programmes. In oral health economics, quality of life measures have become the standard means of assessing the outcome of health care interventions. The addition of quality of life enlightens our understanding of the importance of oral health to the individual’s as well as the society’s well-being. A strong measurement of the social impact of oral diseases is an evaluation of the number of persons prevented from performing their normal activities due to oral health problems. This dimension of social functioning should be studied together with the variable related to communication restriction in relation to oral status.

Definition of indicator
Proportion of subjects aged 18-65 years who has perceived difficulties in doing their normal daily work because of acute or chronic oral problems of any grade in the past 12 months.

Proportion of the children and adolescent aged 8-17 who has perceived difficulties in attending school and being well functioning in school due to acute and chronic oral problems of any grade in the past 12 months.

Numerator: Number of subjects aged 8-65 years prevented from performing daily activities of any grade in the past 12 months.

Denominator: Total number of subjects within a population or a given age group surveyed.

The question to be asked should be: How often did you have difficulties carrying out major work/schoolwork because of problems with mouth or teeth in the last 12 months? and should be recorded on a 5-point scale (0 = never, 1 = hardly ever, 2 = occasionally, 3 = fairly often and 4 = very often).

Definition of important terms
Oral health-related quality of life: Concept refers to self-reports specifically pertaining to oral health, and captures both the functional, social and psychological impacts of oral disease. The various OHRQoL indicators are to varying extent based on a conceptual framework derived from the International Classification of Impairments, Disabilities and Handicaps (ICIDH) developed by WHO in 1980. The ICIDH model consists of the following key concepts: impairments, functional limitations, pain, disability and handicap. It provides a theoretical basis for the empirical exploration of the links between various dimensions of health and oral health. The concept of OHRQoL has been confirmed and validated cross-culturally by the ICSII study (Comparing Oral Health Care Systems, a second international collaborative study) in the context of a multinational investigation of oral health determinants and outcomes, coordinated by WHO.
**Oral Health Impact Profile (OHIP-14)** is a shortened version of the original socio-dental indicator OHIP-49. It is efficient, easy to complete, has been widely tested and found both reliable and valid in many different populations. The OHIP-14 is therefore recommended for use in adult populations. For measurement of OHRQoL among children scales specifically developed for these age groups should be used. The single indicators presented in the OHRoL group are all conceptually based on the dimensions covered by the OHIP scale: Functional limitation, Physical pain, Psychological discomfort, Physical disability and social disability.

**Carrying out major work:** Doing usual adults job either professional work or usual work at home.

**Carrying out schoolwork:** Being able to attend school. Being well functioning and concentrated while being in school

**Common data sources**
None.

**Recommended data collection methods**
Data should be collected house-hold surveys, patient records, and epidemiological surveys by integration of questions in the clinical questionnaire.

**Use of the indicator**
- Adults: To measure to which extent oral disorders disrupt the possibility of doing normal daily work;
- Children: To measure to which extent oral disorders disrupt the possibility of attending school and being well functioning in school;
- To or in school among European countries compare the effect of oral disorders on social disability in terms of difficulties doing usual job at work

**Recommended formats of presentation**
The indicator may be presented in relation to age, gender, socio-economic and education factors. Standard and preferred recommended age-groups are 12-14, 35-44. Units of measurements are “Proportion of the adult or child population who has perceived difficulties in doing their normal daily work/schoolwork because of acute or chronic oral problems”.

**References**
Contact

Professor Denis Bourgeois
EU Project Leader
Department of Public Health
Dental Faculty
University of Lyon
Rue Paradin
69372 Lyon
France

denis.bourgeois@adm.univ-lyon1.fr