

Project
'Health Surveys in the EU: HIS and HIS/HES evaluations and models'

HEALTH EXAMINATION SURVEYS (HES)
Review of literature and inventory of surveys in the EU/EFTA
Member States

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HIS/HES	2
<i>ABSTRACT</i>	4
<i>INTRODUCTION</i>	5
<i>AIMS AND USE OF HEALTH EXAMINATION SURVEYS</i>	6
<i>DEVELOPMENT OF HEALTH EXAMINATION SURVEY METHODS</i>	8
<i>AIMS OF THE REVIEW AND THE INVENTORY</i>	13
<i>METHODS</i>	13
<i>RESULTS</i>	16
COMBINED HIS/HES IN EU/EFTA MEMBER STATES	16
METHODOLOGY AND CONTENTS OF NATIONAL HIS/HES	19
COUNTRIES WITHOUT NATIONAL HES	23
HIS/HES IN EU/EFTA MEMBER STATES	24
AUSTRIA	24
BELGIUM	25
DENMARK	26
FINLAND	26
FRANCE	27
GERMANY	29
GREECE	30
ICELAND	30
IRELAND	31
ITALY	32
LIECHTENSTEIN	33
LUXEMBOURG	33
NETHERLANDS	33
NORWAY	34
PORTUGAL	35
SPAIN	36
SWEDEN	36
SWITZERLAND	38
UNITED KINGDOM	38
EXAMPLES OF MAJOR HIS/HES IN SOME OTHER COUNTRIES	41
USA National Health and Nutrition Examination Survey, NHANES	41
Focused/regional HES in the USA	41
Other major Health Examination Surveys outside EU/EFTA Countries	43
INTERNATIONAL MULTICENTRE SURVEYS	44
MENTAL HEALTH SURVEYS	46
ORAL HEALTH SURVEYS	47
SURVEYS ON CHILDREN'S AND ADOLESCENT'S HEALTH	48
SURVEYS ON AGING	48
INTERNATIONAL POOLING STUDIES	49
OTHER INTERNATIONAL PROJECTS WITH HES METHODOLOGY	50
<i>DISCUSSION AND CONCLUSIONS</i>	51

Appendices

Appendix 1 Search protocol

Appendix 2 Tables

Table 1 National HIS/HES in EU/EFTA Member States

Table 2 National HIS/HES in planning/pilot stage in EU/EFTA Member States

Table 3 Examples of major HES outside Europe

Table 4 Major regional/local HIS/HES in EU/EFTA Member States

Table 5 Major International Multicentre HIS/HES in Europe

Appendix 3 Contact persons/core group members for this HIS/HES inventory

Appendix 4 Abbreviations

Appendix 5 Questionnaires of the HES inventory

ABSTRACT

This review and evaluation of HIS/HES surveys in Europe is part of the first phase of the HMP funded project **Health Surveys in the EU: HIS and HIS/HES evaluations and models**. The final overall project aim is to develop comprehensive and comparable health measurement for health surveys in the EU and the Member States by developing models for surveys, which combine the health interview and the health examination. It is intended that models of varying intensity will be developed for the different circumstances in the Member States. This report, together with the updated report on HIS in EU/EFTA Member States, provides an overview of previous, current and planned national health surveys. A computerised health survey data base and a European network for development and testing of proposed HIS/HES methodologies has also been created during the project.

Relevant literature was retrieved by using several databases. Collection of information about ongoing and planned activities as well as on methods used also relied on personal communication, and a systematic postal survey covering all EU/EFTA Member States. Questionnaires were sent to contact persons for each initially identified national HES and for further surveys identified during the inventory. For countries without national HESs, another questionnaire was used to obtain information about previous and planned HESs, reasons for not carrying out national HESs and the respondent's opinions on usefulness of HES, and the perceived need to develop a standardised core module for HES in Europe.

National population based HESs with a comprehensive focus have been conducted at regular or irregular intervals in five countries (Finland, Germany, Ireland, the Netherlands and UK) and in a large region in one country (Catalonia, Spain). In these countries several local, regional and/or focused surveys have been carried out previously or in parallel to the national HESs. All of these national HESs include a HIS component preceding or parallel to the HES. National surveys in the planning or pilot stage were identified in four countries (France, Italy, Norway, and Sweden) and there are some preliminary plans for a national survey in one more country (Portugal). More focused and geographically limited HESs have been carried out in almost all EU/EFTA countries. The major reason given for not carrying out national HESs until now was the high expense or the difficulties in implementing fieldwork. However, all respondents from countries without national HESs considered that such national HESs are necessary. Most respondents felt that there is a need to develop a core module for HES in Europe.

The HIS/HES may be carried out according to different models. The survey may include an interview with single measurements and/or blood samples or a comprehensive health examination taking several hours to complete. Differences in the fieldwork phase limit comparability of results of the surveys. There are also important differences between sampling frames. There is a clear emphasis on CVD in both national and regional/local surveys, but other health status components have also been covered, most often respiratory diseases and diabetes. Mental and dental health issues are often the subject of separate surveys. Diagnostic interviews for mental health have been part of the general HIS/HESs in three countries, while specific surveys have been carried out in two other countries. Dental health has been studied only in one national HIS/HES.

So far little attention has been paid to the comparability across countries of findings of national HIS/HES. To improve comparability there is a need for better standardisation concerning individual examination methods and measurements. Also, the survey protocols in general must be improved. Individual methods can be developed, and they have already been developed in disease specific studies, but the feasibility of these methods needs to be tested in existing national HESs. Collaboration and co-ordination is needed to promote comprehensive health monitoring at the European level. One part of this is joint evaluation and development of health examinations and their methods. These collaborative analyses and development efforts will be the core of the second phase of this project.

INTRODUCTION

National **health interview surveys (HIS)** are regularly being carried out in 14 of the 18 EU/Efta Member States (Hupkens & Swinkels 2001). HISs deliver valuable information on health and health related topics and interviews and questionnaires are the only way to obtain data on e.g. symptoms and health related behaviour. However, clinical measurement is needed to obtain valid information on many chronic conditions, functional limitations and disabilities, and on several key health determinants. Such data are not available from regular statistical sources and the information can only be obtained by carrying out **health examination surveys (HES)** or by supplementing the HIS by HES methods. Examples of conditions which cannot be sufficiently, reliably and validly assessed by typical HISs are musculoskeletal diseases, mental health problems, functional limitations, and many risk and protective factors. Comprehensive, reliable, valid and comparable Community Health Indicators can only be obtained by using both HIS and HES methods.

Several recommendations have been made, or are being developed for HISs in order to improve the reliability and comparability of findings. Some of these have already been documented (WHO 1996) and more recommendations are currently being developed by the WHO Eurohis project. An inventory of the methods and contents of national health and health related interview surveys in each of the EU Member States was carried out in 1994-1996 (Hupkens 1997). One of the purposes was to facilitate harmonisation activities in order to improve comparability. From each EU country at least one HIS was identified (altogether 78 surveys were reviewed). Other inventories have been made on surveys on specific health topics, i.e. surveys with a mental health component (Hibbet et al 1999) and questions/instruments covering health conditions and disability in national surveys (Gudex & Lafortune 2000). The International Network on Health Expectancy (REVES) was formed in 1989, and the Euro-REVES project was initiated in 1993. In the current Euro-REVES II the target areas are physical and sensory functional limitations, activity restriction in daily life and a global indicator of self-perceived health. European health surveys are reviewed and the aim is to make recommendations on the optimal form of the questions and choice of individual items. (Jagger et al 1998) None of these inventories has covered HES methods.

Several multicentre, multinational studies within Europe have been conducted focusing on specific diseases and disease groups, e.g. on cardiovascular diseases (e.g. the WHO MONICA-project), respiratory diseases (the ECRH study) and osteoporosis (the EVOS-project). The main purpose of these international surveys has been epidemiological analysis, but they can to some extent be used for general health monitoring purposes. Some of these studies have suffered from low participation rates in several countries. O'Neill et al (1995) assume that variation in response rates results both from true population differences as well as from inherent differences in survey methodology, despite of the attempts at cross national standardisation in survey design.

There is no recent review and evaluation of HES in Europe. The U.S. National Centre for Health Statistics has gathered information for an International Health Data Reference Guide (NCHS 2000) which covers 39 nations. However, even the latest 2000 edition of this guide does not contain accurate comprehensive information on HIS/HES in the European countries.

The European Health Risk Monitoring -project was launched in 2000 to plan indicators and mechanisms for co-ordinated standardised national population risk factor surveys, based on the extensive experience in the MONICA and CINDI projects. These surveys have both a HIS and a HES component. The project focuses on CVD risk factors. A review of these risk factor

surveys will be conducted and an assessment of comparability of the methods, results and indicators used in reporting of the surveys will be published.

From the point of view of international and intersurvey comparability, some HES contents and methods have been well standardised, but the majority have not. The well-standardised ones are mainly those relating to cardiovascular diseases such as blood pressure measurement, anthropometric measurements, serum cholesterol measurement, and ECG recording and coding. There are also widely accepted recommendations concerning these measurements. Despite standardisation efforts experience has shown that interobserver variability is a major problem, which hampers also international comparability.

This review and evaluation of HIS/HES surveys in Europe is part of the first phase of the the EU-HMP funded project **Health Surveys in the EU: HIS and HIS/HES evaluations and models**. The final overall project aim is to develop comprehensive and comparable health measurement for health surveys in the EU and the Member States by developing models for surveys, which combine the health interview and the health examination. It is intended that models of varying intensity will be developed for the different circumstances in the Member States. This report, together with the updated report on HIS in EU/EFTA Member States (Hupkens 2001), will give an overview of previous, current and planned national health surveys.

A computerised up to date health survey data base and a European network for development and testing of proposed HIS/HES methodologies has also been created during the project. The results of and developments during phase 1 lay the foundation for the work of phase 2, which is intended to result in evaluation and recommendations on major HIS/HES instruments and measurements. Ongoing development of methods and instruments by other EU-HM projects and the indicator framework defined by the project on Community Health Indicators (ECHI) will be taken into account.

AIMS AND USE OF HEALTH EXAMINATION SURVEYS

Data for health monitoring can be obtained from different sources, most importantly from registers, routine statistics and from health surveys. Mortality and morbidity statistics or statistics on the use of hospitals and other health care services have an important role in health monitoring and epidemiological research. However, it is generally acknowledged that morbidity and mortality statistics can only indicate where the main problems of chronic disease lie and suggest hypothesis for further investigation (Rose & Blackburn 1968). Personal interview, examination and follow-up of suitable populations is needed to test and extend these findings, and to collect more direct evidence on associations between current health and personal characteristics or behaviour, and in longitudinal studies even evidence on causation.

Regular statistical sources and registers, e.g. hospital discharge registers and general practice registers, can give an overview of morbidity and provide valuable data for the evaluation of health care services. However, such data from health care institutions is too limited for health monitoring purposes due to the fact that the hospital and the population pictures of disease may be very different. Health care services never cover total populations despite of efforts to ensure easy access in primary health care systems. Use of health services is associated with the organisation and delivery of services, and the social and employment status of the population (Kasper 1998). Population based health interview and health examination surveys

can overcome some of this selection bias of health service users compared to the total population, if measures are taken to ensure active participation in all population groups.

In a national health interview survey (HIS) a sample of the general population is selected as a random sample of households and/or individuals (Armitage 1976). Trained interviewers are normally used, but there may also be some self-completed questionnaires. In some countries, continuous health surveys form part of a multi-purpose socio-economic surveys system. HIS typically cover topics like health status, life style and health habits, living and working conditions, health protection, and demographic and other social factors (Hupkens 1998).

Diagnoses are often underreported or overreported in HISs (Heliövaara et al 1991, Fisher et al 1996, Kasper 1998, ILSA 1997). Some diseases or conditions do not manifest through symptoms (e.g. hypertension), the symptoms may be difficult to specify through responses to questions (e.g. visual or auditory acuity) or there is a recall bias (e.g. infections and immunisations). The results of physical examination and subjective reporting of pain and disability can differ substantially (Michel et al 1997). There is evidence of under-reporting weight and over- or under-reporting height in self-reports compared to actual measurements (Bolton-Smith et al 2000).

Health examination surveys (HES) involve physical examinations, clinical and laboratory tests and various other technical/psychological measurements/tests. A central battery of tests and assays for HES includes anthropometric measurements, physical examination results (including assessment of disability), interview, and a laboratory component. HESs attempt to accurately measure the prevalence of selected diseases, conditions and risk factors. HESs can provide continuous monitoring of many physical, physiological and psychological characteristics of a population.

HESs were first developed in the 1940s and 1950s to monitor the increasing prevalence of chronic diseases. However, even more important was their use as tools for epidemiologic analyses. In the 1950s and 1960s experimental use of HESs in screening and/or health monitoring was speeded up by the development of laboratory automation (e.g. Socialstyrelsen 1968). Nowadays HESs address a full range of health issues, including nutritional status, prevalence and extent of disability, prevalence of selected infectious diseases and immunisation status in addition to chronic non-communicable diseases. A national population-based HES can at its best cover many common diseases and conditions. HESs may contribute to the understanding of a rare disease through an assessment of the prevalence of risk factors, e.g. smoking as a risk factor for cancer. HESs are also important as bases for longitudinal surveys, which overcome the limitations of cross-sectional surveys in analytic epidemiology.

HES is more expensive and logistically more demanding than HIS, as it requires a variety of highly qualified and specially trained personnel and careful quality control programmes. Safeguarding of confidentiality of information is extremely important and liaison with health service personnel at the examination sites is needed. HES is typically integrated with HIS data collection, sometimes with a smaller sample due to these demands in the design and procedures. (Armitage 1976, Fisher et al 1996)

In 1975 a conference was held to discuss the possibilities for collaborative action between countries of the European Community in conducting various forms of health surveys. At that time local HESs had been carried out for screening purposes or for monitoring purposes in many European countries. However, it was concluded that health examination surveys (HESs)

are less likely to be developed widely in the immediate future than health interview surveys (HISs). This was thought to be due to the higher cost of HES, lack of experience and the absence of an infrastructure to which HESs could be attached. It was suggested that the possibility of future developments should be retained (Armitage 1976).

DEVELOPMENT OF HEALTH EXAMINATION SURVEY METHODS

Major health problems in European countries include cardiovascular diseases, respiratory diseases and allergy, musculoskeletal diseases, and mental health disorders. The prevalence of dementia in the elderly is comparatively high and the burden caused by dementia for both professional and family caregivers is considerable. Model protocols for field surveys, and methods and instruments to measure the prevalence and incidence of these health problems, and the functional limitations related to them, have been developed at varying levels of intensity and specificity for the different health problems. However, comparability of methods used in different studies and different countries leaves much to be desired.

Dowse and Zimmet (1992) have developed a model protocol for **diabetes and other noncommunicable disease** (hypertension and coronary heart disease) field surveys. The protocol includes practical examples and a survey manual based on the writers' cumulative experience mainly in developing countries. They recommend simple random samples or sample stratification, and suggest strategies to ensure high response, to standardise simple procedures (blood glucose samples, glucose loads, height, weight, waist and hip circumference measurements, blood pressure measurements and resting ECGs), and to improve quality control and ethics in the surveys.

HES methods related to **cardiovascular diseases and their risk factors**, such as blood pressure measurement and skin fold measurement, have been well standardised. Development of these methods has been intensive since the 1950's. The first manual of methods for use in epidemiological studies of cardiovascular diseases was prepared in the 1960s and published by WHO (Rose & Blackburn 1968). This manual has later been edited in 1982 (Rose et al 1982). It has been acknowledged that measurements that seem to be deceptively simple are influenced by a host of characteristics (Stamler 1989). The blood pressure measurement is influenced by e.g. time of day, time since last meal, ambient temperature (both inside and outside), prior exercise, state of the emptiness of the bladder, cigarette smoking, familiarity with the procedure, and interplay between examiner and examinee. Even with extensive efforts at standardisation, differences in readings among examiners are hard to eradicate completely.

Several international studies have had an important role in the development of cardiovascular survey methods. One of the first studies is the Seven Countries Study. Later standardised methods, procedures and assessment of quality of data have been developed during the WHO MONICA cardiovascular risk factor surveys. (Böthig et al 1989)

Epidemiological techniques for measuring the prevalence of **diabetes** are also well developed (Fisher et al 1996). Standardised criteria for the diagnosis of diabetes mellitus and impaired glucose tolerance were developed by the U.S. National Diabetes Data Group in 1979 and by WHO in 1980 and updated in 1985. During the late 1970s and throughout the 1980s, an increasing number of investigators undertook population based field surveys of glucose intolerance. It was concluded (King & Rewers 1993) that for diabetes in adults, which may often remain asymptomatic and undetected in routine clinical practice, only such surveys can reveal the true frequency of the disease.

The American Diabetes Association (ADA 1997) published new diagnostic criteria and recommendations for epidemiological studies in 1997. The WHO criteria were later revised, too (Alberti et al 1998, Alberti et al 1999). Analysis of previous studies in Europe (DECODE 1998, DECODE 1999) showed that revising the diagnostic criteria as proposed by ADA changes the prevalence of diabetes. In some populations the prevalence becomes higher while in others it becomes lower than by the WHO criteria. The overlap between individuals diagnosed as diabetics according to the new revised or the older WHO criteria, was also found to be poor and survival of individuals diagnosed as diabetics was different.

Measurements of **respiratory function** have been included in national and regional health examination surveys in several countries. These and other respiratory health surveys have mainly focused on chronic bronchitis and asthma. Recommendations for the measurements of ventilatory function and sputum volume were given as a part of the cardiovascular survey methods already in the 1960s (Rose & Blackburn 1968). Standardised symptom questionnaires were developed by Fletcher and colleagues (Fletcher et al 1978). Recently standardised methods for respiratory health surveys have been developed during the European Community Respiratory Health Survey (ECRHS). This methodological development is problematic since even the most recent definition of asthma cannot be fully applied to epidemiological research, due to absence of an objective and non-invasive measurement of airflow limitation. Population studies using clinical measurements have shown that asthma is often underdiagnosed and undertreated (e.g. de Marco et al 1998)

Standardised methods for **dental/oral health surveys** have been developed since the 1970s. Two large series of investigations, the first (between 1973 and 1981) and the second (between 1988-1992) International Collaborative studies (ICS I and ICS II), have been performed under the auspices of the WHO. Standardised self-administered and interviewer administered questionnaires, and clinical oral examinations have been developed to investigate how factors in the oral health care system, the socioenvironmental characteristics and the individual characteristics of the populations served affected oral health behaviour, oral health status and oral quality of life (Chen et al 1997). In the ICS II study oral health examinations covered dentition and periodontal status as well as treatment needs.

The development of standardised methods for **mental health surveys** has received much attention since 1960s and 1970s. The methods used have varied due to the different concepts used. There are many well-tested psychological measurements, most of these are self-administered questionnaires, e.g. the General Health Questionnaire (GHQ), developed to screen general psychological and psychiatric disorders. They are used in surveys or in clinical settings to identify potential cases, leaving the task of diagnosing actual disorder to a psychiatric interview. Depression scales are among the best established of health measurements, some of them are over 20 years old. There are both self-rating (e.g. The Center for Epidemiologic Studies Depression Scale, CES-D) and clinician-rating (e.g. the Hamilton Rating Scale for depression) scales. The clinician-rating scales are used to assess the severity of depression among diagnosed patients. (McDowell & Newell 1996) Several psychiatric symptom screening scales and diagnostic instruments have been developed in the 1980's and 90's, e.g. DIS, CIDI, SCID, PSQ and SCAN (Cottler et al 1997).

Measures of mental status and **cognitive functioning** are being increasingly applied in health surveys especially in elderly populations. There are several diagnostic guidelines for Alzheimer's disease and related dementias (Beck et al 2000). The recommended procedures and diagnostic tests differ considerably in these guidelines. Tests of cognitive function may be

divided into intelligence tests, clinical neuropsychological tests and laboratory tests. Neuropsychological tests include simple mental status screening examinations (e.g. to screen for cognitive impairment or dementia) and detailed tests of specific cognitive functions such as memory and orientation. Many of the instruments have received extensive validity and reliability testing.

Examples of clinical diagnostic procedures include the Present State Examination (PSE), the Geriatric Mental State Examination (GMS), the CERAD tests (Heyman et al 1997) and the Cambridge Mental Disorder of the Elderly Examination (CAMDEX). These examinations are administered by expert clinicians and they may include different components like a clinical interview, a set of cognitive tests and a physical examination, and an interview with a relative. Screening tests, like the Mini-Mental Status Examination, can also be administered by interviewers without professional health care education, but they cannot be used to diagnose dementia (Cummings 1993). These tests and examinations have been used in several single local population surveys but there have been only few major multicentre studies using identical methodology in a number of sites (Brayne et al 1998).

Despite their importance from the point of view of high prevalence, heavy use of health services and high costs, the epidemiology of most **musculoskeletal diseases** is not well known. So far very few epidemiological studies have included standardised physical examinations to diagnose musculoskeletal diseases and/or tests to detect functional limitations associated with these (Heliövaara et al 1989). Due to differences in methods there are limited possibilities to compare prevalences observed in various studies. Instruments like the Chronic Pain Questionnaire can be used to estimate the prevalence of low back pain (Cassidy et al 1998), but these instruments ignore the significance of comorbidity or strength of associations. For diagnosis clinical examinations are needed in addition to questionnaires (Heliövaara 1998). There is evidence for a relatively weak agreement between several orthopaedic/rheumatologic measurements and the subjective reporting of back pain and disability (Michel et al 1997). Individual clinical signs may be of limited value in population studies (Main 1997).

Applicable, generally accepted methods of diagnosis in epidemiological surveys have not yet been developed. Diagnostics often requires thorough clinical and pathological anatomical examination; and even then, the diagnoses are not necessarily certain or mutually exclusive. Most musculoskeletal conditions are characterised by great variation in the severity and by the central role of pain, which is a subjective symptom. E.g. the rheumatoid arthritis (RA) diagnosis cannot always be established on the basis of one single observation; frequently it is detected only after continuous follow-up (Aho et al 1998). International diagnostic criteria for RA were developed in the 1950s by the American Rheumatism Association (ARA) (Ropes et al 1958). RA prevalence has been estimated in health surveys including serological tests and radiographs while criteria such as soft-tissue swelling have poor interobserver reproducibility (Aho et al 1998). These examples show the lack of agreement of diagnostic criteria and limited development of standardised tests feasible for studies on musculoskeletal diseases.

Since the 1950s there has been an expansion in the development of **functional assessment measures** for clinical, survey and research application (Brooks 1995, McDowell & Newell 1996). This development has been criticised for being uncoordinated and there is not yet enough comparative work on the instruments even though in 1990s there has been an increase in comparisons between measurement instruments. A large number of measures still have inadequate evidence of reliability and validity. The early instruments that cover physical functioning and performance in activities of daily living are being replaced by more

comprehensive general health status measures encompassing physical, psychological and social/role dimensions. Most of these measures are self-administered questionnaires, but some require expert clinical assessment (Brooks 1995, McDowell & Newell 1996). In view of the importance of measurement of function, functional capacity and disability as descriptors of population health it is imperative that better methods are developed and agreed upon. They should take into account existing work and the concepts presented in WHO's classifications (WHO 1980).

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AIMS OF THE REVIEW AND THE INVENTORY

This inventory of comprehensive health measurement by a combination of HIS and HES (HIS/HES), was carried out with special emphasis on HES methods. The first aim was to collect information, describe and review the current situation, experiences and development plans in Europe, and in some selected non-European countries. The second aim was to provide information for the later evaluation of the validity, reliability and comparability of current HES methods and data. Concurrently, an update of the previous inventory of HIS has been carried out and the findings have been reported elsewhere (Hupkens & Swinkels 2001).

The main aim of the HIS/HES part of the project was to describe and analyse the different models and methods used in national (sometimes regional) health examination surveys, which are carried out in order to gather valid and reliable information on major chronic conditions, functional limitations and disabilities and key health determinants in the population. The focus was on studies performed at national or international level in EU and EFTA/EEA countries. Studies in other countries (e.g. USA, Canada) have been reviewed in lesser detail in order to obtain an overview of potential models and methods that could be utilised in future comparable studies in Europe. The information on national HIS/HES in EU/EFTA countries was included into the health survey database. At this stage all other surveys have been covered only in this report.

METHODS

At first, relevant literature was retrieved by using several databases (see Appendix 1). The **literature review** was systematic and comprehensive, and used original articles and reports. However, only reports written in English, Finnish, Scandinavian languages and German were included. Collection of information about ongoing and planned activities as well as on methods used also relied on **personal communication**, and a systematic **postal survey** covering all EU/EFTA Member States. The findings of the literature search were supplemented by including studies identified by consultation with experts (core group members and other senior researchers from many EU member countries). After the first literature searches, **inclusion criteria** for the studies were specified. The criteria were:

- **National population samples** were used in the survey (not local, narrow age group, occupational group, risk or disease specific studies, except for the multicenter studies from several parts of the country). Major regional surveys were included in countries where there were no national studies and/or the regions had a relatively independent status in the country and/or the survey was conducted in several regions.
- Studies which are part of a permanent system of data collection and reporting within the **framework of health monitoring**, i.e. studies with regular data collection, and which have been repeated or are planned to be repeated.
- Recent and ongoing **collaborative European epidemiological studies** using samples of the general population. However, studies focusing on only a specific disease and/or using patient samples or otherwise restricted populations were not taken into account.

- The survey used **clinical/physical examinations**, tests or other professional evaluations (e.g. diagnostic interviews, instruments on functional ability that require expert clinical assessment). Mental health/psychiatric interviews may have been conducted by trained non-professional interviewers if the instrument was considered to be diagnostic.
- In principle, no intervention or experimental studies were included. However, an exception were baseline measurements of national/multicenter intervention studies, e.g. heart health surveys and cardiovascular prevention studies, if they were relevant from the point of view of developing HES methods or estimating disease/risk prevalence.
- Studies concerning **adult and elderly populations** (including children and adolescents within household samples, but not studies with only child and/or adolescent populations).
- **Time period 1975-1999** (future studies currently in the planning stage were included in the questionnaires). If the survey was already repeated at certain intervals, data were collected primarily from the latest survey. However, earlier surveys were reviewed to identify changes in focus and methods.
- Studies carried out in **EU and EFTA/EEA countries**.

The US National Health and Nutrition Examination Survey (NHANES) is the best known model for national HES. Over a 30-year history The National Center for Health Statistics (NCHS) has developed a model which is a multipurpose, national, cross-sectional, prevalence survey of major diseases, conditions, and risk factors (Fisher et al 1996). This model has often been used as a reference when surveys and methods have been developed in several European countries and is thus included in this review. Surveys in other non-European (OECD) countries were reviewed in lesser detail.

After the literature review **methodological questionnaires** were sent to contact persons for each identified national HES (see appendix 5, HES questionnaire a). In all 5 questionnaires were mailed in September-October 2000 and all were returned (Finland, Germany, Netherlands, England and Scotland). Additional questionnaires were mailed to contact persons for further surveys identified during the inventory (France, Spain, Ireland and Norway) and all these were returned. If needed, additional information was requested from the contact persons.

For countries without national HES, another questionnaire was used to obtain information about previous and planned HES in each country, reasons for not carrying out national HES and the respondent's opinions on usefulness of HES, the need to develop a standardised core module for HES in Europe, and his/her interest to participate in the development of such a module (see appendix 5, HES questionnaire b). 10 such questionnaires were mailed (to Austria, Belgium, Denmark, France, Iceland, Italy, Norway, Portugal, Spain and Sweden) in September-October 2000, and 8 were returned. From three countries (France, Norway and Spain) additional information on current situation and plans for future HES was received through later survey specific questionnaires (questionnaire a) and communication with the contact persons.

All questionnaires were mailed to persons appointed by their Ministry of Health or by representatives of the country in the Health Monitoring Programme Committee. In some cases the contact persons were identified through the methodological questionnaires. No contact persons were appointed for three EU/EFTA countries (Greece, Liechtenstein and Luxembourg) since no suitable surveys conducted in those countries. Concerning most

countries a questionnaire response and further information was received directly from the appointed contact person. However, in some cases, several attempts were made before the right experts were found and adequate information was received. From a few countries a questionnaire response was received only after contacting several persons and after several reminders. The main contact persons (respondents) are listed in appendix 3. In addition to these, several other persons have been contacted and have provided additional information on specific surveys.

RESULTS

COMBINED HIS/HES IN EU/EFTA MEMBER STATES

National population based HES with a comprehensive health focus (i.e. not focused on single diseases) have been conducted in five countries (Table 1). In addition in these countries several local, regional and/or focused surveys have been carried out previously or simultaneous with the national HESs. All of these national HESs include a HIS component preceding or parallel to the HES. National surveys currently in the planning or pilot stage were identified in four more countries. There are some preliminary plans for a national survey in one more country. Despite of the relative rarity of comprehensive national surveys, more focused and geographically limited HESs have been carried out in almost all EU/EFTA countries. However, some of these are only small-scale surveys concerning local community samples. In this report these focused surveys will be described only in countries which lack national HES and/or if these surveys involve several research sites. In some cases in the absence of national data these surveys have been used e.g. to estimate national disease prevalence.

Table 1. Population based health examination surveys in EU/EFTA Member States (national and regional multicentre surveys which are not part of international collaborative studies)

Country	National HESs	Regional and/or focused HESs
Austria	No	CVD
Belgium	No	Nutrition/CVD
Denmark	No	CVD
Finland	1979/80, 2000/01	CVD
France	Planned (2002)	CVD and Ageing
Germany	1984/85, 1987/88, 1990/91, 1997/98	CVD, Mental Health, Nutrition, Use of medicines and illicit drugs
Greece	No	Mental health, Diabetes
Iceland	No	CVD/Multipurpose
Ireland	1998	CVD, Mental Health
Italy	Planned (pilot 2000)	CVD and Ageing
Liechtenstein	No	No
Luxembourg	No	No
Netherlands	Annual since 1993	Mental Health (national)
Norway	Planned (pilot 2000/01)	CVD
Portugal	Planned (?)	CVD
Spain	Catalonia 1986/88, 1990/92, 1996/97	CVD, Nutrition and Mental health
Sweden	No	Multipurpose regional/local, Plans for a national survey of the elderly population
Switzerland	No	CVD
UK	England/Annual since 1991 Scotland/1995	CVD, Mental health (national), cognitive function (six areas of England and Wales)

Some EU/EFTA Member States (Tables 2 and 3) have participated in several international HESs, sometimes conducted in several study sites in different parts of each country and providing some information for health monitoring at the national level. The studies have focused on CVD and their risk factors (S.C.S., MONICA), on non-communicable disease factors in general (CINDI), on cancer and nutrition (EPIC), on osteoporosis (EVOS), on respiratory diseases (ECRHS), and on mental health or alcohol and drug problems (Table 3).

Table 2. Participation in major international (collaborative) HIS/HESs in EU/EFTA Member States¹⁾

Country	S.C.S	MONICA	CINDI	EPIC	EVOS	ECRHS
Austria			*		*	*
Belgium		*			*	*
Denmark		*		*		*
Finland	*	*	*			
France		*		*	*	*
Germany		*	*	*		*
Greece	*			*	*	*
Iceland		*				*
Ireland						*
Italy	*	*	*	*	*	*
Liechtenstein						
Luxembourg						
Netherlands	*			*		*
Norway					*	*
Portugal			*		*	*
Spain		*	*	*	*	*
Sweden		*		*	*	*
Switzerland		*				*
UK		*	*	*	*	*
Other, non EU/EFTA countries	* (3)	* (15)	* (21)		* (6)	* (3)

1)

S.C.S = The Seven Countries Study on coronary heart disease, later continued as FINE (Finland, Italy, Netherlands Elderly Study)

MONICA = the Monitoring Project on Cardiovascular Disease Risk Factors, WHO

CINDI= The Countrywide Integrated Noncommunicable Disease Intervention Programme, WHO

EPIC = European Prospective Investigation of Cancer and Nutrition

EVOS = European Vertebral Osteoporosis Study

ECRHS = European Community Respiratory Health Survey

Table 3. Participation in international collaborative mental health surveys in EU/EFTA Member States ¹⁾

Country	Depression	Alcohol & Drug Use	ODIN	WMH 2000
Austria				
Belgium				*
Denmark				
Finland			*	
France				*
Germany	*	*		*
Greece	*			
Iceland				
Ireland				
Italy	*			*
Liechtenstein				
Luxembourg		*		
Netherlands		*		*
Norway			*	
Portugal				
Spain			*	*
Sweden				
Switzerland				
UK			*	
Other, non EU/EFTA countries	* (7)	* (8)		

¹⁾

Depression = Cross-National Epidemiology of Major Depression and Bipolar Disorder (Instrument = DIS) (Weissman et al 1996)

Alcohol & Drug Use = WHO Study on the reliability and validity of alcohol and drug use disorder instruments (= CIDI, SCAN, AUDADIS-ADR) (Üstün et al 1997)

ODIN = Outcomes of Depression International Network (SCAN diagnostic interviews by psychiatrists or psychologists) (Dowrick et al 1998)

WMH2000 = World Mental Health 2000 (Kessler et al 1999)

In the following chapters a summary of methodology and contents of national HIS/HES and data concerning countries without national HES will be presented. After this a general overview of HIS/HES in each EU/EFTA Member State and the international multicentre studies will be presented. Information on study years, survey design, population, sampling and the health status components and methods of each survey is presented in Annex 2, Tables 1-5. Details on national HIS/HES are included in the HIS/HES database.

METHODOLOGY AND CONTENTS OF NATIONAL HIS/HES

Based on the literature review and the questionnaires general national HIS/HES have been carried out in five European countries (Finland, Germany, Ireland, Netherlands and UK). In addition to these surveys one national survey in the pilot stage (Italy) and the Spanish survey regularly carried out in one large region (Catalonia) are included in the following comparison of national surveys. In the case of several (repeated) surveys, the information presented in the following tables refers to the latest survey. The sample size has been relatively small in some of these surveys and the non-response rate for the examinations is high in most surveys. Also the definition of the study population and the type of sample and the sampling procedures vary greatly (Table 4).

Table 4. Population, sample and response rates in national HIS/HESs

	FIN	D	IRL	I	NL	E 1)	UK/E	UK/S
Age range	30-	18-79	18-	35-74	12-	25-64	2-	2-74
Type of sample	Indiv.	Indiv.	Indiv.	Indiv.	Indiv.	Indiv.	Househ	Househ
Target population	All	Non-institutionalised	Non-institutionalised	All	Non-institutionalised	Some institutionalised included	Non-institutionalised	Non-institutionalised
Sample size (invited to examinations)	8028	11601	1035	500-600*	1550	3500	7698*	7932
Non response % (for the examinations)	20**	38.6	45	*	49	25	26 ***	29

1) Catalonia

* pilot, total known yet

** for those examined during the first 3 months of the fieldwork, total not known yet

***households

Table 5. Characteristics of survey phases and examinations in national HIS/HESs

	FIN	D	IRL	I	NL	E	UK/E	UK/Sc
Average duration of HIS phase per person	90 min	30 min	60 min	30 min	45 min	2h	70 min*	40 min
Average duration of HES phase per person	4 h	45 min	20 min	40 min	30 min	20 min	40 min	40 min
Place of HES	Clinic/ Home	Clinic/ Home	Clinic	Clinic	Clinic	Clinic	Home	Home
HES personnel	Nurses, Physicians lab.tech., Dentists	Physicians med-tech assistants	Nurses	Nurses, Physicians	Nurses med-tech assistants receptionist	Nurses, Physicians	Nurses	Nurses

*for two people

The average duration of the examination has varied from 20 minutes to 4 hours. The examinations have been carried out in special clinics/health centres or in the respondent's home or in both. Nearly all surveys employ nurses as survey personnel, but also other health care professionals have been carrying out examinations. (Table 5)

All surveys have comprised CVDs and their risk factors. Respiratory diseases, diabetes and risk factors/health behaviour have also been covered in most surveys, but inclusion of other health status components is quite rare. Dental health and mental health/psychiatric diseases have been the subject of separate surveys, or they have been part of the general HIS/HES. (Table 6)

Table 6. Health status components in the examinations of national HIS/HES

	FIN	D	IRL	I	NL	E	UK/E	UK/S
Cardiovascular	78/80 2000/01	All since 84/85	98	2000	98-	All	91-94, 98	95, 98
Respiratory	78/80 2000/01			2000		All	95-97	95, 98
DM and metabolic	78/80 2000/01	97/99		2000	98-	All	91-94, 98	
Musculoskeletal	78-80 2000/01			2000				
Allergy		97/99					95-96	
Kidney and urinary tract	78/80 2000/01	97/99						
Thyroid function	78/80	97/99						
Infectious diseases and immunisation	2000/01	97/99		2000				
Liver, gall bladder, stomach and pancreas	78/80 2000/01	97/99				86-88		
Haematologic disorders	78/80 2000/01	97/99		2000			97	95
Functional ability/disability	78/80 2000/01				98-			
Mental health/psychiatric	78/80 2000/01	97/99	98		1)	96-97	1)	
Dental health	78/80 2000/01			2000	1)		1)	
Risk factors, Health behaviour	78/80 2000/01	97/99	98			All	94, 97, 98	95
Food habits/nutrition	78/80 2000/01	97/99		2000				98

1) separate survey

Note: some components are covered for specific sub-populations only

Anthropometric and blood pressure measurements, and blood samples have been used in all surveys (Table 7). A joint function test has been used in Finland and in the Netherlands, but several other tests are also used as functional status assessment/tests for the Finnish survey

(e.g. measurements of handgrip strength and standing balance). The MMSE has been used for cognitive function assessment in Finland and in Spain, but other tests are also included in the Finnish survey (e.g. some tests from CERAD neuropsychological measures). The instruments for diagnostic mental health interviews include e.g. CIDI (Finland and Germany), CESD Depression Scale (Spain), Beck Depression Inventory (Finland) and CES-D (Ireland). The Rose questionnaire for chest pain symptoms is most commonly used (Finland, Spain, UK). Some other standardised diagnostic and/or symptom questionnaires used are the MRC respiratory questionnaire (Finland and in England), NHANES –scales (Spain) and the Edinburgh claudication questionnaire (Scotland).

Table 7. Measurements and methods used in national HIS/HESs

	FIN	D	IRL	I	NL	E	UK/E	UK/S
Anthropometric measurements	*	*	*	*	*	*	*	*
Blood samples	*	*	*	*	*	*	*	*
Urine samples	*	*						
Blood pressure	*	*	*	*	*	*	*	*
ECG	*			*		*	*	
Spirometry	*			*		*	*	*
Functional status assessment/tests	*				*			
Vision	*							
Hearing (audiometry)	*					*		
Cognitive function assessment /tests	*					*		
Diagnostic mental health interview	*	*	*			*		
Other diagnostic and/or symptom questionnaires	*	*		*		*	*	*
Clinical dental examination	*							
Clinical physical examination	*							
Bone density	*			*				
Other (Bioimpedance, ortopantomography)	*							

Note: some components are covered in specific sub-populations or years only

Different devices and protocols have been used for e.g. the blood pressure measurements (Table 8), while anthropometric measurements have been more established (Table 9). In Finland blood pressure measurements at home with automatic devices are used for a subsample in addition to the clinic measurements. Blood samples have been most often analysed for lipids and glucose, but some surveys comprise a vast variety of additional analyses, and samples have also been stored for future analysis (not yet specified) in most surveys (Table 10). The fasting time has varied from four hours to twelve hours. Urine samples have only been collected in the Finnish and the German surveys. Urine spot samples have been analysed for e.g. D-vitamin analogues in Finland and for e.g. albumin, bilirubin, protein, erythrocytes, glucose, leucocytes and urobilinogen in Germany.

Table 8. Blood pressure measurement in national HIS/HESs

	FIN	D	IRL	I	NL	E	UK/E	UK/S
Type of device	Stand. mercury manometers	Erka-meter E 3000	Random zero sphygmomanometer	Stand. mercury manometers	Auto-matic Omron H 711	Random zero sphygmomanometer	Auto-matic Dinamap 8100	Auto-matic Dinamap 8100
Number of measurements	2	3	2	2	2	2	3	3
Resting before (min)	5	3	5	4		5	5	5
Resting between (min)	1,5	3	1	2	+/-5	1	1	1
International protocol	WHO		Monica	*		Monica		

Table 9. Anthropometric measurements in national HIS/HESs

	FIN	D	IRL	I	NL	E	UK/E	UK/S
Height	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Weight	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Skinfold	No	No	No	No	No	No	No	No
Waist-hip circumference	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Bioimpedance	Yes	No	No	No	No	No	No	No
Demi-span	No	No	No	No	No	No	Yes (age 65 and over)	No

Table 10. Blood samples in national HIS/HESs

	FIN	D	IRL	I	NL	E	UK/E	UK/S
Fasting	Yes	Yes	No	Yes	Yes/no*	Yes	Yes	No
Analysis in the field laboratory	No	Yes	No	Yes	No	No	No	No
Samples sent to central, external laboratory	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Storage of samples	-20/-70°C	-40°C	No		-80°C	-80°C	-70°C	-70°C
Analysis	e.g. Total Chol, HDL Chol, Trigly, LipoA1, LipoB, Gluc, CRP, GT, IgE, Ferrit, D-Vit, Uraat	e.g. Total Chol, HDL Chol, Trigly, Hkr, Hb, Eryt, Leuc, TSH, T3, T4, ALAT, GT, TSH, IgE	Total Chol, HDL&LDL Chol, Trigly	e.g. Total Chol, HDL Chol, Gluc, Trans-aminase	Total Chol, HDL Chol, Gluc	e.g. Total Chol, HDL Chol, Trigly, Gluc, GT, Uraat, Trans-aminase Alb, Leuc, Eryt, Hb, Hkr, Fibr	e.g. Trigly, Gluc	e.g. GT Vitamins C, A, E (for sub-sample)

* since year 2000, non-fasting for persons who come to the examination in the afternoon

In all national surveys the personnel has received a general training before the fieldwork. A specific training for the key methods (e.g. anthropometric and blood pressure measurements) has also been provided in all surveys except one (NL). Written instructions and protocols have been given for fieldworkers. Repeated training and/or briefing have also been used during fieldwork in Finland, Germany, The Netherlands, Spain and UK. External quality control has been used only in Germany (Table 11).

Various internal quality control methods have been employed in most surveys. Central monitoring of findings reported by field observers has been the most common quality control procedure during fieldwork. Repeated measurements of the same subjects and analyses of standard or control samples have also been used. E.g. in Finland repeated measurements have been carried out by the same observer at one point in time, by the same observer at a longer interval, and by different observers. Observation of performance of field workers by video or by field visits has also been used in quality control, as well as comparison to “standard” observers. In the Netherlands quality control relies mainly on yearly internal control by the chief of the field-workers and centralised weekly control of the data (returned forms).

Table 11. Quality control procedures during fieldwork in national HIS/HES (other than laboratory tests)

	FIN	D	IRL	I*	NL	E	UK/E	UK/S
External/internal	Intern.	Ext. & Intern.	Intern.		Intern.	Intern.	Intern.	Intern.
Repeated measurements of the same subjects	Yes	Yes	No		No	Yes	No	No
Analyses of standard/control samples	Yes	No	No		No	No	No	No
Monitoring findings reported by observers	Yes	No	Yes		No	Yes	Yes	Yes
Other	Yes				Yes			

* pilot, quality control procedures will be specified later

COUNTRIES WITHOUT NATIONAL HES

According to the questionnaire responses, there are plans for future national HES or for adding HES components into national, e.g. serological surveys, in four countries. The major reason given for not carrying out national HESs (previously) was the high expense or the difficulties in implementing fieldwork. Reasons mentioned for not carrying out national HESs were:

- They are too expensive (6)
- They are too difficult to implement (3)
- National HISs are sufficient and therefore HESs are not necessary (2)
- Regional surveys are sufficient (1)

All respondents considered national HESs necessary, definitely (6) or possibly (2). Arguments to support the need for national HES were presented from the point of view of health monitoring, epidemiologic/public health research and planning of health services, prevention or health promotion activities. E.g. the following arguments were used:

- *Morbidity data are rare, especially representative population data; most morbidity data come from hospital database. HES is important for the evaluation of prevention programmes.*
- *To measure major clinical and biological markers for cardiovascular and other diseases such as blood pressure, serum lipids. To measure in biological fluids markers of food or other environmental contaminants. To monitor the nutritional status of the population (BMI, waist/hip ratio, anthropometric measures, physical status etc.). To monitor time trends in all previous variables*
- *In order to monitor diseases in society based on a medical perspective as a complement to monitoring from a population/citizen's perspective*
- *Knowledge of risk factors and health determinants distributions in general population. Planning of health targets and health services. Prevention of diseases by modification of risk factors and determinants. Integration of HIS informations with objective instrumental measurements.*
- *To provide a description of the health status of the population based on objective data, namely anthropometric and clinical measurements, which could complement this data.*
- *In the planning of the health care system, it is important to have knowledge about the health status in the population. National health surveys would also be very valuable in the preventive work of different diseases and gives a possibility to evaluate preventive programs.*

The respondents felt that there is a need to develop a standardised or recommended core module for HES in Europe, only one respondent disagreed. All respondents, except one were interested in participating in the development of such a HES core module.

HIS/HES IN EU/EFTA MEMBER STATES

In this chapter, only brief summary information on surveys is presented. For details on study years, survey design, population, sample, response rate, and methods, see appendix 2, tables 1-4 and the database.

AUSTRIA

No national HESs were found in Austria and no future plans for representative HES were identified. Participation in major European and other international epidemiological surveys seems to have been quite rare in Austria (EVOS and ECRHS Studies). The Austrian Stroke Prevention Study is an example of a local and focused study with HES methodology (Schmidt et al 1994, Schmidt et al 1997). It includes both a prevalence study and a follow-up study. Regional HESs have also been carried out based on the WHO-CINDI programme in western Austria (Vorarlberg). This programme included large risk factor surveys with medical examinations (Schwartz et al 1992, Ulmer et al 1997).

Schwarz B, Bischof HP, Kunze M. Hyperglycemia and coronary risk factors. Results from Western Austria. *European Journal of Epidemiology* 1992;8(1):40-47.

Schmidt R, Lechner H, Fazekas F, Niederkorn K, Reinhart B, Grieshofer P, et al. Assessment of Cerebrovascular Risk Profiles in Healthy Persons: Definition of Research Goals and the Austrian Stroke Prevention Study (ASPS). *Neuroepidemiology* 1994;13:308-313.

Schmidt R, Reinhart B, Schumacher M, Hayn M, Schmidt H, Fazekas F, et al. Prävalenz von Risikofaktoren in der Grazer Bevölkerung (Austrian Stroke Prevention Study). *Wiener Medizinische Wochenschrift* 1997;147(2):36-40.

Ulmer H, Bachman J, Huber K, Concini H, Bischof H-P. Verlaufsbeobachtungen bei

Gesundenuntersuchungen in Voralberg 1986 bis 1994. *Wiener Klinische Wochenschrift* 1994, 105(5):160-164.

Contact person for Austria: Dr Anita Rieder, Institute of Social Medicine, University of Vienna.

BELGIUM

There are no national HESs, but several local and focused surveys in Belgium. Cardiovascular epidemiological studies started in Belgium during the sixties. The first studies concerned specific occupational groups. The major national study with a general population sample utilising HES methodology in Belgium is a national nutrition survey **Belgian Interuniversity Research on Nutrition and Health** (BIRNH), which included measurements of CVD risk factors. This survey was conducted in collaboration with several universities to ascertain the nutritional habits of the population, to determine the prevalence of major CVD risk factors, and to study the relationship between nutrition, CVD risk factors and mortality.

Data from the above mentioned studies have been used to detect trends in risk factor and disease prevalence (e.g. De Henauw et al 1998, Stam-Moraga et al 1998). Belgian research centres have also participated in several international HIS/HES projects, e.g. the MONICA and the ECRHS studies. The MONICA surveys in Belgium included three independent general population studies in two towns; Gent and Charleroi, and one risk factor survey in the entire province of Luxembourg.

The B.I.R.N.H. Study Group. The Belgian Interuniversity Research on Nutrition and Health (B.I.R.N.H.). *Acta Cardiologica* 1989; 44:89-194.

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De Backer G. Regional differences in dietary habits, coronary risk factors and mortality rates in Belgium. 1. Design and methodology. *Acta Cardiologica* 1984;39(4):285-292.

De Backer G, Myny K, De Henauw S, Doyen Z, Van Oyen H, Tafforeau J, Kornitzer M. Prevalence, awareness, treatment and control of arterial hypertension in an elderly population in Belgium. *Journal of Human Hypertension* 1998;12:701-706.

De Bacquer D, De Backer G, Kornitzer M, Blackburn H. Prognostic value of ECG findings for total, cardiovascular disease, and coronary heart disease death in men and women. *Heart* 1998;80:570-577.

De Henauw S, De Bacquer D, Fonteyne W, Stam M, Kornitzer M, De Backer G. Trends in the prevalence, detection, treatment and control of arterial hypertension in the Belgian adult population. *Journal of Hypertension* 1998;16:277-284.

Kesteloot H, Joossens JV. Relationship of dietary sodium, potassium, calcium and magnesium with blood pressure. Belgian Interuniversity Research on Nutrition and Health. *Hypertension* 1988;12(6):504-599

Kesteloot H, Joossens JV. The relationship between dietary intake and urinary excretion of sodium, potassium, calcium and magnesium: Belgian Interuniversity Research on Nutrition and Health. *Journal of Human Hypertension* 1990;4(5):527-33.

Stam-Moraga MC, Kolanowski J, Dramaix M, De Henauw S, De Bacquer D, De Backer G, Kornitzer MD. Trends in the prevalence of obesity among Belgian men at work 1977-1992. *International Journal of Obesity* 1998;22:988-992.

Contact persons for Belgium: Prof. Dr G. De Backer, Universiteit Gent, Department of Public Health and Prof. M. Kornitzer, Laboratoire d'Epidemiologie et de Médecine Sociale, Ecole de Santé Publique, Université Libre de Bruxelles

DENMARK

There are no national HESs in Denmark, but several local and focused surveys. The first cardiovascular epidemiological surveys, the **Glostrup Population Studies**, were started in 1964 in the western part of the Copenhagen County (Hagerup et al 1981, Sjøel et al 1998, Høidrup et al 2000). Several birth cohorts/random samples of the population in this area have been studied and followed up, later under the **Copenhagen County Centre of Preventive Medicine**. This centre also carried out three MONICA surveys in the region (11 municipalities in Copenhagen county) between 1982-1992. Several tests were locally added to the original MONICA study protocol, e.g. psychological tests and ultrasound scanning of the abdomen (Laursen 1990), and re-examinations were also conducted after 11 years of the original health examination (Laursen 1997). Another regional HIS/HES, the **Copenhagen City Heart Study** (e.g. Appleyard 1987, Clausen & Jensen 1990, Clausen & Jensen 1992, Høidrup et al 1999) was launched in the 1970s. These surveys are characterised by randomly selected samples, high participation rates and comprehensive follow-up, inclusion of both sexes and large proportions of elderly subjects. Danish research centres have also participated in other international studies with HES methodology, e.g. the ECRHS and EPIC studies.

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Contact persons for Denmark: Niels Kr. Rasmussen, Statens Institut for Folkesundhed, Copenhagen, Denmark and Torben Jørgensen, Centre for Preventive Medicine, Glostrup University Hospital, Denmark

FINLAND

HESs have been conducted in Finland since the 1950s. The first surveys were disease specific (CVD) and targeted at specific local or regional populations. Later there have been both national surveys (mainly by the Social Insurance Institution), regional and focused surveys (mainly CVD surveys, e.g. as part of the North Karelia Project), and collaboration in international surveys (e.g. The S.C.S Study and MONICA). National health surveys were introduced as evaluation tools after the introduction of the national sickness insurance in

1964. The Mobile Clinics of the Social Insurance Institution (SII) created good possibilities for standardised HESs in different parts of the country. These mobile clinics were used for research purposes between 1965 and 1980. The baseline health examinations for the SII Mobile Clinic HES were carried out in 1966-72 (age 15 and over, N=57 000) and the follow-up examinations between 1973-1976 (N=19 500). There is continuing follow-up based on record linkage. (see e.g. Reunanen et al 1983)

HIS/HES risk factor surveys conducted since 1972 to evaluate and follow-up the impact of the North Karelia Project on CVD prevention have been later carried out also in other parts of Finland, named as the **Finrisk surveys** (e.g. Vartiainen et al 1988, Vartiainen et al 2000). The Finrisk surveys in the 1980s, including two provinces in eastern Finland (Kuopio and North Karelia) and one town and one rural area in South-Western Finland, were also part of the MONICA study (later CINDI programme).

The first comprehensive national health survey was the **Mini Finland health examination survey** conducted in 1978-1980 by the SII Mobile Clinic and it forms the basis for the new HIS/HES in 2000-2001, the **Health 2000 survey**. The National Public Health Institute (KTL) is responsible for the Health 2000 survey in collaboration with other national institutes in the field of health and social security and with several universities. The main aim of the Health 2000 survey is to provide an up-to-date comprehensive picture of health and functional ability in the working-aged and aged population by studying the prevalence and determinants of most important health problems and associated need for care, rehabilitation and help.

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For the Health 2000 survey, see also <http://www.ktl.fi/Terveys2000>

Contact person for Finland: Prof. Arpo Aromaa, Department of Health and Disability, National Public Health Institute, Finland

FRANCE

No national HESs have been conducted in France. There are several local/regional surveys, e.g. the PAQUID research program undertaken to assess and follow-up a cohort of older subjects living at home. This is an interdisciplinary study designed to investigate cerebral and functional ageing (Personnes Agées Quid) in elderly people living independently in the

community. The Paquid program is complemented by a Pavin (Personnes Agées Vivant en Institutions) project of institutionalised elderly.

There are also studies based on data from regular health examinations (check-ups) of working and retired persons at the Investigations Pre-Cliniques (IPC) Check-up Center (Paris). The French Public Health System (Sécurité Sociale-CNAM) offers to all working and retired persons and their families free health examinations every 5 years. The IPC is one of the largest medical centres in France, since 1970 about 20 000 examinations of persons living in the Paris area have been performed annually. Data from these health examinations have been used in epidemiological studies.

A national health interview survey, **Enquete Sante**, has been carried out every ten years in France since 1960. There are plans to include health examinations in the next national survey in year 2002. No decisions have been made so far about the fieldwork phase, but measurement of weight, height, blood pressure, audiometry, vision and oral health, as well as blood samples, are considered to be included in the health examination. Also more elaborate measurement of functional capacity and mental health is being considered. The Institut de Veille Sanitaire will be mainly responsible for the new HES in collaboration with the French National Statistics Institute (INSEE) and the Ministry of Health.

French research centres have participated or acted as coordinators in several international studies, such as the MONICA, EPIC, ECRHS and the EVOS studies. The MONICA study had also national significance in France since the population covered three centres (regions) in different parts of the country, and both rural and urban areas.

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Contact persons for France: Dr Hubert Isnard and Dr Thierry Lang, Institut de Veille Sanitaire, Département des Maladies Chroniques et des Traumatismes, Paris, Saint Maurice, France.

GERMANY

The national health surveys in Germany were first initiated to obtain national level reference data for the German Cardiovascular Prevention Study (GCP). The GCP was a multicentre community-based intervention study for the primary prevention of ischaemic heart diseases and cerebrovascular diseases (e.g. GCP Study Group 1988). The GCP was launched in 1984 in five study regions spread all over the former West Germany. Since 1991 **the German National Health Interview and Examination Survey (Bundes-Gesundheitssurvey)** has also covered regions from the former East Germany and the latest survey covers several health topics in addition to CVD (e.g. Bellach et al 1998). The Robert Koch –Institute is mainly responsible for this HIS/HES in collaboration with other institutes. The main aim of the survey is to support health monitoring and evaluation of health policy.

German research centres have participated in several international HES studies, the MONICA, CINDI, EPIC and ECRHS studies. The MONICA study had also national significance in Germany, since the population covered two cities, two counties and one administrative region in different parts of former West Germany and three towns in different parts of the former East Germany.

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Contact person for Germany: Dr. Bärbel-Maria Bellach, Head of the Department for Epidemiology and Health Reporting, Robert Koch Institute, Berlin.

GREECE

Greece has no national HES. Several local studies focusing on a specific health status component or disease have been made in Greece, e.g. surveys with the aim of defining the prevalence of diabetes in elderly populations living in small geographically defined areas (Papazoglou et al 1995). A mental health survey utilised a general population sample and used instruments developed in international collaboration (CES-D) to study the relationship between the use of non-prescribed medication and illicit drugs and problem drinking with reported depressive symptoms and suicidal behaviour (Madianos et al 1994). Greek research centres have also participated in several international studies with HES methodology, e.g. the S.C.S study and the EPIC, ECRHS and EVOS studies.

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Contact person for Greece: No contact person was appointed

ICELAND

No national HESs were found in Iceland, but a national HIS (Health and Living Conditions in Iceland) conducted in 1998 included several symptom scales and other psychological and social psychological scales. It is planned to be repeated in 2003. Longitudinal birth cohort studies in Iceland have been feasible as the country is a comparatively remote island and there has been little emigration. High rates of follow-up have been attained. One of the first of such cohort studies is a psychiatric epidemiological study initially designed in 1956 (Helgason & Magnusson 1989). The study was designed to contribute to the descriptive and comparative epidemiology of mental disorders, with the main emphasis on functional disorders. Personal interviews by research psychiatrists were conducted and data from different registers were obtained.

A prospective CVD population study has been conducted in the capital city, **The Reykjavik Study**. Other health status components, e.g. rheumatic diseases and diabetes have been included in its follow-up surveys (Hardarson et al 1987, Jonsdottir et al 1998, Jonsson et al 1992, Sigurdsson et al 1995, Vilbergsson et al 1997, Agnarsson et al 1999, Sigurdsson et al 1999). The city of Reykjavik was inhabited by close to half of the total population of Iceland at the time this study was initiated.

Icelandic participation in international HIS/HES projects seems to have been quite rare (e.g. ECRHS and MONICA). The MONICA study had also national significance in Iceland since it included the entire country, the risk factor surveys were carried out in both urban (city of Reykjavik) and rural areas.

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Contact persons for Iceland: Dr Matthias Halldorsson, Ministry of Health and Social Security and Professor Runar Vilhjalmsson, University of Iceland

IRELAND

No national HESs with general health focus were found in the literature search. In 1990 The National Nutrition Survey was carried out on people aged 18 and over. This study included interviews, 7 -day dietary histories and anthropometric measurements (weight, height, mid upper arm circumference and wrist diameter) in the participants' homes by trained dieticians (Hurson et al 1997).

However, the inventory on HIS revealed that a clinical examination was conducted for a subsample within the national **Survey of Lifestyle, Attitudes and Nutrition (SLÁN)** in 1998. Within this study 90% of the total sample (N=10 515) was surveyed by post and the remaining 10% invited to attend a clinical examination. The Department of Health Promotion at the National University of Ireland is mainly responsible for the survey. This survey provides monitoring data for targets set in the National Health Strategy 1994 to aid health policy and health promotion planning. (Friel et al 1999, NNSC 1999, NNSC 2000)

An example of regional studies utilising HES methodology in Ireland is the Kilkenny Health Project initiated in 1985 (e.g. Shelly et al 1991). During this project the first surveys of factors associated with coronary heart disease and oral health in random population samples in Ireland were conducted. The project was established in 1985 as a community-based research and demonstration programme for CVD in County Kilkenny (SouthEast Ireland with a total population of approximately 70 000), and as a pilot programme for future national initiatives. The project has been an Associate Member of the MONICA Project.

Participation in international studies with HIS/HES methodology in Ireland has been relatively rare (e.g. ECRHS study).

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Contact person for Ireland: Sharon Friel, National University of Ireland, Department of Health Promotion, Galway

ITALY

Italy has a long tradition of cardiovascular surveys, but no national HES in Italy fully met the inclusion criteria for this review. However, some previous surveys have been done in Italy on local and regional population-based samples. Most relevant from the point of view of health examination methods are the RIFLE, OEC and ILSA projects. The **RIFLE** (Risk Factors and Life Expectancy) project exploits epidemiological data from nine different large-scale population studies on cardiovascular diseases started between 1978 and 1987 in Italy (Menotti 1993, Menotti et al 1994, Menotti et al 1995).

The data of the OEC - **Cardiovascular Epidemiological Observatory** (ANMCO) study constitute an updated reference benchmark for the Italian population's health status at the end of the '90's. Data on cardiovascular risk factors (blood pressure, cholesterol levels, obesity and smoking) were collected during 1998 from 34 Cardiology Centers or Divisions covering all regions in Italy. The aim is to evaluate the distribution of CVD risk factors and the prevalence of cardiovascular diseases in the Italian adult population. (Giampaoli & Vanuzzo 1999 a&b)

The **Italian Longitudinal Study on Aging** (ILSA) aims to study the prevalence and incidence rates of common chronic conditions in the older population aged 65-84 years, to identify their risk and protective factors, and to assess age-associated physical and mental functional changes. (Maggi et al 1994, ILSA 1997, Di Carlo et al 2000)

Italian research centres have also participated in several international HIS/HES projects, e.g. the S.C.S study, the MONICA, EPIC, EVOS and ECRHS studies. The MONICA populations in Italy cover large areas in Northern parts of the country, i.e. seven health districts in the area between Milan and the Swiss border, and a major part of one autonomous region in North Eastern Italy. Italy has also been an associate member of the CINDI programme, with a risk factor survey in 1999.

There are future plans to combine HES to the national HIS regularly conducted in Italy since the 1980s. The **pilot phase of the national HIS/HES** was started in autumn 2000 in Florence, including several health status components, tests and other measurements.

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Contact person for the Italian Studies: Dr Gino Farchi, Laboratorio di Epidemiologia e Biostatistica, Istituto Superiore di Sanita, Roma

LIECHTENSTEIN

No national HESs or participation in international HIS/HES projects were found in the literature search and no contact person was appointed.

LUXEMBOURG

No national or regional health examination surveys or participation in international HIS/HES projects were found in the literature search and no contact person was appointed.

NETHERLANDS

Netherlands has a long tradition of HES studies, which first focused mainly on CVD risk factors (Verschuren et al 1993, Lean et al 1998). Later these studies have been extended to cover other chronic diseases. **The MORGEN -project** (The Monitoring Project on Risk Factors for Chronic Diseases) started in 1987 as an extension of several previous projects that focused mainly on cardiovascular risk factors (Smit et al 1994). From 1993 the project has covered several chronic diseases. The project was carried out in three towns in different parts of the country. The Morgen project aimed to determine the prevalence of risk factors for

chronic diseases as well as the prevalence of some specific chronic conditions in a sample of the general population. (Verschuren et al 1993, Smit & Verschuren 1994, Lean et al 1998)

Since 1998 **the Regenboog project** has been developed into a national multipurpose HIS/HES study (Regenboog... 1999). The Regenboog project (Risicofactoren En Gezondheids Evaluatie Nederlandse Bevolking, een Onderzoek Op GGD's) aims to monitor the health status of the Dutch population, the prevalence of risk factors for chronic diseases as well as the prevalence of some specific chronic conditions, use of health services, and immunity (selected infectious diseases). The National Institute of Public Health and Environmental Protection (RIVM) is mainly responsible for the surveys in collaboration with Statistics Netherlands and the National Association of Municipal Public Health Services.

In addition to these there are specific studies on mental and dental health of the Dutch population, and several local/regional studies. **The Netherlands Mental Health Survey and Incidence Study (NEMESIS)** is the first large-scale nation-wide prospective population study on psychiatric morbidity and incidence of psychiatric disorders. It uses a full, structured psychiatric interview administered to a representative sample of the Dutch adult population. (Bijl et al 1998 a&b) **The Dutch National Dental Survey** aimed to obtain representative data for the Dutch population concerning the prevalence of oral diseases, objective and subjective oral health needs, and oral selfcare and its determinants (van't Hof et al 1991)

Research centres in the Netherlands have also participated in several international HIS/HES projects like the S.C.S study and the ECRHS and EPIC studies.

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Contact persons for the Netherlands: Dr Jaap Seidell and Lucie Viet, National Institute of Public Health and Environmental Protection (RIVM), Bilthoven, the Netherlands

NORWAY

Epidemiological studies in various fields have a long tradition in Norway, especially regarding CVD. First regional studies were conducted in the late 1950s and early 1960s, e.g. the blood pressure surveys in Bergen. The Oslo study was initiated in 1972 to survey CVD risk factors in 10-49 year old men. A similar study with a male population was also initiated in Tromsø. The model for nation-wide health examinations was developed in the 1970s

during **the Cardiovascular disease study**, which was initiated in the first region (Finnmark) in 1974. Later a national organisation (Statens helseundersøkelser, SHUS/National Health Screening Service, previous National Mass Radiography Service) has conducted cardiovascular examinations with the same model (so called **40-year-examinations or health screenings**) since 1985 and in 1993 these examinations became nation-wide. All municipalities have been visited by the SHUS survey team with an interval of three years. These examinations have focused on the prevention of CVD and they have been targeted at all citizens in the age-group 40-42 years.

Plans have been made to develop general/multipurpose HESs focused at chronic conditions, asthma and allergy, osteoporosis and dementia. The age limit is planned to be extended from 40-42 years to those aged 15-16 (school survey) and those aged 30-76. In 2000-2001 these surveys are planned to be initiated in the Oslo area where all persons in these age groups will be invited to the examinations (HUBRO, **Health examination survey in regions of Oslo**). There are plans that similar surveys will later be carried out in other parts of the country.

Norwegian participation in international HIS/HES projects seems to have been quite rare, but one Norwegian centre participated in the EVOS study and one in the ECRHS study.

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Contact persons for Norway: Jorun Ramm, Statistics Norway and Haakon E. Meyer, Randi Selmer and Yngve Haugstvedt, National Health Screening Service

PORTUGAL

No national HESs have been conducted in Portugal. Participation in international HIS/HES projects is also quite rare, but some research centres have participated in e.g. the EVOS, CINDI and ECRHS studies. Regional HESs have been conducted within the framework of the WHO CINDI programme in 1987-1992, e.g. a baseline survey of 3000 individuals randomly selected from the district of Setúbal has been carried out (Amorim Cruz 1989). The General Directorate of Health was responsible for the CINDI survey in Portugal in collaboration with the National Health Institute (INSA) and the National Institute for Preventive Cardiology (INCP).

There are some future plans for a national serological survey, which could include a HES component.

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Contact person for Portugal: Dr Carlos Matias Dias, Instituto Nacional de Saúde, Observatório Nacional de Saúde, Lisbon, Portugal

SPAIN

No national HESs were found in the literature search. The study on CVD risk factors in the Spanish population is the sole study available containing information representative of Spain as a whole (Banegas et al 1998). Several regional surveys have focused on CVD risk factors in Spain. Some measurements used in the **Nutrition and Health Examination Survey in the Valencian Region** study (weight, height and waist to hip ratio) have been carried out also in Nutritional surveys conducted in other autonomous regions of Spain (Cataluna, Pais Vasco, Madrid) between 1989-1994.

Spanish research centres have participated in several international HIS/HES projects, e.g. the MONICA, EPIC, EVOS and ECRHS studies. The MONICA study was carried out in five counties in Catalonia (north of Barcelona). There is also a WHO CINDI centre in Barcelona. The MONICA study had also national significance, since it covered this large region of Spain and the health monitoring has been continued later. **The Catalan Chronic Diseases Survey (CRONICAT)** has been carried out every 4-6 years since the first survey in 1986-88 (Sans, personal communication). The Institut of Health Studies in Barcelona is mainly responsible for the CRONICAT surveys (the Research and Epidemiological Program for Chronic Diseases). Several risk factor surveys have been carried out in other regions, many of them also following the MONICA protocol, but they have not been repeated at regular intervals for health monitoring purposes.

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Contact person for Spain: Dr Susana Sans, Institute of Health Studies, Barcelona

SWEDEN

Several regional and local HESs have been conducted since the 1960s, but no national level HESs have been conducted in Sweden. Swedish research centres have participated in several international HIS/HES projects, e.g. the MONICA, EPIC, EVOS and ECRHS studies. Within the MONICA project some questions have been added to the study protocol. The population aged 25-64 years was included for three Northern Sweden MONICA screenings performed in 1986, 1990 and 1994 (Huhtasaari et al 1993, Peltonen et al 1998) and the GOT-MONICA screenings in 1985, 1990 and 1995 (Wilhelmsen et al 1997). The Northern Sweden MONICA study had also national significance since it covered both urban and rural areas in the whole northern part of Sweden and the health monitoring has also been continued later.

Local and regional studies in Sweden have been used as the basis of regional and local planning (e.g. Berglund et al 1996, Allander et al 1997, Weinehall et al 1998). Several studies (e.g. Lithell et al 1984, Aberg et al 1985, Wilhelmsen et al 1986, Skarfors et al 1991) have had epidemiological targets of estimating risk factor and disease prevalence and incidence, e.g. CVD and diabetes, including re-examinations and register based follow-up of the study cohorts. Such studies have been conducted e.g. in Uppsala, Malmö and Gothenburg. There are also studies including dental examinations (Osterberg et al 1984, Ahlqvist et al 1999, Hugoson et al 1998) and psychiatric examinations (e.g. Enzell 1983). An intensive psychologicaal-medical investigation has been carried out in the city of Örebro (Bergman 2000).

Several surveys of elderly populations have been carried out in Sweden. These have included tests for cognitive function and dementia (e.g. Kilander et al 1997). **The Swedish National Study on Ageing and Care (SNAC)** will follow a large representative panel of elderly across different age cohorts over time. The study will be carried out in four different areas in Sweden and the data collection is planned to start in 2001 (Lagergren 2000). The Gerontology Research Centre in collaboration with universities and the Social Ministry will be responsible for the SNAC survey.

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Contact person for Sweden: Birgitta Stegmayr, Department of Medicine, Umeå

SWITZERLAND

No national HESs were found in the literature search. A local HES of the general population in the canton of Geneva has been conducted annually since 1992. The project is called “**Bus Santé 2000**” and it focuses on CVD risk factors (Morabia et al 1997, Curtin et al 1999).

Switzerland has participated in the ECRHS and MONICA projects and some specific national elements have been added to the MONICA protocol. E.g. one study reported the trend of blood lead levels based on HES during the MONICA project (Wietlisbach et al 1995). The MONICA study had also national significance in Switzerland as it was carried out in three cantons (Ticino, Vaud and Fribourg).

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For the Bus Sante Survey see also <http://www.bus-sante.ch>

Contact person for Switzerland: Dr Alfredo Morabia, Hopitaux Universitaires de Geneve

UNITED KINGDOM

There is a long tradition of HES in UK. **The British Regional Heart Study**, which was initiated in late 1960s, focused on middle-aged men (e.g. Shaper et al 1981). Later regional Heart Health Surveys with health examinations have also been conducted in Scotland (e.g. Smith et al 1987, Lee et al 1990, Woodward et al 1992), Wales (e.g. Pullen et al 1992) and Northern Ireland with samples of both women and men. Longitudinal multipurpose studies with regional cohorts have also been carried out in UK, e.g. The West of Scotland Twenty-07 Study (Der et al 1999).

British research centres have participated or acted as co-ordinators in several international HIS/HES projects, e.g. the MONICA, EPIC, EVOS and ECRHS studies. The MONICA surveys were carried out in two cities, one in Northern Ireland (Belfast) and one in Scotland (Glasgow), partly concurrently with the Scottish Heart Health Study. CINDI risk factor surveys have been carried out in the Northern Ireland. Some clinical measurements (weight, height, waist circumference and blood pressure) have also been conducted in the 1984-85 **National Health and Lifestyle Survey (HALS1)** and repeated in 1991-1992 (HALS2) on the same subjects originally aged 35-75 years (Cox et al 1998).

Repeated national HIS/HES have been conducted in England and Scotland in the 1990s as separate surveys, but following similar procedures and covering several health indicators. These are the **Health Survey for England** (e.g. Prescott-Clarke & Primatesta 1996, Dong et al 1997, Colhoun et al 1998, Bost et al 1999, Erens & Primatesta 1999, Primatesta et al 2000) and the **Scottish Health Survey**. The Department of Epidemiology and Public Health at the University College of London is mainly responsible for these surveys in collaboration with the National Centre for Social Research. The main aim of the surveys is to monitor trends in the nation's health and to facilitate evaluation of health policy. In Wales there are only HISs and focused HESs just as in Northern Ireland (The Northern Ireland Health and Activity Survey, MacAuley et al 1996 & 1998).

In UK mental health/psychiatric morbidity in the population, cognitive abilities of the elderly and dental health have been covered by separate surveys with nationally representative samples. **The National Psychiatric Morbidity Surveys** of Great Britain is a set of four surveys (Melzer et al 1995, Jenkins et al 1997 a&b). **The Medical Research Council Cognitive Function and Ageing Study (MRC CFAS)** is the first European study of dementia and cognitive decline which uses the same methodology in multiple sites with sufficient sample size to detect differences across centres large enough to be of public health or epidemiological interest (Brayne et al 1998, Meltzer et al 1999). The study provides an indication of the prevalence of dementia at the national level. The latest **Adult Dental Health Survey** was conducted in 1988 to establish the current state of dental health of adults compared with similar previous surveys in 1968 and 1978 (Todd & Lader 1991).

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For the Health Survey for England see also:

<http://www.official-documents.co.uk/document/doh/survey98/hse98.htm>

For the Scottish Health Survey see also:

<http://www.official-documents.co.uk/document/scottish/shealth/shhm.htm>

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EXAMPLES OF MAJOR HIS/HES IN SOME OTHER COUNTRIES

USA National Health and Nutrition Examination Survey, NHANES

In 1956 the U.S. Congress passed a special law to set up the National Health Survey to secure information on the amount, distribution, and effects of illness and disability in the United States and the services received for or because of such conditions. The first National Health Examination Survey (NHES I) was carried out in 1960-62. This first survey was limited to the adult population aged 18-79 and focused on CVD, arthritis and rheumatism, and diabetes. Later the study has been expanded to cover other age-groups and topics (see Appendix 2, Table 3). Beginning in 1970 a large nutrition component was added to the basic design (National Health and Nutrition Examination Survey, NHANES I in 1971-74). A special study of Hispanic populations in the United States was conducted in 1982-84. NHANES III (1988-94) was the first to include children as young as 2 months of age, first to include persons 75 years of age and over, and the first to include planned oversampling of the two largest minority groups, the black and the Mexican-American populations. The first stage of the sampling was selecting primary sampling units, which were divided into survey locations. The second stage of the design consisted of area segments (geographically defined areas), and the third stage of households. At the fourth stage, individuals were selected based on sex, age, race or ethnicity. Starting from 1999 (NHANES IV) there have been annual samples for a continuous survey to determine the incidence of major diseases, risk factors for diseases and nutritional status. High tech mobile survey units travel in different counties for interviews and examinations. The NHANES surveys have been widely used in epidemiological research.

Mobile health survey stations prepare to hit the road. *Nation's Health* 1998;28(8):4.

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Focused/regional HES in the USA

A vast variety of population based HESs focus on specific health problems in the United States, some of them initiated as early as the 1940's. Some of the best known studies often used as reference or comparison to European surveys are briefly listed below.

The classical example of a comprehensive health examination was carried out under the auspices of the Commission on Chronic Illness (1956, 1957, 1959) in Boston in the 1950s. An example of a very thorough health examination survey with important methodological development work is the Rand Health Insurance Study (Brook et al 1979). The Chicago Study (Stamler et al 1960) investigated the occurrence of coronary heart disease and its causes in the labour force of an industrial corporation. The Teamsch Study (Epstein et al 1965) in addition to CVD looked at several other chronic diseases and physiological and behavioural factors in Teamsch community, Michigan.

Cardiovascular Surveys:

- ❑ **The Framingham Heart Study** was established in 1948 to evaluate potential risk factors for coronary heart disease (e.g. Lloyd-Jones et al 1999). In 1971 additional subjects (N=5124, offspring of original cohort subjects and their spouses) were enrolled into the Framingham Offspring Study. These participants have received follow-up evaluations every 4 years.
- ❑ **The Atherosclerosis Risk in Communities Study (ARIC)** is a prospective study to investigate the etiology of atherosclerosis and its clinical sequelae and variation in CVD risk factors, medical care, and diseases (The Aric Investigators 1989 a&b, Sorlie et al 1999).
- ❑ **The Cardiovascular Health Study** (e.g. Mittelmark et al 1993, Smith et al 1999) is a population-based longitudinal study of cardiovascular diseases in older adults in four research sites.
- ❑ **The MONICA Study** was carried out in four communities in California.

Mental Health Surveys:

- ❑ **The Epidemiologic Catchment Area Survey (ECA)** is the largest, most comprehensive survey of mental disorders conducted in the United States (e.g. Kessler et al 1987, Bourdon et al 1992).
- ❑ **The National Comorbidity Study** (e.g. Blazer et al 1994) represents the first epidemiologic data from a national sample of community residents in the United States to estimate the prevalence, risk factors and consequences of psychiatric morbidity and comorbidity.

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Other major Health Examination Surveys outside EU/EFTA Countries

Australia

The National Nutrition Survey conducted in 1995 included physical measurements (blood pressure, height, weight, waist and hip circumference) in addition to food intake questionnaires for persons 2 years of age and over, selected from respondents to the National Health Survey (HIS).

Donath SM. Who's overweight? Comparison of medical definition and community views. *Medical Journal of Australia* 2000;172(8):375-377.

Canada

Several national health surveys with HES methods have been conducted in Canada since the 1970's (Kendall et al 1997).

- **The Canada Health Survey** in 1978/79 was the first survey including a physical measures component in one third of the household interviews (The Health of Canadians 1981, Arraiz et al 1992). Blood pressure, cardiorespiratory fitness, height, weight and skinfold measurements were conducted.
- **The Canada Fitness Survey** has been carried out twice in the 1980s (e.g. Villeneuve et al 1998, Katzmaryck et al 1999) including e.g. standardised fitness tests and physical (anthropometric) measurements.
- All 10 provinces undertook the **Canadian Provincial Heart Health Surveys** between 1986 and 1995, following a standardised core protocol with home interviews and clinic visits (MacLean et al 1992).
- **The Canadian Study of Health and Aging** was carried out in 1991-1992 (e.g. McDowell et al 1994, MacKnight et al 1999) to estimate the prevalence of dementia and its subtypes by sex and age group for five regions of Canada. The study included comprehensive clinical examinations and neuropsychologic tests for people aged 65 years and over (see Appendix 2, Table 3).
- **The mental health supplement to the Ontario Health Survey** was designed to estimate the prevalence of mental disorder in the general population (Boyle et al 1996).
- **The MONICA Study** was carried out in Halifax county including both urban and rural areas. The WHO **CINDI** study has also been carried out in Canada.

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Other countries

Nationally representative Health Surveys with some health examination methods have also been conducted e.g. in Latvia, in Singapore and in Ukraine. Some clinical measurements have also been included in National Nutrition Surveys in the Republic of Korea and in New Zealand (NCHS 2000).

NCHS. International Health Data Reference Guide 1999. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2000.

INTERNATIONAL MULTICENTRE SURVEYS

Some examples of recent international multicentre HIS/HES comprising several European countries and used also for health monitoring purposes are described here (see Appendix 2, Table 5).

The CINDI programme (Countrywide Integrated Non-Communicable Disease Intervention) is a WHO co-ordinated programme for prevention of major non-communicable diseases and for promotion of health by co-ordinated and comprehensive action. The aim is to reduce common, established risk factors and to favourably influence related lifestyles in the population. The CINDI programme was established in 1985. Standardised periodical risk factor surveys have been carried out as part of the outcome evaluation of the CINDI programme in 23 countries in Europe. (CINDI 1994) The MONICA methods have been used in the CINDI surveys.

The European Commission Respiratory Health Survey (ECRHS) was initiated in 1990 under the European Community's Concerted Action on Asthma Prevalence and Risk Factors. It was designed to cover all areas of the European Community and areas outside Europe have also been included. The following EU/EFTA countries participated in ECRHS: Austria, Belgium, Denmark, France, Germany, Greece, Iceland, Italy, Ireland, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, UK. Non-EU/EFTA centres include: Algiers, Australia, Canada, India, New Zealand, Latvia, and USA. (e.g. de Marco et al 1994, de Marco et al 1998, Kogevinas et al 1998, Norrman et al 1998)

The European Prospective Investigation into Cancer and Nutrition (EPIC) investigates the relation between diet, nutritional and metabolic characteristics, various lifestyle factors and the risk of cancer. An additional component EPIC-Heart extends the study to CVD. The following countries participate in Epic: Denmark, France, Germany, Greece, Italy, Netherlands, Spain, Sweden, and UK. This prospective cohort study was initiated in 1990. The subjects will be followed up for the rest of their lives. (e.g. Bingham et al 1997, Gonzales et al 1997, Klipstein-Grobush et al 1997, Kroke et al 1998, Riboli & Kaaks 1997)

The European Vertebral Osteoporosis Study (EVOS) aimed to study the prevalence, risk factors and impact of vertebral osteoporosis. 36 European centres from 19 countries were invited. The following countries participated in EVOS: Austria, Croatia, Czech Republic, Belgium, France, Germany, Greece, Hungary, Italy, Norway, Poland, Portugal, Russia, Slovenia, Spain, Sweden and UK. The study was cross-sectional, initiated in 1989. (O'Neill et al 1994, O'Neill et al 1995, Johnell et al 1997)

The Multinational Monitoring of Trends and Determinants in Cardiovascular Disease (MONICA) project is a multicentre international collaborative project co-ordinated by the WHO. It was initiated in the early 1980s. The project had common standardised survey methods for data collection, and centralised data analysis and quality control. The MONICA methods have been utilised by several other projects in addition to the MONICA centres. All MONICA surveys included a common core, but additional methods and health status components were used in several countries/study areas. In some countries the surveys were carried out in one area (e.g. one city), in others the surveys had also national significance with several nationally representative study areas in different parts of the country. (e.g. Tunstall-Pedoe et al 1988, Böthig et al 1989, Keil et al 1989, Döring et al 1990, Hense et al 1995, WHO MONICA Project 1997)

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MENTAL HEALTH SURVEYS

Development of diagnostic instruments for cross-national use in psychiatric epidemiology began in 1970s. Focused inventories of mental health (psychiatric) surveys have been carried out recently (Hibbett et al 1999) or they are currently being carried out in other HMP projects (Korkeila 2000, personal communication). Therefore mental health surveys are only briefly described here.

A European database of mental health surveys, Sigmund, has been assembled. A census of 60 studies from 12 European countries (Hibbett et al 1999) revealed that dementia and depression were the most common topics, and the MMSE was used in over half of the studies. A total of 66 different instruments were reported, most of them only used in single countries. Some examples of recent or ongoing international multicentre mental health surveys including study centres in European countries are described here.

The WHO in collaboration with three US National Institutes of Health began a joint project on diagnosis and classification of mental disorders, alcohol and drug-related problems in 1979. One of the primary aims of the project was to develop instruments that could be used cross-culturally. E.g. the reliability and validity of the substance abuse instruments, namely the SCAN, the CIDI and AUDADIS, was tested during the WHO/NIH project in 12 participating centres (including centres in the Netherlands, Greece and Luxembourg).

The **WHO International Consortium of Psychiatric Epidemiology (ICPE)** is an international consortium created in 1997 to facilitate cross-national comparative epidemiological research using the WHO CIDI instrument (Cottler et al 1997, Üstün et al 1997). **The World Mental Health 2000 Initiative (WMH2000)** will include a third series of CIDI surveys. The WMH2000 is a project aiming to obtain accurate cross-national information about the prevalence and correlates of mental, substance, and behavioural disorders (Kessler 1999). The project is co-ordinated through the ICPE. Over 14 countries in all WHO Regions will participate. In the European region a parallel set of six nationally

representative surveys is funded by a major pharmaceutical company: in Belgium, France, Germany, Italy, the Netherlands, and Spain.

The Cross-National Collaborative Group was formed in 1990 in order to compare findings of population-based epidemiologic studies on **major depression and bipolar disorder** (Weissman et al 1996). This was the first time that the rates and patterns of major depression and bipolar disorder were compared in diverse countries using similar diagnostic methods. The DIS instrument was used in 10 countries (including France, Germany and Italy). These cross-national analyses were limited as some of the sites had quite small samples and the age structure of the samples differed.

The Outcomes of Depression International Network (ODIN) aims a) to provide data on the prevalence, risk factors and outcome of depressive disorders in rural and urban settings within the EU and b) to assess the impact of two psychological interventions on the outcome of depression and on service utilisation costs (Dowrick et al 1998). Five centres (in UK, Ireland, Norway, Finland and France) are participating. The Beck Depression Inventory (BDI) is used as the case finding instrument with a social support measure, the List of Threatening Experiences. The SCAN version 2.0 is used to measure diagnostic status, and other instruments are used to assess disability, risk factors for depression and health care utilisation. Respondents identified as cases of depressive disorders are randomly allocated to the individual intervention group, group intervention or control group.

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ORAL HEALTH SURVEYS

The **WHO Oral Health Programme (ORH)** aims to develop standard data based planning. During several past years emphasis has been given to collection for planning and monitoring of epidemiological data using WHO standards, and dissemination of data analysis results. The ORH provides technical support for epidemiological surveys and the information collected on oral diseases is stored in the Global Oral Data bank. Information for all countries for ages 12 years and 35-44 years is collated each year, but very few surveys provide a national estimate. Recommendations for Basic methods in Oral Health Surveys have been published in 1997.

Two **International Collaborative Studies on Oral Health Care Systems** have been conducted, the first from 1973 to 1981 (ICS I) and the second from 1988 to 1992 (ICS II). The ICS II was undertaken at ten sites in seven countries: Germany, France, Latvia, Japan, New Zealand, Poland, and USA. The studies included both clinical oral examinations and questionnaires/interviews. Individuals in three age groups were studied (12-13, 35-44 and 65-74 years). Data was collected e.g. on oral health behaviour, dentition and periodontal status, treatment needs, and oral quality of life. A standard oral examination protocol was developed. (Chen et al 1997)

Chen M, Andersen RM, Barmes DE, Leclercq M-H, Lyttle CS. Comparing Oral Health Care Systems. A Second International Collaborative Study. WHO, Geneva 1997.
<http://www.who.int/ncd/orh>

SURVEYS ON CHILDREN'S AND ADOLESCENT'S HEALTH

Children and adolescents are included in national HIS/HES in the Netherlands and UK. In Britain the previous National Study of Health and Growth has later been replaced by including children in the national health survey (Chinn 1995, Rona 1995). Children and adolescents have rarely been included in regional/international surveys with a health monitoring focus. However, specific HIS/HES on children's and/or adolescent's health have been conducted in most EU/EFTA Member States. These include e.g. national or regional **surveys on cardiovascular risk factors** (Guillaume et al 1996, Åkerblom et al 1999) and national or regional **growth studies** (de la Puente et al 1997, Cole & Roede 1999). The methods in these surveys vary from a few anthropological measurements to a more comprehensive health examination. In the growth surveys data collection has been carried out on routine visits (in child health care clinics or at school), or by specific survey personnel. There are also some international studies focused on monitoring specific diseases among children and adolescents. Eg. a collaborative group of childhood diabetes registers has been established in the EURODIAB project to monitor incidence and to study the risk and causation of type 1 diabetes and its geographical distribution (EURODIAB 2000).

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SURVEYS ON AGING

The International Network on Methodology of Longitudinal Studies on Aging aims to address and help resolve methodological issues in conducting and analysing longitudinal

studies. It also aims to create a network of researchers to further co-ordinate and harmonise international longitudinal research. The network was launched in 1997. It will work towards the development of substantial questions for cross-national comparison and the design of an experimental module to implement in future cycles of selected studies. (Deeg 2000)

The general objective of the EC concerted action on Gerontology, **EuGeron**, is to develop a knowledge base about the conditions of health and functioning that promote or inhibit the independent living in relation to age. The **Cross-European Longitudinal Study of Aging (EXELSA)** includes field surveys of home visit type to a representative community based sample of individuals aged 30-85. A European Survey on Aging Protocol (ESAP) has been translated to several European languages. The ESAP consists of one hour interview plus half an hour examination.

The Survey in Europe on Nutrition and the Elderly (SENECA) was initiated in 1988. Nine of the original 19 participating towns in 12 European countries continued the longitudinal study by conducting a second survey in 1993. The survey included dietary intake measures, the MMSE, the Geriatric Depression Scale, and measurements of weight, height, waist-to-hip ratio and blood samples (optional) for the random stratified sample of men and women born between 1913 and 1918. (SENECA 1996)

Deeg D. Activities of the Methodology of Longitudinal Studies on Aging Network. Paper presented at the Joint Conference of the Ministry of Health and Social Affairs, Sweden and the OECD. Stockholm, May 29, 2000.

<http://dbs.cordis.lu/cordis-cgi>

SENECA. Nutrition and the elderly in Europe. Follow-up study and longitudinal analysis. *European Journal of Clinical Nutrition* 1996;50 Suppl 2:S1-127.

INTERNATIONAL POOLING STUDIES

Some examples of international pooling studies including several European countries are described here. In these studies only the data analysis and reporting are standardised, differences in methods and data collection may restrict the comparability of data.

The DECODE-study initiated by the European Diabetes Epidemiology Group combined data from 17 population-based studies and 3 in occupational groups (DECODE Study Group 1998, 1999). The aim was to evaluate the impact of the new diagnostic criteria on the prevalence of diabetes and classification of individuals on the basis of data from epidemiological surveys carried out with the standard glucose tolerance test in European countries.

The WHO ERICA (European Risk and Incidence, a Coordinated Analysis) Study was launched in 1982 with the aim of collecting all existing CVD studies in Europe and analysing their individualised data centrally (ERICA 1988, ERICA 1991). The main criteria for joining the project were a well-defined population, a baseline study completed between 1970 and 1979, standardised methodology; and readiness to submit original, individualised data. A total of 34 studies from 17 countries were included.

The EURODEM Study (EC Concerted Action Epidemiology and Prevention of Dementia) was a collaborative study of 1980-1990 findings in several surveys in ten European countries to estimate the prevalence of dementia in Europe (Hofman et al 1991). In addition re-analysis of case-control studies of Alzheimer's disease in Europe have been carried out to study risk factors (Duijn & Hoffman 1992). A total of 20 centres participated in the prevalence study by

sending original data of 23 population studies (Hofman et al 1991). The studies used different screening procedures and psychometric instruments, e.g. the MMS, CAMDEX and CAMDOG tests, and different diagnostic protocol by neurologists, psychiatrists and trained physicians.

EURALIM (European Information Campaign on Diet and Nutrition) was designed to improve ways to compare European data on risk factors from disparate projects (Morabia 1998). EURALIM also sought to determine whether a European surveillance system of risk factors could be derived by combining data from locally run programs. It comprised 7 independent European projects (in France, Netherlands, Switzerland, Northern Ireland, Spain and Italy)

DECODE Study Group on behalf of the European Diabetes Epidemiology Study Group. Will new diagnostic criteria for diabetes mellitus change phenotype of patients with diabetes? Reanalysis of European epidemiological data. *BMJ* 1998;317:371-375.

DECODE Study Group on behalf of the European Diabetes Epidemiology Study Group. Is fasting glucose sufficient to define diabetes? Epidemiological data from 20 European studies. *Diabetologia* 1999;42:647-654.

ERICA Study. *European Heart Journal* 1988;9(Supplement 1):1-36.

ERICA Research Group. Prediction of coronary heart disease in Europe. The 2nd report of the WHO-ERICA Project. *European Heart Journal* 1991;12:291-297.

Hofman A, Rocca W, Brayne C, Breteler M, Clarke M, Cooper B, Copeland J, Dartiques J, Da Silva Droux A, Hagnell O, Heere T, Engedal K, Jonker C, Lindsay J, Lobo A, Mann A, Mölsä P, Morgan K, O'Connor D, Sulkava R, Kay D, Amaducci L. The Prevalence of dementia in Europe: A collaborative study of 1980-1990 Findings. *International Journal of Epidemiology* 1991;20(3):736-748.

Morabia A, Beer-Borst S, Hercberg S, for the EURALIM Study Group. Locally Based Surveys, Unite! The EURALIM Example. *American Journal of Public Health* 1999;88(8):1153-1155.

Van Duijn C, Hofman A. Risk factors for Alzheimer's disease: The EURODEM collaborative re-analysis of case-control studies. *Neuroepidemiology* 1992;11(suppl 1):106-113.

OTHER INTERNATIONAL PROJECTS WITH HES METHODOLOGY

Some examples of major earlier international HIS/HES, relevant from the point of view of development of standardised HES methods are described here.

The Seven Countries Study (S.C.S) set a pattern of standardising examination methods. It was a pioneering effort in cardiovascular disease epidemiology (Keys 1980, Kromhout et al 1994). The study was the first one to make systematic comparisons of CVD rates and characteristics of risk in contrasting cultures. It was also first in combining cross-sectional surveys with long-term follow-up among cohorts. It included 16 cohorts of men aged 40-59 at the beginning of the study. The entry examinations for the study were held between 1958 and 1964, on 12 763 men in Finland (2 cohorts), Italy (2 cohorts), Yugoslavia (3 cohorts), Greece (2 cohorts) and Japan (2 cohorts). A sample of men in a small town in the Netherlands were also included as well as occupational cohorts in Serbia, the United States and Italy.

Five cohorts, located in Finland, the Netherlands, and Italy, could be re-examined at year 25 of the original S.C.S Study and then followed-up for another 5 years (Menotti et al 1996). This part of the investigation was identified as **the FINE Study** (Finald, Italy, Netherlands Elderly Study). These re-examinations were held in 1984 and 1985 when the men were aged 65 to 84 years. Further examinations in survivors have been carried out in 1991, 1995 and 2000.

The WHO European Collaborative Group comprised centres in Belgium, Italy, Poland, Spain and the UK (Rose et al 1974, WHO European... 1986). The centres collaborated in a randomised controlled trial in the 1970's called the **multifactoral prevention of coronary heart disease**. The study populations were defined occupationally, and in most instances the programme operated at the male middle-aged participant's places of work. Thus, the baseline survey of this study does not meet the inclusion criteria for this review. However, the project is worth mentioning because of the international standardisation of screening methods.

Keys A. (ed) Seven Countries. A Multivariate Analysis of Death and Coronary Heart Disease. Harvard University Press, 1980.

Kromhout D, Menotti A, Blackburn H. (eds) The Seven Countries Study. A scientific adventure in cardiovascular disease epidemiology. RIVM, Bilthoven 1994.

Menotti A, Kromhout D, Nissinen A, Giampaoli S, Seccareccia F, Feskens E, Pekkanen J, Tervahauta M. Short-Term All-Cause Mortality and Its Determinants in Elderly Male Populations in Finland, the Netherlands, and Italy: The FINE Study. *Preventive Medicine* 1996;25:319-326.

Rose G, World Health Organisation European Collaborative Group. An International Controlled Trial in the Multifactoral Prevention of Coronary Heart Disease. *International Journal of Epidemiology* 1974;3(3):219-224.

WHO European Collaborative Group. European Collaborative Trial of Multifactoral Prevention of Coronary Heart Disease. Final report of the 6-year results. *Lancet* 1986;(Apr 19):869-872.

DISCUSSION AND CONCLUSIONS

Health surveys, both interview surveys and examination surveys, are an essential component of national health monitoring, and the role of national HESs is growing in Europe. The surveys range from comprehensive ones to risk factor surveys and narrowly focused ones considering single diseases and disorders. This review describes the development and current status of national HESs in European EU/EFTA countries. In addition, it provides background information on relevant focused, regional and local or international surveys and some major surveys carried out elsewhere.

We believe that together with our expert network from most countries we have been able to put together all or the majority of the relevant information and hope that it will serve further development in this important part of health monitoring. More detailed information can be found in the database of the project which will soon be made available. Further analyses and recommendations will become available during the second phase of the project, which will be carried out during 2001 and 2002.

This inventory could not be completely representative since not all reports published in other languages than English, German or the Scandinavian languages were available. However, we believe that this bias was avoided by the questionnaires and consultations with contact persons from almost all EU/EFTA Member States, even though there were some difficulties to find suitable contact persons with national level expertise on HESs in all countries. The remaining unidentified surveys are unlikely to be major studies. However, we do not claim to have completely covered local and regional surveys, nor the majority of the abundant epidemiological studies. The contact persons were invited to join the network and attend the plenary meeting in June 2000, where the preliminary results of this inventory were presented. All contact persons also received a draft version of this report and several of them suggested additional surveys to be included in the inventory and/or other revisions of the report. Their suggestions were taken into account in this report and we believe that the potential bias in the coverage of the surveys has been greatly reduced. We do not believe that any national HESs have been missed, but there are probably some regional surveys which could have been

included. On the other hand we did not attempt to cover all regional and international surveys, since they serve here mainly as examples, which can be useful for the development of national HESs.

National HISs are a widely used tool of health policy and planning. Comprehensive national HESs are still relatively rare but interest in them is increasing. The most important reason is that accurate information on many major public health problems and their risk factors cannot be obtained by any alternative methods. National HESs have by now been carried out at regular or irregular intervals in five European countries (Finland, Germany, Ireland, the Netherlands and UK/England and Scotland). All these surveys include a HIS phase before HES. Currently pilot HES studies exist in two more countries (Italy and Norway) and plans for national HESs exist in two more countries (France and Portugal). In addition a national HIS/HES in the elderly population is planned in Sweden. The Spanish surveys carried regularly out in a large region (Catalonia) were also considered as national surveys in this inventory. No international collaborative comprehensive HESs were identified although there are a number focused surveys.

Comprehensive local or regional HESs have been carried out occasionally in several countries. Often their motivation is not a health monitoring need but scientific research. Numerous risk factor surveys have been carried out in European countries, and some of them have been part of international collaborative studies. However, these surveys are only exceptionally based on nationally representative population samples. Several regional/local HIS/HESs have been carried out in most countries and most countries have participated in major international multicentre HIS/HESs carried out since the 1950s. In a few countries these regional studies have been carried out regularly, and they have also been used to provide national health estimates.

Most surveys, national, local or international concerning the occurrence of diseases and disorders typically look at single conditions and their determinants. Usually, these surveys are descriptive or analytical epidemiological research studies although some of them have been initially designed for health monitoring purposes.

The national HIS/HESs have been carried out using different models. The surveys may consist of an interview with single measurements and/or blood samples or a comprehensive health examination taking several hours to complete. There were also important differences in the sampling frame. Some surveys have not included the institutionalised population, which may cause serious bias in the results, since those who most likely have several chronic conditions and functional limitations are excluded. Differences in the fieldwork phase limit comparability of results. There were differences e.g. in the place of the examinations (home or clinic), profession and number of survey personnel, and in their training before and during fieldwork. Quality control procedures for laboratory tests and some measurements (e.g. blood pressure) are well established and recommendations for quality control are available from previous surveys (e.g. the MONICA), but for some measurements there are no common standards.

There has been a clear emphasis on CVD in both national and regional/local surveys, but other health status components have also been covered, most often respiratory diseases and diabetes. Mental and dental health issues are often covered by separate surveys. Diagnostic interviews for mental health are part of the general HIS/HESs in a few countries (Germany, Finland, Ireland), while specific surveys are carried out in other countries (UK, Netherlands).

Similarly dental health is covered only in the Finnish national HIS/HES and in a few regional surveys in Germany, Ireland and Sweden.

Based on this review and inventory it can be concluded that so far little attention has been paid to the comparability across countries of methods and findings of national HIS/HES. Nearly all experts agree that there is a need to develop a standardised or recommended core module for HES in Europe. To improve comparability there is a need for more standardisation efforts concerning individual examination methods and measurements. Also, the survey protocol in general must be improved, in particular to obtain representative samples and to achieve high response rates. However, to reach this goal may be very difficult. In some countries low response rates in all large surveys may indicate a sort of 'survey fatigue'. Changes in attitudes towards surveys at the population level as well as improvements in the survey protocol may be prerequisites for higher response rates. Due to the destructive effect of non-response, however, new efforts are needed to improve participation in national and international studies in Europe.

Individual methods can be developed, and they have already been developed in disease specific studies, but the feasibility of these methods needs to be tested in existing national HESs. Standardisation of methods used in surveys covering other health status components except CVD is rare. Collaboration and co-ordination is needed to promote comprehensive health monitoring at the European level. One part of this is joint evaluation and development of health examinations and their methods. This will be continued during the second phase of this project.

Optimum systems of national health monitoring should utilize several existing statistical and other data sources as well as information from health interviews and health examinations. These tools should be used recurrently at suitable intervals. So far recurrent national health examinations are rare. However, national HIS/HESs were considered necessary also in countries without previous national HESs or any actual plans for such studies. The increasing interest in national HIS/HESs may well lead to more comprehensive national health monitoring systems.

In view of the primarily national development of comprehensive surveys it would seem to be advisable to improve validity and comparability of the findings by various means. Items affecting comparability between surveys and countries range from sample and contents to measurement methods and implementation. Thus, in addition to reviewing the current experience overall methodology and individual measurement methods should be reviewed, developed and recommendations on best practices should be given. For disease specific and risk factor specific information international collaborative studies as well as methods development should be continued. In due course some of the elements of comprehensive national surveys should be taken up by all of them so as to allow meaningful comparisons.

Although there are many similarities between national HESs, there are also differences between their aims, design, execution, contents and methods. It is an important future task to analyse these similarities and differences more closely in order to assess the validity and comparability of the data obtained. From the health monitoring point of view and to secure comparability between surveys there are a number of important aspects. Examples of possible problem areas are different sampling frames and response rates, differences in methods used, insufficient quality control and lack of standard measurements which would be a proof of comparability. In practice it would be relatively simple to make sure that results of laboratory

tests and a few other measurements are going to be comparable between major European surveys and other studies.

Already our superficial analysis demonstrates that there is an urgent need to analyse more closely the possibilities for enhancing comparability and to aim at recommendations and other practical arrangements which help to arrive at that goal. This is a major task during the second phase of this study. E.g. the aims of the surveys should be compared in more detail and this information should be included in the future development of the database. In this inventory general survey aims have been considered only as inclusion criteria for the surveys. However, the more specific aims of the surveys affect the whole survey process and they should be evaluated when the survey methods and their results are compared. A more detailed evaluation of the design and the sampling process, and the inclusion and exclusion criteria would also be needed to explain e.g. the big differences in survey response rates.

During the second phase of this project it is intended to 1) select, evaluate and recommend methods for use in HIS/HESs and for future field testing and development, and 2) to maintain and to develop the health survey database, to add new data and information on existing recommendations and standards and to develop the system for dissemination. The project will concentrate on methods for measurement of major public health problems such as cardiovascular and musculoskeletal diseases and functional limitations and their determinants. The relevant ongoing HMP projects will be taken into account.

Appendix 1

Search protocol

Medline (1959-1999):

Several search strategies and combinations of search terms were experimented to leave out irrelevant information. The search was limited to studies with publication year ≥ 1975 and with a target population of adults and the aged. The following were excluded: occupational health surveys, maternity health surveys, surveys on environmental risks, school health surveys, surveys in developing countries, other specific patient/population groups (e.g. sample of hospital patients, diabetic population, convicts, homeless, unemployed, institutionalized elderly, polluted areas), merely HIS (subjective evaluation of symptoms & functional capacity, self rating instruments), screening in clinical practice, studies with register based data, and methodological and policy articles without clinical data. The final search strategy was carried out in three phases:

1. Combination of Health Survey to other search terms separately (search terms selected after previous experimental searches), with the help of the EndNote3 program.
2. Combination of these 5 files and exclusion of duplicates of the articles
3. Further exclusion of methodological articles, clinical trials, disease-specific and/or local surveys, and duplicates of references to one project (e.g. NHANES, MONICA). If several articles referred to one project, the most comprehensive description was selected and measurement/disease specific results excluded.

Search terms:

Health examination survey (146 references) or **health survey and health examination** (101 references) – after exclusions finally 104 references

Health surveys & Physical examination (207 references) – after exclusions 60 references

Health surveys & Clinical examination (63 references) – after exclusions 32 references

Health surveys & Mental Health (531 references) – after exclusions 75 references **Health surveys & screening** (522 references) - after exclusions 130 references

Health surveys & Activities of daily living (392 references) – after exclusions 15 references

Health surveys & population surveillance (353 references) – after exclusions 26 references

Health surveys & geriatric assessment (83 references) – after exclusions 15 references

Health surveys & oral health or (Oral health surveys & physical examination or clinical examination) (198 references) - after exclusions 108 references

Health surveys & (Musculoskeletal diseases or muscular diseases or bone diseases) (229 references) - after exclusions 11 references

Health surveys & Respiratory tract diseases (193 references) - after exclusions 30 references

Health surveys & Cardiovascular diseases (329 references) - after exclusions 109 references

Health surveys & Diabetes mellitus (286 references) - after exclusions 15 references

Health surveys & Neoplasms or cancer (217 references) - after exclusions 9 references

Health surveys & Infection or communicable diseases (352 references, after exclusions 0)

Health surveys & Psychiatric status rating scales (148 references) - after exclusions 19 references

Combined file of these results (total 4250 references), excluding duplicates of references and after exclusions 640 references

Health surveys & names of the EU/EFTA Member States and other countries with national HES according to the International Health Data Reference Guide (NCHS 1997), 116 new references

Added to previous file, total 756 references, further exclusion – leaving 165 references

The WHO bibliographic database, WHO/Europe catalogue of publications (1990-1998) and the list of documents (1995/1996). These were contacted at <http://www.who.dk/docpub/docpub.htm>

Search terms: Health examination, Health survey, Epidemiology & statistics, Health status indicators

CORDIS, the European Community Research and Development Information Service (<http://www.cordis.lu>). Search terms: health survey (345 records), epidemiology & prevalence (74 records).

Euroethics –database (via spri web-site), European reference database for medical ethics, including references from France, Netherlands, Sweden and Germany. Search terms: health examination, health survey

Sociofile 1/74-12/97 (CD-Rom). Search terms: Health examination, Health survey

CINAHL 93-98 (Cumulative Index for Nursing and Allied Health Literature). Search terms: Health examination, Health survey and national or population based

Embase (the Reed-Elsevier Excerpta Medica database), Search term: health examination survey

OMNI (<http://www.omni.ac.uk>) gateway service (Internet resources in medicine, biomedicine, allied health, health management and related topics)

U.S. Department of Health and Human Services, list of publications (web-site

<http://www.cdc.gov/nchswww/>)

UCL Department of Epidemiology & Public Health – Joint Health Surveys Unit (web-site

<http://www.ucl.ac.uk/epidemiology/jhsu>)

Internet web-sites of the Scandinavian health authorities and public health institutes (searched for lists of publications and research activities/projects and local databases):

Sweden:

Spri (<http://www.spri.se>), Hälso- och sjukvårdens utvecklingsinstitut (Swedish Institute for Health services development)

Spriline-database and **Spriline Project -database** (references to current projects in health care and public health) (references to books, articles, reports on health care studies and development projects). Search term: Hälsoundersökningar (health surveys)

Folkhälsoinstitutet (<http://www.fhinst.se/>) – publications

Socialstyrelsen (National Board of Health and Welfare, <http://sos.se>), **Epidemiologisk centrum** (Centre for Epidemiology, <http://sos.se/epc>) – publications

Norway:

Statens institut for folkehelse (<http://www.folkehelse.no>) - publications

Statens helseundersøkelser (<http://gruk.no>) – publications

Danmark:

Dansk Institut for Klinisk Epidemiologi (<http://www.dike.dk>) – publication

Appendix 2/Table 1. National HIS/HES in EU/EFTA Member States (* the survey is included in the HIS/HES database)

Country	Name of the study	Year(s)	Survey design, population and sample type	Sample size (invited)	Response rate	Health status component(s)	Methods	References
Finland	Mini Finland Health Examination Survey/Health 2000*	1978/80 2000/01	Cross sectional with follow-up, stratified cluster sample of population aged 30 and over	8000	80% (for 2000/01 total not known yet)	CVD, Respiratory diseases, Musculoskeletal Disease, Mental disorders, their risk factors, oral and dental health	Interview, Questionnaires, weight, height, blood sample, urine sample, BP, ECG, Spirometry, dental examination, joint function test, physical examination, mental health interview etc.	e.g. The execution of... 1989
Finland	Finrisk*	5 year intervals after 1972 (first regional), latest in 1997	Cross-sectional, Stratified random sample in 5 regions, age 25-64 (adult survey) and 65-74 (Senior Survey)	10 000	72%	CVD Risk factors, functional status	Height, weight, waist and hip circumference, BP, blood samples, joint function test, additional examinations/ tests for the seniors	e.g. Vartiainen et al 1998

Germany	Bundes-Gesundheits-survey*	1984/85 1987/88 1990/91 1997/99	Cross sectional, stratified random sample of those aged between 18-79	11601	61%	CVD, DM, Allergy, etc. Multipurpose	Questionnaire, height, weight, waist/hip circumference, blood sample, urine sample, BP, M.CIDI-S, CIDI/DIA-X	e.g. Bellach et al 1998
Ireland	Survey of Lifestyle, Attitudes and Nutrition (SLÁN)*	1998	Cross sectional, multistage probability sample, population aged 18 and over	1035	55%	CVD, Mental Health, Risk factors	Height, weight, blood sample, BP, GHQ12, CES-D, WHOQol	Friel et al 1999, NNSC 1999, NNSC 2000
Netherlands	Regenboog (previous MORGEN)*	1987/91 1998 1999 2000	Cross-sectional, multistage probability sample, Population over 12 years	1550	51%	CVD, DM	Interview, height, weight, waist and hip circumference, blood sample, BP, joint function test	e.g. Smit & Verschuren 1994, Regenbook... 1999
Netherlands	NEMESIS	1996 1997 1999	Prospective, multistage stratified sample, population aged 18-64	7076	70%	Mental health	CIDI, for selected persons also SCID and MMSE for those aged 55 and older	Bijl et al 1998 a & b
Netherlands	National Dental Survey	1986	Cross-sectional Stratified sample of population aged 15-79 years	7879	45%	Oral/dental health	Interview, clinical dental examination	Van't Hof et al 1991

Spain/ Catalonia	CRONICAT*	1986-88 1990-92 1996-97	Cross-sectional, Multistage probability sample of men and women aged 25-64	3500	75%	Focus on CVD, Including other chronic diseases (e.g. respiratory, DM)	Interview, Height, weight, waist/hip circumference, blood sample, BP, ECG, Spirometry, audiometry (only 1986-88), MMSE, CESD depression scale (only 1996-97)	Sans (personal communication)
UK/ England	Health Survey for England*	Yearly since 1991	Cross-sectional, Multistage probability sample of households/ persons aged 2 and over	12019	74%	Multipurpose	Interview, questionnaire, height, weight, waist-hip circumference, BP, ECG (1999), Blood sample, Spirometry (1995/96)	e.g. Prescott- Clarke & Primatesta 1996
UK/ Scotland	Scottish Health Survey*	1995 1998	Cross-sectional Multistage probability sample of households, persons aged 2- 74 years	7932	71%	Multipurpose	Interview, questionnaire, height, weight, waist-hip circumference, BP, Blood sample, Spirometry	e.g. Doug & Evens 1995

UK	National Psychiatric Morbidity Surveys	1993/94	Cross-sectional, Multistage stratified sample of households to identify persons aged 16 to 64 years	12730	79%	Psychiatric (e.g. neurotic and psychotic disorders, alcohol and drug dependence)	Interviews (e.g. CIS-R, PSQ, SCAN, GHQ)	e.g. Melzer et al 1995 Jenkins et al 1997 a&b
UK	Adult Dental Health Survey	1968 1978 1988	Cross-sectional, stratified sample of addresses (households)/ Adults aged 16 and over	7252	82%	Dental Health	Interview and home dental examination	e.g. Todd & Lader 1991

Appendix 2/Table 2. National HIS/HES in planning/pilot stage in EU/EFTA Member States

Country	Name of the study	Year(s)	Survey design, population and sample type	Sample size (invited)	Response rate	Health status component(s)	Methods	References
France	Enquete sante	2002	Random sample of households, stratified by geographic area All members in the households	12 000 households (all members)	Not known	Multipurpose	Questionnaires, Weight, height and BP, audiometry, vision, oral health, blood samples	Isnard & Lang, personal communication
Italy	Pilot in Florence	2000	Random sample of the population aged 35-74 years	500-600	Not known	Multipurpose	Questionnaires Weight, height, waist-hip circumference, BP, blood samples, ECG, Spirometry	Farchi, personal communication
Norway/ Oslo	Health examination survey in regions of Oslo (HUBRO), planned to be part of a national survey	2000/01	Cross-sectional, all men and women aged 30-76 (+school survey to those aged 15-16)	50 000	Not known	Multipurpose	Height, weight, waist/hip circumference, BP, blood sample, bone density measurement on subsamples, Psychiatric screening	Selmer (personal information)

Sweden	The Swedish National Study on Ageing and Care (SNAC)	2001	Cross-sectional with follow-up examinations, random sample of individuals stratified by age and geographic area, 60-96 years, including institutionalised	10 000	Not known	Multipurpose	Questionnaire, Interview, Height, weight, blood and urine sample, BP, ECG, vision, hearing, cognitive function, functional status, CPRS-d	Lagergren 2000
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Appendix 2/Table 3. Exaples of major HESs outside Europe

Country/ region	Name of the study	Year(s)	Survey design, population and sample type	Sample size	Respon- se rate	Health status component(s)	Methods	References
USA	National Health and Nutrition Examination Survey (NHANES)	1960/62 1971/74 1976/80 1988/94 1999-	Cross-sectional, Multistage sample of non- institutionalised population aged 2 months and over. Oversampling of black persons, Mexican- Americans, the very young and the very old	40 600	73%	Multifocus	Interview, examination with e.g. blood samples, OGTT, BP, spirometry, fundus photograph, gallbladder ultrasound, bone density measurements, x-rays of the hands, wrists and knees, physician's and dentist's examinations, cognitive assessment, physical performance tests, audiometry, DIS	NCHS 1994

Canada	Canadian Study of Health and Aging		Random sample of population aged 65 and older (including institutionalized)	Community sample 14091, Institutional sample 1586	72-82%	Dementia	Modified MMSE (3MS), CAMDEX, clinical interview and physical examination, neuropsychological tests	MacKnight et al 1999
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Appendix 2/Table 4. Major regional/local studies in EU/EFTA Member States

Country/ region	Name of the study	Year(s)	Survey design, population and sample type	Sample size	Respon- se rate	Health status component(s)	Methods	References
Austria/ Graz	Austrian Stroke Prevention Study	1991/93	Cross sectional with follow up examinations every 3 years, Random sample of population aged 50 to 75 years	8436	32%	Cerebrovascular Risk Factors	Neurologic and physical exam, BP, MMSE, Mattis Dementia Rating scale, ECG, Blood sample, neuroimaging and neuro- psychological tests for 500 participants	Schmidt et al 1994 Schmidt et al 1997
Belgium/ All 43 districts	Belgian Interuniversity Research on Nutrition and Health	1979/84	Cross-sectional, men and women aged 25 to 74 years, random samples in 43 districts	8058	31-46%	Nutrition and cardiovascular risk factors	24h food record, questionnaires, height, weight, BP, ECG, blood sample	De Backer 1984 De Backer et al 1998
Denmark/ Copenhagen	The Copenhagen City Heart Study	1976/78 1981/83	Prospective, population aged 20 years and over living in a defined area	20 000	74% 70%	Cardiovasculat and cerebrovascular diseases/risk factors	Questionnaires, Height, weight, BP, ECG, Blood sample, lung function test	Appleyard 1987 Clausen & Jensen 1990 Clausen & Jensen 1992

Denmark/ 11 municipalities in the western part of Copenhagen county	Copenhagen County Centre for Preventive Medicine (former Glostrup Population Studies)	1964-74 1978 1982-84 1986-87 1991	Cross-sectional and longitudinal, several birth cohorts/random samples of the population aged 30, 40, 50 and 60	25 000	73-88%	CVD and multipurpose	Questionnaires, BP, Physical examination, blood and urine samples, OGTT, spirometry, cognitive function tests (differences between study years/samples)	e.g. Hagerup et al 1981, Sjøel et al 1998, Høidrup et al 2000
France/ Gironde and Dordogne	PAQUID	1988/90	Longitudinal, random sample of community residents aged 65 years and older	5554 + 380 inst.	68%	Ageing, disability, dependence	Questionnaire, cognitive function tests (e.g. MMSE), CES-D, ADL, Dental examination	Dartigues et al 1992
Iceland/ Reykjavik	The Reykjavik Study	1967/69 1970/72 1974/79 1979/84 1985/91	Longitudinal (one cohort) and cross-sectional (5 cohorts), males and females living in Reykjavik and adjacent communes born 1907-1935.	34174	69%	CVD, Diabetes, rheumatoid factors, lung function, Risk factors	Questionnaire, height, weight, BP, chest x-ray, ECG, OGTT, Blood and urine samples, Spirometry, physical/ Medical examination	e.g. Hardarsson et al 1987, Jonsson et al 1992, Sigurdsson et al 1995, Vilbergsson et al 1997
Ireland/ Kilkenny	Kilkenny Health Project	1985/86 1990/91	Cross-sectional, random samples of those aged 35 to 64 years	749 (+approx. 600 in the reference county)	70-75%	CHD and cerebrovascular disease and their risk factors, Oral health	Questionnaire, interview, height, weight, BP, ECG, blood sample	Daly et al 1991 Shelley et al 1991 a& b Shelley et al 1995

Italy/ 17 out of 20 regions	Cardiovascular Epidemiological Observatory (AMNCO)	1998	Cross sectional, stratified sample of the population aged 35-74 years Screening at 34 Cardiology Centers or Divisions covering all regions in Italy	6414	Not reported	CVD Risk factors	Questionnaire, height, weight, waist and hip circumference, BP, ECG	Giampaoli & Vanuzzo 1999a&b
Italy/ 8 municipali- ties distributed across northern, central and southern Italy	Italian Longitudinal Study on Aging (ILSA)	1992 /93 1995	Longitudinal, random sample of those aged 65-84	5632	64-83%	Chronic conditions, risk and protective factors, functional ability	Interview, BP, blood sample, MMSE, ADL, IADL, physical examination, Spirometry, retinography etc., clinical confirmation of diagnoses by specialists (phase 2)	Maggi et al 1994, ILSA 1997, DiCarlo et al 2000
Norway/ 3 counties	The Cardiovascular Disease Study (The County Study)	1974/ 76 1977/ 83 1986/ 88	Longitudinal, All men and women aged 35- 49 and a random sample of those aged 20-34	161 000	83%	CVD Risk factors	Questionnaires, Height, weight, BP, blood sample	e.g. Bjatveit et al 1979, Bjartveit et al 1983

Norway/ 18 counties	The Age 40-programme	1985-	Cross-sectional, all men and women aged 40-42 (plus other age groups in some counties and study years)	340 000	67% (latest round)	CVD Risk factors, since 1994 also asthma, muscular pain, psycho-social problems, women's health	Questionnaires, Height, weight, BP, blood sample	Bjartveit & Wøien 1997
Sweden/ Örebro	Individual Development and Adaptation (IDA)	1965 1968/71 1981 1998	Longitudinal Age cohorts studied at age 10 – 43 (main cohort)	512 (I) 639 (IV)	78.5% 63-89%	Social, psychological and physical factors	In 1998: Questionnaires, personal interviews and examination e.g. height, weight, BP, ECG, bone density measurement, blood and urine samples, memory test, psychiatric interview (SCID)	Bergman 2000
Sweden/ Uppsala	The Primary Preventive Study in Uppsala	I 1970-1973 II 1980	Longitudinal, all men born in 1920-24	I 2322 II 2063	I 81.7% II 90%	CVD, DM, Risk factors	Questionnaire, Height, weight, skinfold BP, Blood sample, OGTT	Lithell et al 1984 Skarfors et al 1991
Sweden/ Västerbotten	Västerbotten Intervention Programme (VIP)	1992-1993	Cross-sectional with intervention, all men and women aged 30, 40, 50 and 60 years	24870	57%	CVD Risk factors	Questionnaire, Weight, height, BP, Blood sample	Weinehall 1998

Sweden/ Malmö	Malmö Preventive Project	1974- 1984	Cross-sectional with follow up and intervention, all men born in 1949-1921	22444	75%	CVD Risk Factors	Questionnaire, interview, examination: weight, skinfold, BP, lung function test, OGTT, blood sample	Berglund et al 1996
Sweden/ Göteborg	Multifactor Primary prevention Study	I 1970/73 II 1974/77 III 1980/83	Prospective, All men born between 1915- 1922 and 1924- 1925 (intervention group one third)	10 000 (interven- tion group)	75%	CVD risk factors	Questionnaire, Screening examination: Weight, height, BP, ECG, blood sample	Wilhelmsen 1986 Rosengren et al 1999a
Sweden/ Göteborg	Prospective Population Study of Women	1968/69 1974/75 1980/81 1992/93	Prospective, Women, sample on the basis of date of birth	Not reported	90% 89% 79% 70%	Multipurpose survey	Questionnaire, Health examination: Weight, height, waist and hip circumference, triceps and subscapular skinfold, BP, ECG, blood sample, Dental examination	Ahlqwist 1999

Sweden/ Göteborg	The Study of Men Born in 1913, 1923, 1933 and 1943	1963+ re-examinations 1973 1983	Longitudinal, sample of men aged 50	973 292 1016 1463	88% 77% 76% 55%	CVD Risk factors	Questionnaire, Health examination: Weight, height, waist and hip circumference, BP, ECG, blood sample + chest x-ray in 1963	Hansson 1999 Rosengren et al 1999b
Switzerland /Geneva	Bus Sante	Annual since 1992	Cross-sectional, random sample of men and women aged 35-74	1212 (latest)	59%	CVD Risk factors, women's health	Questionnaires, interview and examination: Weight, height, BP, blood sample	e.g. Morabia et al 1997
UK/253 towns	British Regional Heart Study	1978/80	Prospective, men aged 40-59 years	8241	78%	CVD Risk factors	Questionnaire, Weight, height, BP, Spirometry, ECG, blood sample	Shaper et al 1981
UK/London	Whitehall study	1967/70 1985/88 1991/93	Longitudinal, Civil servants aged 35-55 years working in the London offices	19019 10308	73%	CVD Risk factors	Questionnaires, Weight, height, BP, ECG, blood sample, OGTT	Hemingway et al 1998 Stafford et al 1998
UK/ Scotland	Scottish Heart Health Study (linked with the Scottish MONICA survey)	1984/87	Cross-sectional with register based follow-up, Men and women aged 40-59 years registered with randomly selected GPs	10359	74%	CHD Risk factors	Questionnaires, Weight, height, BP, ECG, blood sample, 24 h urine specimen	Smith et al 1987 Lee et al 1990 Cairns et al 1992 Woodward et al 1992 Todd et al 1999

UK/ Scotland	West of Scotland Twenty-07 Study	1987/88 1990/91	Prospective survey of three age cohorts, aged 15, 35 and 55 at first interview	3036	86%	Multipurpose	Interview, Questionnaire, Weight, height, BP, Spirometry, ECG	Der et al 1999
UK/ Northern Ireland	Northern Ireland Health and Activity Survey	1992	Cross-sectional, two-stage probability sampling of adults aged 16 years or over	1600	39%	Physical activity, other lifestyle parameters and CVD Risk factors	Interview, Weight, height, BP, ECG, blood sample, treadmill test	MacAuley et al 1996 MacAuley et al 1998
UK/ Six areas of England and Wales	Medical Research Council Cognitive Function and Ageing Study	1991/92	Longitudinal cohort study with stratified random samples of people aged 65 and over	24 066	82%	Cognitive function	Interview (e.g. MMSE, CAMCOG)	Brayne et al 1998 Melzer et al 1999

Appendix 2/Table 5. Major International Multicentre HIS/HES in Europe

Countries/ Regions	Name of the study	Year(s)	Survey design, population and sample type	Sample size	Respon- se rate	Health status component(s)	Methods	References
23 countries in Europe	The CINDI Programme	1985-	Cross-sectional surveys, random sample of population aged 15/25 to 65 years	800-1000/ survey site	Not reported	Risk factors for major non- communicable diseases	Questionnaires and screening examination: Height, weight, BP, blood samples	WHO 1994
48 centres (in 11 EU countries+ 7 other countries)	ECRHS	1990	Cross-sectional surveys, random sample of population aged 20-44	3000/ centre	40-80%	Asthma, asthma- like symptoms and brochial lability, and risk factors for asthma	Questionnaire and examination: spirometry, blood samples, skin prick testing, 24 h urine collection	e.g. de Marco et al 1994 & 1998 Kogevinas et al 1998 Norrman et al 1998
22 centres in 9 European countries	EPIC	1996-98	Prospective cohort study, population aged 30-40 to 60-74	35 000- 50 000/ Country	Not published	Risk factors for cancer	Dietary and lifestyle questionnaires, examination: weight, height, waist and hip circumferences, blood samples, BP	e.g. Klipstein- Grobush et al 1997 Kroge et al 1998 Riboli & Kaaks 1997

16 centres in 19 European countries	EVOS	1989-	Cross-sectional, population aged 50 and over	600/centre	5-83%	Prevalence and risk factors of vertebral osteoporosis	Life-style questionnaire and examination: height, weight, lateral thoracic and lumbar spine radiographs, bone density measurement	e.g. Johnell et al 1997 O'Neill et al 1995
41 centres in 26 countries (11 European countries)	MONICA	1982-1988	Cross-sectional, population aged 35-64 (25-74 in some centres)	1200-1600/centre	54-89%	CVD risk factors (extended for local needs/interests in most countries)	Questionnaires and examination: height, weight, waist circumference, BP, blood sample	e.g. Böthling et al 1989 Keil et al 1995 Tunstall-Pedoe et al 1988 WHO 1997

Appendix 3

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Country	UK
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Tel	+44 171 391 1269
Fax	+44 171 813 0280
e-mail	paolap@public-health.ucl.ac.uk

Appendix 4. Abbreviations and list of measurements/tests/instruments

Studies

- Countrywide Integrated Noncommunicable Disease Intervention CINDI
- European Community Respiratory Health Survey ECRHS
- European Network for the Calculation of Health Expectancies (European Réseau De Vie En Santé) Euro-REVES
- European Prospective Investigation of Cancer and Nutrition EPIC
- European Risk and Incidence, Coordinated Analysis ERICA
- European Information Campaign on Diet and Nutrition EURALIM
- EC Concerted Action Epidemiology and Prevention of Dementia EURODEM
- European Vertebral Osteoporosis Study EVOS
- Finland Italy, Netherlands Elderly FINE
- Multinational Monitoring of Trends and Determinants in Cardiovascular Disease MONICA
- The Survey in Europe on Nutrition and the Elderly, a Concerted Action SENECA
- The Seven Countries Study on Coronary Heart Disease S.C.S

Other abbreviations

- Computer assisted personal interview CAPI
- Coronary Heart Disease CHD
- Cardiovascular Diseases CVD
- General Practitioner (personal/primary health care doctor) GP
- Health Examination Survey HES
- Health Interview Survey HIS
- Combination of HIS and HES HIS/HES

Clinical measurements

- Blood pressure BP
- Electrocardiography ECG
- Spirometry
 - Vital capacity VC
 - Forced vital capacity FVC
 - Forced expiratory volume in one second FEV₁
- Peak expiratory flow PEF
- Body Mass Index BMI

Instruments/scales

- Automated Geriatric Examination Computer Assisted Taxonomy AGE CAT
- Activities of Daily Living ADL

- Instrumental Activities of Daily Living IADL
- Cambridge Cognitive Examination CAMCOG
- Composite International Diagnostic Interview CIDI
 - Mental health
- Clinical Interview Schedule CIS
 - Mental health
- Center for Epidemiologic Studies Depression Scale CES
- Diagnostic Interview Schedule DIS
 - Mental health
- General Health Questionnaire GHQ
- Mini Mental State Examination MMSE
- Present State Examination PSE
 - Mental health
- Psychosis Screen Questionnaire PSQ
- Schedule for Clinical Assessment in Neuropsychiatry SCAN
- Rose Questionnaire
 - Cardiovascular symptoms
- Structured Clinical Interview SCID
 - Mental health
- WHOQol
 - Quality of life
- Laboratory tests (Serum, Plasma, Blood, Urine)
 - Albumin Alb
 - Indicator of kidney function
 - Alanine Aminotransferase ALAT
 - Indicator of liver and gall bladder function
 - Alkaline Phosphatase AFOS
 - Indicator of gall bladder function, skeletal diseases
 - Aspartate Aminotransferase ASAT
 - Indicator of myocardial function, liver function
 - Bilirubine Bil
 - Indicator of liver and gall bladder function
 - Calcium Ca
 - Indicator of nutrition status, fluid balance, endocrine diseases, carcinoma etc.
 - C-reactive Protein CRP
 - Indicator of infections
 - Total Cholesterol Chol
 - Blood lipid level
 - HDL Cholesterol Chol-HDL
 - Blood lipid fraction (high density)
 - LDL Cholesterol Chol-LDL
 - Blood lipid fraction (low density)
 - Cotinine
 - Indicator of active and passive smoking
 - Creatinine Crea
 - Indicator of kidney function
 - Erythrocyte Count Eryt
 - Indicator of anemia
 - Ferritin Ferrit
 - Indicator of iron deficiency and iron overload

- Fibrinogen
Indicator of e.g. infections Fibr
- Folate
Indicator of nutrition and megaloblastic anemia Folat
- Follicle-Stimulating Hormone
Indicator of hormone balance, menstrual cycle FSH
- Fructosamine
Indicator of diabetes ProtGly
- Glucose
Indicator of diabetes Gluc
- Gamma-Glutamyl Transferase
Indicator of liver and gall bladder function, chronic alcohol consumption GT (γ GT)
- Glycosylated Hemoglobin
Indicator of diabetes, glucose balance GHb-A1, GHb-A1c
- Hematocrit
Indicator of iron deficiency B-HKR
- Hemoglobin
Indicator of iron deficiency Hb
- Hepatitis markers
anti HBs, anti HBc, HbsAg,
antiHCV, anti HAV
- Immunoglobulin E
IgE
- Immunoglobulin G
IgG
- Immunoglobulin M
IgM
All immunoglobulins are indicators for immunological disease mechanisms
- Insulin
Indicator of diabetes Insu
- Iron
Indicator for iron deficiency and excess Fe
- Leucocyte count
Indicator of e.g. infections Leuc
- Lipoprotein (a)
Lipo(a)
- Apolipoprotein B
LipoB
- Apolipoprotein A-1
LipoA1
- Apolipoprotein E
ApoE2, ApoE4
All lipoproteins are indicators for cardiovascular risk
- Luteinizing Hormone
Indicator of menstrual cycle LH
- Magnesium
Indicator of nutrition status Mg
- Mean Corpuscular Volume
MCV
- Mean Corpuscular Hemoglobin
MCH
- Mean Corpuscular Hemoglobin Concentration
MCHC
Haematological analysis
- Oral Glucose Tolerance Test
OGTT
- Potassium
Indicator of nutrition status and fluid balance K
- Platelet Count
Haematological analysis Tromb
- Rheumatoid factor (Waalser-Rose/Latex tests)
Indicators for rheumatoid diseases RF-O(latex), RF
- Thyroxine
Indicator of thyroid function T4

- Thyroid-Stimulating Hormone TSH
Indicator of thyroid function
- Triglycerides Trigly
Blood lipid level
- Triiodothyronine T3
Indicator of thyroid function
- Uric Acid Uraat
Indicator of kidney function and gouty arthritis
- Vitamin A A-vit
- Vitamin C C-vit
- Vitamin E E-vit
- Vitamin B12 B12-Vit
- Vitamin D D-vit
Indicators of nutrition and e.g. risk for osteoporosis (D-vit)

Appendix 5. Questionnaire(a) of the HES inventory

Project
'Health Surveys in the EU: HIS and HIS/HES evaluations and models'

**QUESTIONNAIRE CONCERNING METHODOLOGICAL ASPECTS
OF HEALTH EXAMINATION SURVEYS**

Survey name: [filled in by means of the database]
Institute: [filled in by means of the database]
Country: [filled in by means of the database]



This project is financially supported by the European Commission



This project is realised in co-operation with the
University of Maastricht, department of Medical Sociology
The Netherlands

This page contains information we have derived from the literature. These data may be outdated or inadequate. Please make additions and/or corrections. If options are mentioned, then we would like you to make a choice from these alternatives.

Survey name : [filled in by means of the review]
 Survey name in English: [filled in by means of the review]

Institute mainly responsible for this survey and the contact person:

Institute : [filled in by means of the review]
 Department : [filled in by means of the review]
 Name contact person : [filled in by means of the review]
 Telephone number :
 Fax :
 E-mail :

Other institutes involved in this survey (please state their role):

.....

Institutes that finance the survey:

.....

The type of the above-mentioned survey:

[filled in by means of the review]

(options: national HIS/HES; national HES; regional HIS/HES; regional HES; other)

Coverage of the survey:

[filled in by means of the review]

(options: Broad/multipurpose survey; Focused survey (e.g. cardiovascular); Other)

The frequency of the survey:

[filled in by means of the review]

(options: Continuous; Yearly; Yearly; Irregular; Only once)

The years in which the survey was carried out (incl. this year if applicable):

[filled in by means of the review]

The next year(s) the survey is expected to be carried out:

[filled in by means of the review]

Survey design:

[filled in by means of the review]

(options: Cross-sectional study without follow-up; Cross-sectional with register-based follow-up, Cross-sectional with follow-up examinations for subsample(s)/all participants)

The mode of data collection used for the survey:

[filled in by means of the review]

(options: One phase only, The examination consists of several phases, e.g. interview phase/questionnaire before examinations, additional phases/examinations after screening)

Survey structure:

(options: Core survey supplemented with different modules each time the survey is conducted, Core survey supplemented with specific modules for certain subpopulations, No major differences between years and subpopulations, Other)

Health status components covered in the examinations

(Filled in by means of the review)

Component	Year(s)
Cardiovascular disease	
Respiratory disease/respiratory function	
Diabetes mellitus and metabolic diseases	
Musculoskeletal diseases	
Allergy	
Kidney and urinary tract diseases	
Thyroid function	
Infectious diseases and immunization	
Diseases in liver, gall bladder, stomach and pancreas	
Hematologic disorders	
Reproductive/women’s health	
Hearing	
Vision	
Functional health status	
Mental health/psychiatric disorders	
Dental health	
Risk factors and health behaviour	
Other, specify _____	

Measurement/methods (e.g. laboratory and other tests) used:
(Listed by means of the review)

Anthropometric measurements:

- height
- weight
- skinfold
- waist/hip circumference
- demi-span

Blood samples

Fasting status: Fasting, non-fasting

Analysis: in the field laboratory, sent to external/centralised laboratories, samples stored for future analysis (specify temperature)

Urine samples

Type of sample/test: Dipstick, spot sample, urine collection (overnight, 24 hour etc)

Blood pressure

number of measurements:

type of device:

length of resting before measurements:

length of resting between measurements:

ECG

Protocol: 12 lead, other

Interpretation: Minnesota code, other
Automatic, manual

Spirometry

FVC, FEV₁, PEF

Allergy test

Skin prick test, other

Bone density measurement

Ultrasound, other

Location (calcaneus, trochanter, radius etc.):

Type of device:

x-ray:

Chest, other

Vision

Hearing

Functional status assessment/tests (specify)

Cognitive function assessment /tests (specify)

Diagnostic mental health interview (name of instrument)

Other diagnostic and/or symptom questionnaires (e.g. Rose questionnaire)

Clinical dental examination

Clinical physical examination

Description of main topics:

Other, specify

PLEASE ANSWER THE FOLLOWING QUESTIONS:

1. **In general two types of sample are possible.**

Which of these was used the last time the survey was carried out?

- A sample of households → go to question no. 2
- A sample of individuals → go to question no. 3
- Not applicable: all citizens were included → go to question no. 7

2. **If a household sample was drawn: which persons of the household were examined for the survey?**

- Only one person
- A limited number of persons of the household, namely persons
- All persons of the household of a certain age
- All persons of the household

→ go to question no. 4

3. **If a sample of individuals was drawn: were other persons belonging to the household examined as well?**

- Yes, all members of the household were selected
- Yes, some members of the household were selected
- No other persons were examined

4. **What kind of sampling procedure was applied?**

- A multistage probability sample → go to question no. 5
- A simple probability sample → go to question no. 7
- Other procedure, namely

.....

..... → go to question no. 7

5. **If a multistage probability sample was taken: which variables were used for the stratification?**

(tick more than one answer if necessary)

- Age
- Sex
- Marital status
- Geographic area
- Degree of urbanisation
- Other, namely

6. **If a multistage probability sample was taken: was oversampling applied for certain groups of persons?**

- Yes, namely for
- No

7. In the case of a HIS preceding the HES, where all sampled persons invited to health examinations?

- Yes, all persons were invited
- No, only a sample of those who were interviewed or returned a questionnaire were invited
- No, but all those who were first interviewed or returned a questionnaire were invited
- No, only those who filled the following criteria were invited
Criteria _____

**8. What size was the sample (those invited to the examinations) the last time the survey was carried out?
(net sample size, i.e. *exclusive of non-response*).**

Number of households:

Number of persons:

**9. Which of the following institutionalised groups were included in the survey?
(tick more than one answer if necessary)**

Persons living in:

- Homes for the elderly
- Nursing homes
- Psychiatric institutions
- Institutions for the mentally handicapped
- Boarding schools
- Convents/monasteries
- Prisons
- Others, namely

10. Was the survey restricted to certain age groups?

- Yes: minimum age:
maximum age:
- No: all age groups were included

11. What was the overall percentage of non-response for the health examinations the last time the survey was carried out?

(Number of examined households or individuals / Number of sampled households or individuals)

Percentage non-response:% (households)

Percentage non-response:% (individuals)

12. In the case of non-response: was basic information on the non-respondents collected e.g. by means of a short questionnaire?

- Yes
- No

- 13. Please indicate below in which months the examinations were conducted the last time the survey was carried out?
(tick all months that apply)**

- | | | |
|-----------------------------------|---------------------------------|------------------------------------|
| <input type="checkbox"/> January | <input type="checkbox"/> May | <input type="checkbox"/> September |
| <input type="checkbox"/> February | <input type="checkbox"/> June | <input type="checkbox"/> October |
| <input type="checkbox"/> March | <input type="checkbox"/> July | <input type="checkbox"/> November |
| <input type="checkbox"/> April | <input type="checkbox"/> August | <input type="checkbox"/> December |

- 14. Average duration of health examination per participant (total)**

Interview phase _____ hours _____ minutes

Examination phase _____ hours _____ minutes

- 15. Where were the field examinations carried out?**

- At the participants home
 At a mobile clinic
 At normal health care organisations/facilities (health centres or hospitals)
 Other _____

- 16. Was specific survey personnel employed to carry out the examinations?**

- No, regular health care personnel was used
 Yes, specific survey personnel/teams was employed

- 17. What kind of personnel groups carried out the examinations? (tick several, if necessary)**

- Nurses
 Physicians
 Psychologists
 Dentists
 Dental hygienists
 Laboratory technicians
 Medical-technical assistants
 Trained/lay interviewers
 Other _____

- 18. What kind of training did the personnel receive before and/or during fieldwork? (tick several, if necessary)**

- A general training before fieldwork
 A special training for some/the following methods _____
 Repeated training/briefing during fieldwork
 Other _____

- 19. Were the examination results entered in a computer file already during the field examination?**

- Yes
 No

20. Which previously standardised or recommended procedures (e.g. cardiovascular survey methods recommended by WHO, blood pressure measurement according to the WHO MONICA protocol) were followed during the fieldwork?

21. How were the participants informed about examination results? (tick several if necessary)

- The results were explained to them during and/or at the end of the examination
- The results were explained in a mailed letter to the participant
- The results were mailed to the participant's own doctor, GP or other professional

22. Was external quality control performed during fieldwork (other than laboratory tests)?

- Yes, by _____ name of the institute(s)
- No, only internal quality control
- Other _____

23. What type of quality control procedures were used during fieldwork (other than Laboratory tests)?

- Repeated measurements of the same subjects
- Analyses of standard/control samples
- Monitoring findings reported by observers
- Other _____

24. Are the micro-data (i.e. data on the level of the individual) from the survey available (in principle) for research by other institutes?

- Yes
- No

25. Publications: The following publications have been used in our literature review

Please, give a list of other major publications where the design, methods and procedures of this survey have been reported

SOME QUESTIONS ABOUT OTHER HEALTH EXAMINATION SURVEYS IN YOUR COUNTRY

If you know of any other health examination surveys in your country that would be of interest to us, please fill in the next section. Please inform us also of surveys at an advanced planning stage.

Please note that any survey to be included should meet the following criteria:

1. The survey should contain a substantial *health monitoring* component.
2. The survey uses *national* population-based samples or representative *regional* samples.
3. The survey should not be restricted to a specific part of the population (e.g. children, occupational groups, patients or prisoners)
4. The survey should not be restricted to one specific health component/disease (e.g. nutrition, asthma or AIDS)
5. Preferably there should be plans to repeat the survey later unless it already has been repeated. You can record also once-only surveys if there are no repeated surveys.

Name of the survey:

Name of the survey in English:

Type of survey
(National /regional):

Institute responsible for this survey:

Contact person for this survey

Address

Telephone number

Fax

E-mail

Name of the survey

Name of the survey in English

Type of survey
(National/regional)

Institute responsible for this survey

Contact person for this survey

Address

Telephone number

Fax

E-mail

Name of the survey
Name of the survey in English
Type of survey
(National/regional HES)
Institute responsible for this survey
Contact person for this survey
Address
Telephone number
Fax
E-mail

THANK YOU FOR ANSWERING THE QUESTIONS.

Please return this questionnaire, our draft description (review) with your corrections and, if applicable, manuals/protocols to:

National Public Health Institute (KTL)
Department of Health and Disability
Päivikki Koponen
Mannerheimintie 166
FIN-00300 Helsinki
Finland
e-mail: paivikki.koponen@ktl.fi

Appendix 5 (b)

Project
'Health Surveys in the EU: HIS and HIS/HES evaluations and models'

**QUESTIONNAIRE CONCERNING HEALTH EXAMINATION SURVEYS
AND THEIR METHODOLOGICAL ASPECTS**

Contact person:

Country:



This project is financially supported by the European Commission



This project is realised in co-operation with the
University of Maastricht, department of Medical Sociology
The Netherlands

1. Have HES been carried out in your country?

- Yes
- No (go to question number 5)

2. What type of HES have been carried out?

- With nationally representative population samples
- With regional/local population samples
- By participation in international multicentre studies
- Other

3. Have some of the HES been broad, multipurpose surveys on the general health status of the population and with a health monitoring focus (as opposed to surveys restricted to one specific health component, e.g. asthma)?

- No
- Yes

4. Are there any plans for future national HES in your country?

- Yes, in _____ (year) No

5. If no national HES have been carried out in your country, is this mainly because:

- National health examination surveys are considered too expensive
- National health examination surveys are considered too difficult to implement (e.g. difficulties to receive sufficient participation rates)
- Regional surveys are considered sufficient
- Participation in international, multicentre studies is considered sufficient
- National Health Interview Surveys are considered sufficient
- Other reasons _____

6. Do you consider national HES necessary?

- Yes, definitely
- Yes, possibly
- No

7. Please, provide some arguments why you consider national HES necessary

8. Please, provide some arguments why you consider national HES unnecessary

9. Do you think there is a need to develop a standardised/recommended core module for health examination surveys in Europe?

Yes

No

10. Are you interested in participating in the development of such a module for health examination surveys?

Yes

No

11. If you are not interested, can you suggest some other person in your country whom we can contact?

Name

Organisation

Address

In annex 1 you will find a draft summary description based on our literature review, please check the information and let us know of anything you would like to add or correct!

If you know of any other health examination surveys in your country that would be of interest to us, please fill in the next section. Please inform us also of surveys at an advanced planning stage.

Please note that any survey to be included should meet the following criteria:

6. The survey should contain a substantial *health monitoring* component.
7. The survey uses *national* population-based samples or representative *regional* samples.
8. The survey should not be restricted to a specific part of the population (e.g. children, occupational groups or patients)
9. The survey should not be restricted to one specific health component/disease (e.g. nutrition, asthma or AIDS)
10. Preferably there should be plans to repeat the survey later, unless it already has been repeated. You can record also once-only surveys.

Name of the survey

Name of the survey in English

Type of survey (National /regional)

Institute responsible for this survey

Contact person for this survey

Address

Telephone number

Fax

E-mail

Name of the survey

Name of the survey in English

Type of survey (national/regional)

Institute responsible for this survey

Contact person for this survey

Address

Telephone number

Fax

E-mail

Name of the survey

Name of the survey in English

Type of survey (national/regional HES).....

Institute responsible for this survey

Contact person for this survey

Address

Telephone number

Fax

E-mail

THANK YOU FOR ANSWERING THE QUESTIONS.

Please return this questionnaire our draft description (review) with your corrections and, if applicable and possible, articles or other reports on HES in your country to:

National Public Health Institute (KTL)
Department of Health and Disability
Päivikki Koponen
Mannerheimintie 166
FIN-00300 Helsinki
Finland
e-mail: paivikki.koponen@ktl.fi

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