

**DEFINING A MINIMUM DATA SET AND RELATED INDICATORS FOR USE
WITH THE SYSTEM OF HEALTH ACCOUNTS IN THE EUROPEAN UNION**

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ABBREVIATIONS

Π	Productivity
BASYS	Consultancy for Applied Systems Analysis (Beratungsgesellschaft für angewandte Systemforschung)
C	Cost sharing for personal services
CARE	Expenditure for dependency care
CEPS	Centre for Population, Poverty and Public Policy Studies (Centre d'Etudes de Populations, de Pauvreté et de Politiques Socio-Economiques)
CREDES	Research and Information Centre for Health Economics (Centre de Recherche, d' Etude et de Documentation en Economie de la Santé)
CURA	Expenditure for personal health services excluding CARE
DDD	Defined Daily Dose
EBM	Evidence based medicine
ECHI	European Community Health Indicators
EPC	Economic Policy Committee
EUROSTAT	Statistical Office of the European Communities
HALE	Health-adjusted life expectancy
HL	Health labour
HPRI	Health care prices
ICHA-HC	International Classification of Health Accounts- Health Functions
ICHA-HF	International Classification of Health Accounts- Health Funding
ICHA-HP	International Classification of Health Accounts- Health Providers
IGSS	General Inspectorate of Social Security (Inspection Générale de la Sécurité Sociale)
MS	Member State
NHPC	National Health Policy Committee (Australia)
OECD	Organisation for Economic Co-operation and Development
OMC	Open Method of Coordination
OOP	Out of pocket (payments for health care)
QALY	Quality-adjusted life year
PR	Patient ratio
PHI	Private health insurance
PREV	Expenditure for health prevention
SHA	System of Health Accounts
SHI	Social health insurance
TFR	Total financing rate
PFR	Public financing rate
SHA	System of Health Accounts
SNA	System of National Accounts
SPC	Social Protection Committee
THE	Total health expenditure at current prices
THER	Total health expenditure at constant prices
VA	Value added
IC	Intermediate consumption
WHO	World Health Organisation

PREFACE

This report summarises interim results of work to develop indicators focusing on four dimensions of health system performance: sustainability, efficiency, effectiveness, and equity, by applying the method of the *System of Health Accounts (SHA)*. It is proposed that these indicators form a Minimum Data Set to use with the SHA. To this end Eurostat has provided grant funding for two closely related projects within the work programme of the Core Group on Health Care Statistics of the Partnership Health.

The results of both projects are presented in this report. It should be noted that the indicators proposed are related to both the selected dimensions for measuring health system performance, and the SHA method, which means that the proposed indicators do not reflect all dimensions of health care policy. Examples of a broader set of indicators proposed by ECHI and other projects are also presented in this report.

The paper is an internal document and should not be quoted without authorisation by the authors. Comments are welcome.

EXECUTIVE SUMMARY

1. Eurostat wants to improve the information available for policy-making in health care in European countries. To this end it has provided grant funding for two closely related projects within the work programme of the Core Group on Health Care Statistics of the Partnership Health :

Development of a Methodology for Collection and Analysis of Data on Efficiency and Effectiveness in Health Care Provision

and

System of Health Accounts (SHA) in the EU: Definition of a Minimum Data Set and of Additional Information Needed to Analyse and Evaluate SHA.

This is an interim report on work being carried out in these projects.

2. The work focuses on four dimensions of health system performance which reflect current European health policy objectives:

- sustainability;
- efficiency (and productivity);
- effectiveness;
- equity.

3. This paper reviews work done to date to assess health system performance in these areas by academic researchers, national governments and international organisations; proposes a set of indicators for a Minimum Data Set (MDS) on the basis of this assessment; and describes an approach to collecting prototype data for these indicators for the Member States of the European Union.

4. The four dimensions are defined as follows:

A *sustainable* health system is one in which the scale and the structure of the state's activities are such that the health needs of the current generation for high quality effective health services may be met without compromising the ability of future generations to meet their needs.

An *efficient* health system is one where the maximum possible outcome is produced for a given level of expenditure, this being achieved by maximising productive and allocative efficiency.

The *effectiveness* of a health system may be measured by assessing the extent to which health system interventions achieve defined goals for health outcomes, for outputs and the quality of the process of care, and for health system responsiveness to the legitimate expectations of the population.

An *equitable* health system is one which ensures equality of opportunity, where anyone receives as much health care as anyone else in the same medical condition, regardless of any factors thought to be irrelevant e.g. income, race, sex and age.

5. The indicators proposed to measure performance in these areas are the following:

Summary of indicators proposed for the MDS of the System of Health Accounts

Policy dimension and sub-dimensions	Indicators for immediate compilation	Indicators for future development
1. SUSTAINABILITY		
Scale of health expenditure	Total health expenditure/Gross National Income	
Scale of publicly-financed health expenditure	Public health expenditure/Gross National Income	
Fiscal sustainability	Public health expenditure/total government expenditure ^a	Evolution of revenue/expenditure ratios
2. EFFECTIVENESS		
Outcomes	Infant mortality PYLL ^b for selected causes	Mortality and PYLL for causes of death amenable to health care Disability adjusted life expectancy Changes in the prevalence of risk factors linked to health behaviours
Process/quality of care		Preventive care (vaccination and cancer screening rates)
Responsiveness		Further discussion needed to define suitable indicator
3. EFFICIENCY/PRODUCTIVITY		
System productivity		Effectiveness indicators with related health expenditure
Unit cost	Average unit costs for selected outputs where data is immediately available (e.g. hospital inpatient cases)	Unit costs of selected outputs (such as case-mix adjusted hospital admissions, Defined Daily Doses)
Mode of production	Ratios of day-care surgery to all surgery for selected procedures	
Input productivity		Value added per employee
4. EQUITY		
Equity of finance	% of private financing (for out-of-pocket expenditure and for private insurance) for selected health care functions (HC.1 to .5)	Financial burden of health care by decile of income (all payments) i.e. direct payments by households for health care including direct taxes, contributions, OOP, private health insurance premiums
Equity of access and utilisation of the health care system		Geographical disparities (standardised by age and gender of the population) in: <ul style="list-style-type: none"> – Health sector employment per inhabitant – Hospital admission rates for selected diseases / interventions
Geographical		
Between socio-economic groups		Health care expenditure, breakdown by function, by deciles of household income (if possible standardisation by health status, see below)
Effect of health care system on health inequalities		Disparities in health status by: Socio-economic status or decile of income Level of education Geographical area

6. Having defined the indicators for our MDS, the next step is to assess the availability of information with which to compile these indicators, and the approach to use to compile and to interpret them. Some of the data is available in SHA, and some of it in other databases. Of

^a Total government expenditure as defined in the System of National Accounts

^b Potential years of life lost

course this availability varies between countries. Work carried out in another Eurostat-funded project on SHA provides the most up to date assessment of current availability of SHA data in Member States. This shows the extent to which SHA data needs to be supplemented with other data to compile the MDS proposed here, as of December 2003.

7. In order to interpret the data in the MDS it will be necessary to have the following information on the context of the data:

- SHA data;
- Data on utilisation of health services and prices;
- Manpower data;
- Metadata on health systems;
- Metadata on statistical resources;
- Metadata on the compilation of SHA;
- Metadata on regulations concerning the financing and provision of health services.

8. The report distinguishes between two approaches to collecting SHA data for the MDS : either using standard data tables or integrated data sets. Standard tables represent the traditional approach to data collection from Member States. The procedures for the collection of the data are defined and described in guidelines. The compilation is done in the Member States. The integrated data set approach collects all data needed to compile the tables. The data set is based on transactions (activities) and actors. The core indicators or tables are derived by procedures of aggregation of transactions and actors.

9. The next stage of this work will be to collect prototype data for the MDS for Member States. This pilot phase of data collection will enable us to refine our selection of indicators and to develop detailed definitions of each indicator, by giving us an idea of the feasibility of collecting and the accuracy of the data available for each indicator.

10. We will then be in a position to:

- prepare detailed suggestions for the MDS data structure and detailed suggestions for the provision of additional (contextual) data required to interpret the MDS;
- prepare a logical data model for MDS data and additional data;
- make a final proposal for the MDS contents and arrangements for work-sharing and mutual support between Member States and Eurostat.

1 INTRODUCTION

This report presents a proposal for a Minimum Data Set (MDS) on health system performance to be developed from the System of Health Accounts (SHA) and other relevant data in European countries. The proposed MDS includes information on four dimensions of health systems: sustainability, efficiency, effectiveness and access including equity. Indicators are proposed relating to each of these dimensions. The choice of dimensions, and their related indicators, has been guided by EU policy objectives with regard to health and health care, and a review of recent and ongoing work on measuring health system performance by academic researchers, national governments and international organisations.

The work carried out to produce this report has been done within two Eurostat grant-funded projects :

Development of a Methodology for Collection and Analysis of Data on Efficiency and Effectiveness in Health Care Provision

and

System of Health Accounts (SHA) in the EU: Definition of a Minimum Data Set and of Additional Information Needed to Analyse and Evaluate SHA.

These projects are part of a broader programme of work to develop the SHA in Europe. Details of other projects and their interrelationships and dependencies are given in Chapter 8.

1.1 Organisation of the report

The report is presented in two parts. Part I reviews the work done to date on health system performance assessment by academic researchers, national governments and international organisations, for the four dimensions specified above, and then proposes a group of indicators for an MDS. In Chapter 2 current work to develop the SHA in Europe is discussed briefly, in the context of the development of EU health policy. The report then defines a conceptual framework within which an MDS may be developed (Chapter 3). Chapter 4 proposes a set of indicators for an MDS within this framework.

Part II assesses the current availability of SHA data, in order to take forward the development of practical proposals for implementing an MDS for the System of Health Accounts. Chapter 5 describes SHA data in the light of the indicators proposed in Chapter 4, and Chapter 6 assesses the possibility of Member States (MS) supplying the data required to produce these indicators, given current progress in implementing SHA at the national level. Chapter 7 makes some preliminary remarks about the practicalities of operationalising a Minimum Data Set. Chapters 8 and 9 respectively discuss coordination with other projects in this area, and present conclusions.

PART I. WHICH INDICATORS AND WHY

2 BACKGROUND

2.1 European Union health policy

The European Union considers a healthy population to be crucial for the well-being of our societies, and therefore a prerequisite for sustainable development. A safe environment and decent health care are basic elements of social and economic progress. How a society cares for its most fragile members is also a measure of its own health and sustainability. Good health is important for our economic and material prosperity: sick or unhealthy people cannot work and are dependent on those who do.¹(p 22)

Properly functioning social protection systems help to keep populations healthy. The Commission's Communication of 14 July 1999 on "A concerted strategy for Modernising Social Protection" identified four broad objectives for reforming social protection systems:

- To make work pay and provide secure income
- To make pensions safe and pension systems sustainable
- To promote social inclusion, and
- To ensure high quality and sustainability of health care.²

With the broad objective of “ensur(ing) high quality and sustainability of health care”, the communication stresses the need to :

- “- contribute to the efficiency and effectiveness of health systems so that they achieve their objectives within available resources;
- ensure access for all to high quality health services and reduce health inequalities”;

and to strengthen support to long term care for frail elderly people and to improve illness prevention and health promotion. The objective thus encompasses all four dimensions of sustainability, effectiveness, efficiency, and access including equity.

A report on health care and care for the elderly drafted by the Social Protection Committee and the Economic Policy Committee for the Barcelona European Council in March 2002 also underlines the importance of these dimensions.³ This report was prepared on the basis of the Commission's Communication “The future of health care and care for the elderly: guaranteeing accessibility, quality and financial viability”.⁴ The report draws attention to the long-term projections of public expenditure on healthcare and long-term care of the elderly undertaken by the Economic Policy Committee ...(which) suggest that sustainability and cost-effectiveness will be a major focus of concern of health and care systems over the coming years. (p 7) With regard to the accessibility of health systems, the report draws attention to the need to ensure that the population as a whole can access high quality health care.....in an effective and cost-efficient way. (p 5) The report also advocates the pursuit of equity in health systems which guarantee solidarity, equity and universality. (p 5)

2.2 Developing indicators of health system performance in Europe

2.2.1 Development of health indicators by Eurostat

In 1997, the Eurostat Task Force ‘Health Care Statistics’ presented a conceptual framework for the phased introduction of a comprehensive system of health care statistics in Europe at the 1997 meeting of the Working Party (WP) ‘Public Health Statistics’. The ‘System of Health Accounts’ (SHA) is a core element in this comprehensive framework with health expenditures serving as the pilot area for the overall SHA. The WP discussed and approved both the framework concept and the SHA elements suggested. From 1997 to 2000, the current version of SHA was developed as a joint effort of the OECD Health Policy Unit in Paris and the Eurostat Task Force ‘Health Care Statistics’ (TF/CARE). In 2000 the development phase was completed with the release of the OECD manual on SHA.⁵

In the meantime, most Member States (MS) have started to implement SHA. More and more data from prototype implementations in MS is becoming available. On various occasions – particularly during meetings of the TF/CARE in spring 2001 and spring 2002 – experts have discussed how to use this SHA data to inform national and international health policy development. In so doing they explicitly referred to the framework of the European Programme of Community Action on Public Health 2003-2008.

One of the three main aims of this programme is to “improve information and knowledge for the development of public health.”⁶ One action to support this aim, defined in the published programme, is to develop and operate “a sustainable health monitoring system to establish comparable quantitative and qualitative indicators at Community level on the basis of existing work..... and to collect, analyse and disseminate comparable and compatible age- and gender-specific information on human health....concerning health status, health policies and health determinants”.^c

So, we have an important new source of comparable data on health expenditure and a clear mandate from the EU to develop and use information of this kind to improve public health. Eurostat has taken practical steps to put this into practice by commissioning work to develop a methodology for collecting data on efficiency and effectiveness, and to develop an MDS based on SHA. The Terms of Reference for these two projects specify the particular dimensions of health systems for which indicators should be developed. These dimensions reflect EU policy with regard to health development.

In the context of health policy, using SHA data to analyse the dimensions of *efficiency* and *effectiveness* in health care provision is considered particularly important for the following reasons:

- The majority of users are not fully aware of the potential embodied in SHA. In particular the fact that data on health care resources, and health care output, and financial data on health expenditure and sources of funding, is becoming available

^c Other actions to be taken in support of this aim include: improving the system for the transfer and sharing of information and health data including public access; developing mechanisms for analysis, advice, reporting, information and consultation with Member states and stakeholders on health issues relevant at Community level; improving analysis and knowledge of the impact of health policy developments and other Community policies and activities.....in contributing to a high level of health human protection, including developing criteria and methodologies for assessing policies for their impact on health.⁶

simultaneously and in a consistently defined way, has not yet been fully understood or exploited. SHA data opens up new possibilities for analysing the efficiency and effectiveness of health systems.

- Classical economic analysis – e.g. all forms of monitoring the “economic principle” – is often still underused in health care because the main interest has been in input factors. The output of the health care system – the goods and services produced – is not analysed. Monitoring output, if it is practised at all, is done using proxies; a comprehensive nomenclature system for health care “output” does not exist. SHA data can help to fill this gap.

Monitoring the performance of health systems in these areas requires sophisticated data, at least some of which SHA can provide. The SHA is a nested system based on a set of different but complementary data, collected systematically by referring to a common framework. SHA data can be used to analyse the performance of health systems from the point of view of efficiency, effectiveness, sustainability and accessibility. In order to do this, we must first answer the following questions:

- Which forms of efficiency/effectiveness analysis are explicitly asked for by health policy makers in MS?
- Which indicators of efficiency/effectiveness already exist?
- Which further similar indicators are likely to be needed?
- How can we assess the sustainability, accessibility and equity of our health systems?
- Which information and analysis can be provided using existing data?
- Which additional data are needed to provide the requested information?

As several projects dealing with SHA are currently underway, any new work in this area must take due account of existing information, as well as additional information which is scheduled to become available soon. The following information is relevant and currently available:

- The SHA manual contains a set of 10 “standard tables”, which are intended to present the core information collected in SHA. They determine potentially available SHA data and enable the identification of possible gaps in the data. (See Annex F for a list of the categories used in the International Classification of Health Accounts of the SHA.)
- Since 2001, a Eurostat project on “Statistical Analysis and Reporting of Data on Health Accounts” has been compiling the results of SHA prototype implementations in MS. It aims to evaluate the consistency and comparability of data from different MS, and to advise them on how to improve data quality. The project results provide information on the subset of SHA “standard” data currently available in MS.⁷
- Since 2001, a Eurostat project has been developing guidelines for SHA implementation in MS. The project will provide insight into problems which MS confront when compiling SHA data.⁸
- A Eurostat project completed in 2003 has explored the possibility of routinely providing health expenditure data categorised by age and gender.⁹

2.2.2 Development of health indicators by the General Directorate of Health and Consumer Protection

The European Community Health Indicators (ECHI 2) project is being carried out within the Programme of Community Action on Public Health (2003-2008) of the Directorate General of Health and Consumer Protection (DG SANCO). It has compiled a draft list of indicators which are considered necessary from the European perspective, relating to demographic and socio-economic factors, health status, determinants of health and health systems.¹⁰ The indicators for an MDS proposed in this paper cover, broadly speaking, the same area as the health system indicators proposed in ECHI 2, although they are grouped differently. This paper is, then, presented as a contribution to the debate on what would constitute an appropriate group of indicators for monitoring the performance of European health systems.

2.2.3 Development of social indicators by the Economic and Social Protection Committees of the European Council

At the European Council of Göteborg in June 2001¹¹ it was proposed to apply the Open Method of Coordination (OMC)^d in the area of health care and long term care for the elderly. Following this the Commission presented its first ever communication on health care and care for the elderly where it sets out the guiding principles for European health care systems: accessibility, quality and financial viability.¹² The Social Protection Committee (SPC) and the Economic Policy Committee (EPC) of the European Council are implementing the OMC approach in this area, by developing comparable quantitative indicators to measure progress and facilitate the exchange of information between MS. An indicator sub-group of the SPC has been developed for this purpose. So far two indicators which specifically address health have been proposed within a broader group addressing the issue of social inclusion (otherwise known as poverty).^e The indicator development sub-group will begin working on health indicators soon.

The potential of the OMC has already been demonstrated in the field of pensions: the European Council and the European Commission prepared a joint report on the quality and sustainability of pensions in the light of demographic change, for the Brussels European Council in March 2003.¹³ The approach used in the pension report guides, to some extent, the definition of financial sustainability discussed in the following chapter.

^d The open method of co-ordination is an approach to cooperation between MS in which countries establish common objectives in a given policy area, prepare national action plans, examine each other's performance with Commission guidance, and learn from their successes and failures. It is a new way of working together in the EU – no longer using legislation alone, but also through flexible yet structured co-operation among Member States.
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^e The first of these is either: the percentage of the population failing to reach age 65 (premature mortality), or the ratio of the proportions in the bottom and top quintile groups (by equivalised income) of the population aged 15 and over who classify themselves as being in a bad or very bad state of health according to the WHO definition. The second proposed indicator is: the proportion of people unable to obtain medical treatment for financial reasons, or on account of waiting lists, during the previous 12 months⁶⁹ (pp 155 and 158).

2.2.4 Principles of indicator development

Indicators can and should be useful aids to policy development. Well-designed indicators should be reasonably straightforward to compile, and capable of unambiguous interpretation. There should not be duplication of effort in the production of different sets of indicators which are designed to measure similar aspects of health systems.^f The indicators presented in this report (summarised in Table 13) have been chosen on the basis of the discussion in Chapter 3 below. It is argued that these indicators will provide information which will:

- a) be feasible to provide given the current state of development of the SHA in European countries, and the availability of data in other databases;
- b) provide key data relevant to the EU's central policy concerns in the field of public health;
- c) and thereby help to improve the performance of health systems in Europe.

^f Atkinson et al (2002)⁶⁹ present a useful summary of the principles which should guide the construction of social indicators for monitoring national performance. (See p 190).

3 CONCEPTUAL FRAMEWORK FOR HEALTH CARE INDICATORS

3.1 Introduction

- For each of the dimensions of sustainability, efficiency, effectiveness and equity, the following sections: define a conceptual framework,
- review the recent attempts to measure health system performance (both in research work and in national projects aiming to monitor performance on a routine basis), and the methodological and practical difficulties,
- assess the content of SHA and other databases to select relevant indicators,
- make final suggestions on a list of indicators and data to collect.

Before developing each concept in depth, it is useful to summarize the way they relate to each other. Figure 1 below schematises the process of health production, in which individuals use medical care among other factors as inputs for producing health^g, and distinguishes three steps^h in this process:

- 1) financial resources generated by economic activity (taxes, payroll contributions, insurance premiums, households budgets...) are used to buy resources for health care, i.e. the inputs : labour, technology,...
- 2) in the first process these inputs are used to produce health services (outputs),
- 3) and in the second process health is produced using the results of the first process, the production of medical care, as input.

Sustainability relates to the first stage, i.e. how financial resources can fund the health care system securely (with a concern about the long term future). It deals with the level of health expenditure and structure of health financing (for example the level of public spending and the public/private mix).

Effectiveness is concerned with the achievement of the health care system, its outcome, this being the health of the population. In practice, as we will see below (part .2), the quality of the output (quality of care) is often used as a proxy for final outcome (i.e. health improvement).

Productivity refers to the relationship between input quantities and output quantities, in the first production process (production of health services). We call this “input productivity”. In the literature the term productivity is also used with respect to the relation of output to outcome. In this second case we use the term “system productivity”.

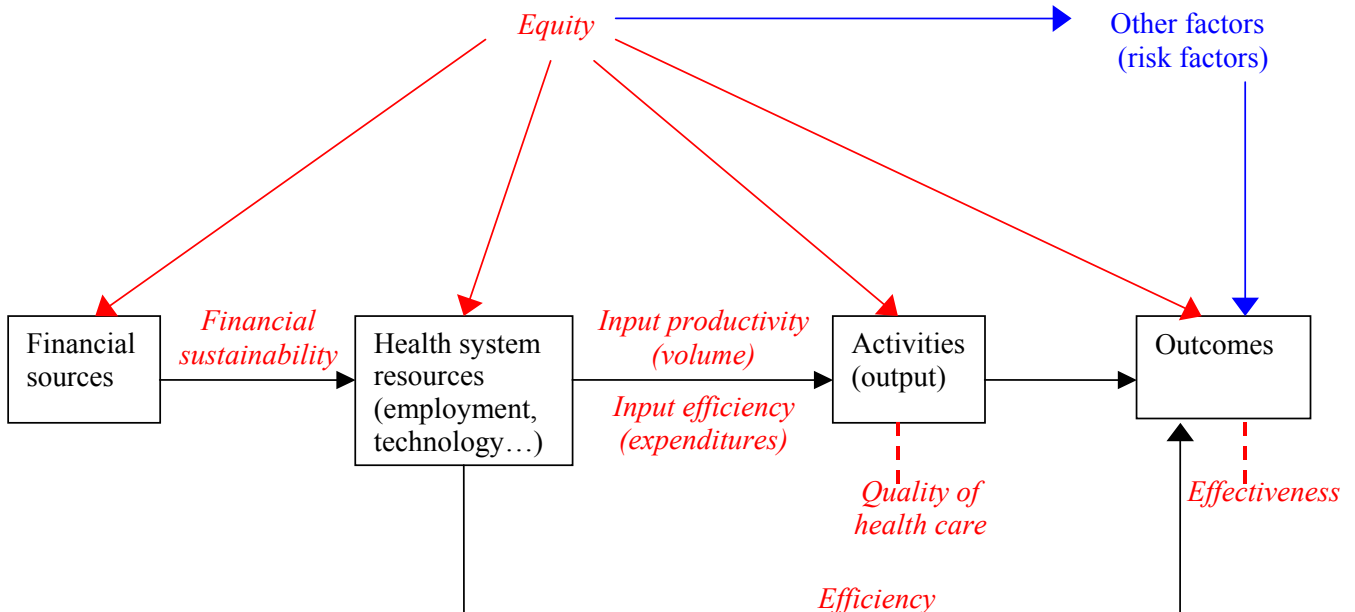
Efficiency relates the outcome to the value of the inputs, i.e. the expenditure of the health care system. Total efficiency is the result of the efficiency of the two processes: the production of health services (efficiency here derives both from productivity, i.e. the technical relation between input and output, and from input prices), and the production of health by health

^g See *Grossman M* (1972).⁷⁰

^h The relations among financial sustainability, efficiency, effectiveness, and access are developed in annex A.

services. Again, we will see that in practice, efficiency indicators are often partial and relate expenditure to outputs rather than outcomes. (This partial efficiency is referred to as „input efficiency” in the figure).

Figure 1: Health system and policy objectives

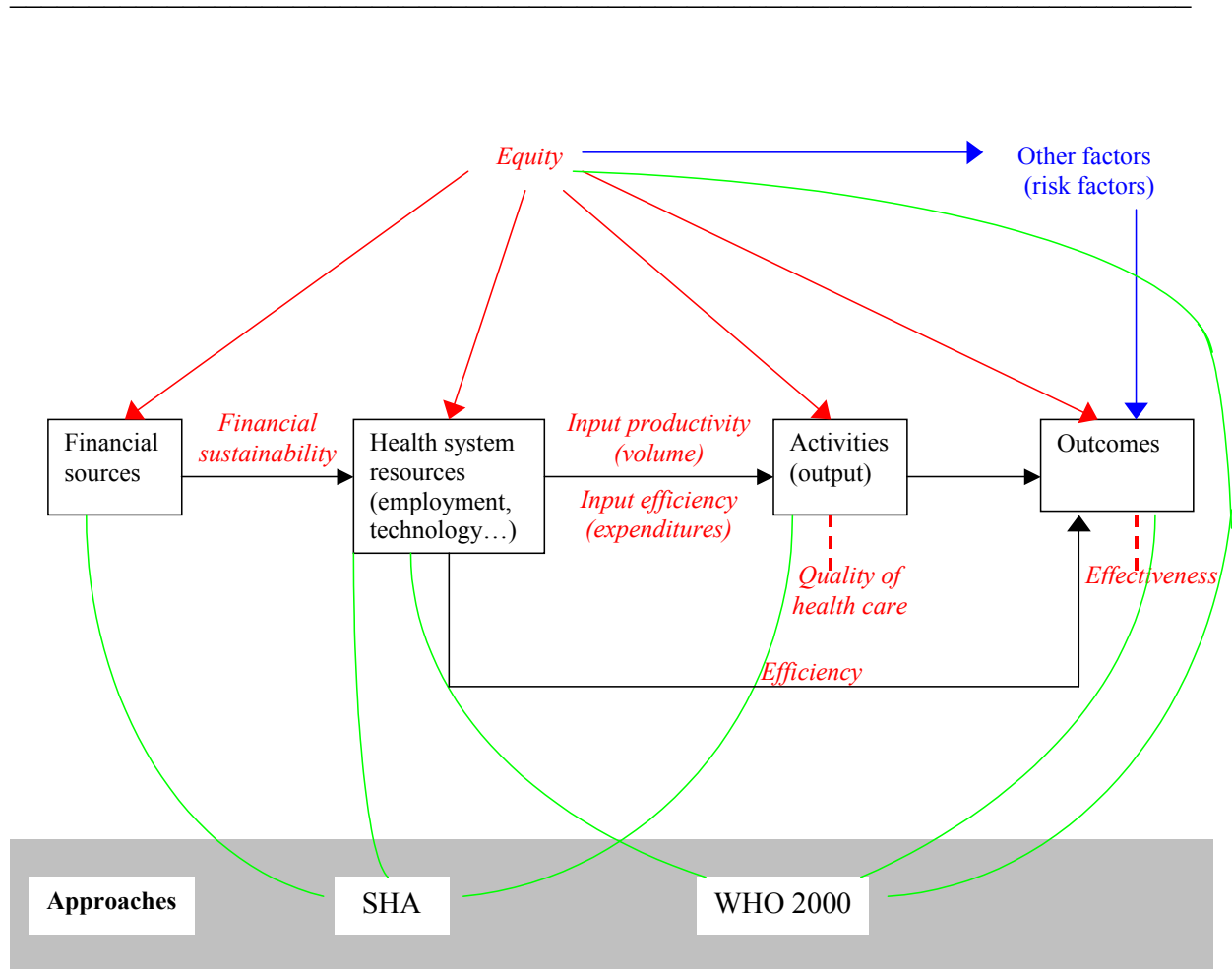


Sustainability is not independent from productivity and efficiency: efficiency helps to ensure sustainability by lowering the cost of delivering the needed quantity and quality of care. Equity adds a dimension to these processes which have been considered thus far as “macro-processes” at the level of the entire system. It refers to the distribution of each element among the population: distribution of the financial burden (equity of finance), of the quantity and quality of the outputs (health care use, health care expenditures), and of the outcome (health inequalities).

Referring to this production process, Figure 2 shows where the SHA approach lies, and thus in which areas of performance assessment it is likely to provide relevant data and indicators. By comparison, the scope of the performance assessment undertaken by WHO in the 2000 annual report is very broad, since it relates expenditures, outcomes and various dimensions of equity.¹⁴

SHA enables indicators of sustainability, efficiency or productivity to be constructed, but is obviously more limited in the field of effectiveness and equity.

Figure 2: Health system performance assessment: comparison of WHO and SHA approaches



3.2 Sustainability

3.2.1 Definitions

“Sustainability” is a concept that is “immediately understandable and yet open to multiple interpretations and misinterpretations”.¹⁵ (p 1)

The project proposal poses the following question:

*How can the provision of health care services in sufficient quality and quantity be guaranteed in future, when tax and social security systems are heavily challenged, and the size of the labour force is declining due to population ageing?*¹⁶ (p 4)

In order to design indicators for an MDS which will help to answer this question, we must produce an operational definition of sustainability. We note at the outset that we are charged with producing statistics which are as neutral as possible, so that health policy makers and politicians may use them to inform their own decisions about e.g. the appropriate level of financing of a country’s health system. Hence we are not in the business of producing “normative” indicators. An example of a normative indicator would be a measure of the distance of a country from the *desired* level of funding of it’s health system. However, where the design or interpretation of an indicator involves a value judgement, this should be made clear. For example, a positive interpretation of a rise in country X’s proportion of GDP spent on health towards the European average implies that this average is appropriate in a normative sense.

If, then, we are not trying to specify an ideal health system, the task of defining sustainability is considerably simplified. Below we consider definitions of sustainability from the perspective of welfare economics, sustainable development, sustainability as a dynamic process and generational accounting.

Welfare economics

In his textbook on the economics of the welfare state Barr examines its *sustainability*. He asks whether it is compatible with the globalisation of the economy and says that, in assessing states’ ability to adapt to globalisation, “it is vital to keep two issues logically separate:

- What should be the *scale* of the state’s activities – that is, the level of public spending on income transfers, health, education and the like?
- What is the appropriate *structure* of activity – that is, the public/private mix?”¹⁷ (p 412)

“Scale is concerned with the optimal level of spending on an activityⁱ; it is largely a macroeconomic issue, particularly of fiscal sustainability: Fiscal pressures are an argument for fiscal containment, not *per se* an argument for privatisation..... Structure is concerned with whether an activity is more efficiently produced in the public or private sector....this

ⁱ The optimal level of spending on an activity “... represents the quantity where the value gained from the last health intervention is equal to the marginal value which could be derived from the alternative use to which the resources could be put”.¹⁷ (p 279)

issue is primarily microeconomic, focusing on the extent of market failures and the ability, or otherwise, of governments to address them”.¹⁸ (p 2)

Sustainable development

Sustainable development is “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”.¹⁹(p 8) This aspect of sustainability is captured by one of the definitions proposed at the end of this section.

In the view of the European Union, sustainable development offers a positive long-term vision of a society that is more prosperous and more just, and which promises a cleaner, safer, healthier environment – a society which delivers a better quality of life for present and future generations.

Sustainable financing

Kornai and Eggleston identify nine general principles for reform of the health sector. They propose these in the context of transitional economies in Eastern Europe. However they are of wider relevance and are reproduced in Box 1. One of these relates to sustainable financing:

“The state budget must be continually capable of financing fulfilment of the state’s obligations.” (We must look at) “calculations which show how the welfare commitments legally enshrined in particular countries will become unsustainable eventually, other things being equal and taking into account the likely economic growth rate and demographic trends. State health care services, with great pressure on them from the demand side, will eventually become impossible to finance. The date when experts predict that the system will reach the financing limits varies from country to country. In some cases the gap can be financed by raising taxes, in others not. This is partly an economic question - higher taxes dampen incentives and impede investment – and partly a political one – the unpopularity of the increases must be weighed against the unfavourable effects on public opinion of reducing welfare spending”.²⁰ (pp 41- 42)

We need to distinguish between *fiscal stability* and *financial sustainability* of the health care system. Fiscal stability relates to the need for public revenue and public expenditure on health care to be in equilibrium in the short-term (say five years). Financial sustainability is a wider concept embracing the idea that total (public and private) income to and expenditure on the health system should be in equilibrium in the medium-term (say twenty years). To monitor the second we need time series indicators which will show whether countries are moving away from this equilibrium.

Sustainability as capacity to continue with no external input

In the context of sustaining primary health care in developing countries, La Fond defines sustainability as the capacity of the health system to function effectively over time with minimum external input.²¹ (p.12) (In the European context “external” would refer to entities such as the organisations of the European Union. For example the EU provides structural funds for some Member States.) She argues that there is no single or perfect combination of contextual and investment factors which will guarantee sustainability. It represents a process rather than a static quality. Indicators of sustainability must therefore capture this movement

over time, or capacity for continuity. Assessing sustainability is further complicated by the fact that there is no agreed normative definition of a health system.

The sustainability of a health system will also be affected by changes in demand placed on the system in the form of changing health risks. If health promotion, improvements in the work environment or changes in the environmental determinants of health, succeed in reducing health risk, then the sustainability of the health system will improve because fewer resources will be needed to cope with reduced demand for health care. (See in this context Robertson's discussion of the economics of sustainable development.²²)

Health sector development and economic growth

In the long-run the sustainability of a health system depends on the contribution of the health system to economic growth and productivity. Health enters the intertemporal decision framework of a society in three ways:

- First, ill-health influences the amount and productivity of labour supply to an economy.
- Second, the production of health services uses scarce resources that have alternative uses.
- Third, good health influences utility directly, which includes health, ageing, and the size of the population.

Obviously, the relations between economic growth and health expenditures are complex. In the endogenous growth model, economic growth rises with the productivity of both health generation and the human capital accumulation process.²³ (p 177). Both health production and human capital accumulation compete for scarce labour resources. The increase in input productivity, which means *ceteris paribus* that additional labour can produce human capital or consumption goods, will support economic growth. Therefore it is necessary to measure input and output productivity in order to assess long-term sustainability.

Generational accounting

Another important indicator is the quantity of health services consumed by the active and the inactive population compared to the ability to pay for these services by both groups. Generational accounting may offer some additional insights into health system sustainability. Kotlikoff cited in Barr argues (in the context of pensions) that government should promote 'generational equity' and therefore seek to equalise tax burdens across generations.¹⁷ (p 109) Applied to health care, this means that in attempting to decide the appropriate level of spending on health now we should be concerned with the balance between the population making net contributions to health sector revenue and those receiving health care but making no contributions (children and, in most cases, the elderly). However to model this for health care is more complex than for pensions, because the status of an individual at a given point in time may be that of payer and consumer of health services. For example taxed income from pensions may be used to fund health care.

The following definitions are proposed for the Minimum Data Set:

Definition 1

A *sustainable health system* is one in which the scale and the structure of the state's activities are such that the health needs of the current generation for high quality effective health services may be met without compromising the ability of future generations to meet their needs. ¹⁷ (p 412)

Definition 2

Sustainability means ensuring that sufficient resources are available over the long term to provide timely access to quality services that address the evolving health needs of populations. ¹⁵ (p 1)

3.2.2 Review of recent literature on assessing sustainability

Future requirements for health care

Ideally we would specify a set of indicators which enable us to compare whether need/demand and resources are in equilibrium; and enable us to detect changes in the public/private funding balance. This requires indicators which enable us to monitor change in the main drivers of need/demand and supply/cost over the next, say, twenty years.

To form an idea of what would be involved in this approach, we have searched the literature for comprehensive assessments of future requirements for health care. The objective here is not to do an exhaustive search for every attempt to do this, but to find examples of serious attempts to do so, which will show what is involved in designing a set of indicators which capture the main drivers of change in need/demand and supply/cost.

One such attempt is the report commissioned by the British Chancellor of the Exchequer, *Securing our Future Health: Taking a Long-term View*.²⁴ Another is described in *Policy Futures for UK Health*.²⁵ The first is the more comprehensive and detailed of these two British reports. The Canadian Commission on the Future of Health Care published a report on this subject for Canada in 2002. The Caledon Institute of Social Policy examined the issue of sustainability of health care spending in Canada.²⁶ The OECD Ad Hoc Working Group of Experts on the Fiscal Implications of Ageing has produced projections of spending on health and long-term care to 2050 for OECD countries.²⁷ Each of these is described briefly below.

UK reviews of future health care requirements

In 2001 the British Chancellor of the Exchequer commissioned a review of the long-term trends affecting the British health service. The resulting report described the key factors likely to have an impact on the resources required to deliver a high quality health service over the next 20 years – population health needs, rising expectations, technology and medical advance, and workforce and other productivity changes. ²⁴Table 1 below summarises these drivers of health need and cost. Having specified these factors the report attempts to quantify the

financial and other resources required to ensure that the NHS can provide a publicly-funded, comprehensive, high quality service available on the basis of clinical need and not ability to pay. An estimate is produced of the average annual real growth in NHS spending needed to sustain such a health service. A range of estimates is produced for three scenarios: solid progress, slow uptake and fully engaged. The scenarios vary in terms of life expectancy and health status, responsiveness of the health system, appropriateness of primary health care use, intensity of use of information technology and efficiency of resource use (see Box 1).

Box 1: Scenarios in the Wanless Report²⁴

1. *Solid progress.* The population is more engaged in its own health, life expectancy and health status improve, the health system becomes more responsive, primary care is used more appropriately, ICT is used extensively, and resources are used more efficiently.
2. *Slow uptake.* No change in level of public engagement. Small rise in life expectancy but deterioration in health status. Relatively unresponsive health service and low productivity.
3. *Fully engaged.* High level of engagement of public in its own health. Life expectancy better than current forecasts, dramatic improvement in health status, responsive health service with high rates of technology uptake. More efficient resource use.

A model is developed to estimate resources for each of these scenarios and a summary of projected UK health spending is produced. Average annual per cent real growth in UK NHS spending is estimated for 5 year periods to 2022. It is assumed, for purposes of simplification, that private health expenditure will remain constant at 1.2% of GDP.

The model estimates the impact of the following factors on future demand for health (and social care): demography, health status, health in old age, health promotion and disease prevention and health seeking behaviour. In terms of factors driving supply, the model incorporates change in technology and medical advance, information and communication technology, the health service workforce, pay and prices and productivity. The projected revenue requirements are very sensitive to the assumptions made about productivity in the model.

It is worth noting the approach to measuring productivity taken in the Wanless review. It is difficult to measure changes in productivity in services like health and education, where the majority of services are not priced in the market and changes in service quality are difficult to assess. Hence conventional measures of output used in calculations of health service productivity do not adjust for quality changes. Thus, if quality is improving, productivity will tend to be understated; whereas if it is falling, productivity will be overstated. Therefore the review attempted to consider UK NHS productivity on a quality-adjusted basis and split the productivity assumptions which it had to make into two components: the first measuring the achievement of productivity improvements through lower unit costs, and the second measuring the impact of improved quality.²⁴ (p 62)

The approach in *Policy Futures for UK Health*²⁵ is less detailed and less ambitious as far as **quantifying** the future goes. The Dargie report looks forward to 2015.

Table 1: Drivers of health need and cost over the next twenty years

		Type of trend	Factor in model
The health service in 2022		Patient & public expectations Delivering high quality	Fast access: reduced waiting times
			Safe and high quality treatment: Improved clinical governance
			Better accommodation
			National Service Framework (NSF) areas CHD Renal Cancer Diabetes Mental health Extending the NSFs to other areas
Scenarios	Impacting on demand	Changing health needs	Demography Life expectancy
			Health status Proximity to death Health needs in old age
			Impact of health promotion & disease prevention
	Impacting on supply	Technological development and medical advance	Likelihood of seeking care for a given level of need
			Technology and medical advance including ICT
			Pay and prices
Use of the workforce and productivity	Use of the workforce and productivity	Productivity	

Source: Wanless, 2002²⁴ (p 9)

This period is chosen because it extends “beyond the usual constraints of the electoral cycle, but is short enough to allow realistic assessment of future developments”.²⁵ (p xi)

The study analyses the broad environment for health in the UK in 2015, and the implications of that for current health policy. In analysing future issues for health it looks at:

- rising public expectations
- the ageing population
- new technologies
- information and communication technology and information management
- workforce education and training
- system performance and quality (ibid p 5).

Beyond highlighting these key areas of change the report is less useful for defining indicators than Wanless.

Canadian reviews of the future of health care and financial sustainability

In assessing the sustainability of the Canadian system the Commission on the Future of Health Care in Canada focussed on three essential dimensions, each of which is key to sustaining the health care system: **services**, **needs** and **resources**.¹⁵ (p 2) It emphasises that there is no invisible hand keeping these elements in place. Rather it is the overall governance of the system at all levels that ultimately decides how these elements are balanced. Thus the fourth key to sustaining the health care system is **governance**, involving the political, social and economic choices that citizens, their governments and those in the health care system

make concerning how the system balances the needs, services and resources that make up the system.

Ruggeri assesses the sustainability of the Canadian health system in response to the perception that escalating costs make the current structure and financing of health care in Canada unsustainable.²⁶ He identifies three aspects of sustainability. The first relates to the ability of the economy to sustain current and projected levels of health care spending; the second to the capacity of the full fiscal system (i.e. federal and provincial governments combined) to withstand the pressures of rising health care expenditures; the third looks at the ability of provincial/territorial governments to fulfil their constitutional commitment to the provision of health care. He concludes that at present, for Canada, if there is an issue of sustainability it is confined to the third aspect.

In looking forward, he looks at the effects of population ageing and quality on sustainability. In order to examine the effect of population ageing two projections are developed, one for total health care spending and one for GDP. To quantify the effect of ageing he incorporates the projected growth of the total population, the assumed rate of inflation and the escalation of real costs, leaving the age distribution of the population unchanged as it was in 2000. The second projection includes the projected change in the age distribution of the Canadian population. His analysis shows that the combination of population growth, population ageing and increases in per capita costs by age group will result in a steady increase in the share of GDP directed at financing health care spending, but that these increases do not reach crisis proportions and do not justify cries of unsustainability. He concludes that if a sustainability issue arises with health care spending in future it must have a fiscal dimension because – in terms of its share of GDP – health care spending is sustainable.

Although Ruggeri's projections of health care expenditure assume that the quality of health care remains unchanged at its 2000-01 level, he concedes that this assumption may not be warranted. So he looks at the effects of a \$7 billion increase in health expenditure and an increase equivalent to the rate of personal income tax growth for the following 25 years, assuming that these increases would be used at least in part to pay for improved quality. He goes on to argue that although the *level* of health spending may increase if funds are made available to improve quality, this level increase may not necessarily be associated with higher growth rates. Thus, for example, the purchase of new diagnostic equipment may raise average costs immediately, but its use may generate low marginal costs. And if such equipment can help in disease prevention through early detection, this could reduce future treatment costs. The indicators proposed by Ruggeri are worth considering for our minimum dataset and are given in Section III below.

OECD projections of health and long-term care spending

OECD projected health and long-term care spending by examining the likely impact of demographic changes on age-related public spending (old-age pensions, programmes permitting early withdrawal from the labour force, health and long-term care and child and family allowances). The projections were constructed on the basis of the average cost of health and long-term care by age group. These results were adjusted by an index of GDP per worker (taken to be a productivity indicator) and the result then taken as a share of GDP. Hence, this is an attempt to quantify resources needed in the future, but based on a much more limited range of need drivers than in the Wanless review for the UK. It is more ambitious only in the sense that it projects further forward.

Box 2: Kornai & Eggleston's principles for reform of the health sector²⁰

1. *Sovereignty of the individual*

The transformation promoted must increase the scope for the individual and reduce the scope for the state to decide in the sphere of welfare services.

2. *Solidarity*

Help the suffering, the troubled and the disadvantaged.

3. *Competition*

There should not be a monopoly of state ownership and control. Let there be competition among various ownership forms and coordination mechanisms.

4. *Incentives for efficiency*

Forms of ownership and control that encourage efficiency need to emerge.

5. *A new role for the state*

The main functions of the state in the welfare sector must be to supply legal frameworks, supervise non state institutions, and provide ultimate last-resort insurance and aid. The state is responsible for ensuring that every citizen has access to basic education and health care.

6. *Transparency*

The link between welfare services provided by the state and the tax burden that finances them must become apparent to citizens. The practical measures of reform must be preceded by open informed public debate. Politicians and political parties must declare what their welfare sector policies are, and how they will be financed.

7. *The time requirement of the programme*

Time must be left for the new institutions of the welfare sector to evolve and for citizens to adapt.

8. *Harmonious growth*

Let there be harmonious proportions between the resources devoted to investments that directly promote rapid growth and those spent on operating and developing the welfare sector.

9. *Sustainable financing*

The state budget must be continually capable of financing fulfilment of the state's obligations.

Assessing the resources needed for a basic publicly financed package of care

One approach to assessing the sustainability of health systems could involve determining the components of a basic package of care, costing this and then assessing the future availability of the revenue needed to finance this. Kornai and Eggleston provide a useful summary of methods for defining a basic package of care.²⁰ (p218) They discuss the following approaches:

1. Status quo
2. Limited by the real capacity of the health sector
3. Develop a prioritised list of included health services
4. Use legal system to define the scope
5. Clinical guidelines
6. List of excluded services.

However such an approach to developing indicators of sustainability is essentially normative and as such probably not worth pursuing in the context of this project, given our search for "neutral" statistics. An exception to this might be made if we define our basic package in terms of the status quo. It might then be instructive to track over time who is financing the basic benefit package, and whether the pattern of provision of this package is changing.

3.2.3 Indicators based on SHA

Need and cost drivers in the Wanless Report

If then we accept the drivers of health need and cost specified by Wanless as a reasonable attempt to pin down the future, what is the next step in specifying “indikanda”? Here we may jump a step for purposes of the present exercise, and focus on those indicators which SHA may address as it is currently designed, or with some additional effort.

If we accept an approach to sustainability based on asking whether countries can afford the projected cost of their health systems, one way forward would be to establish baseline activity rates and baseline unit costs for agreed disease areas (See Chart 4.1, p. 72, Wanless²⁴). Disease areas could be selected in terms of the total morbidity or mortality for which they account at the European level. The next step is to apply population projections to the baseline activity rates. The approach up to this point would be possible using SHA data.

Operationalising this model becomes more difficult when determining which activity rate adjustments and unit cost adjustments to apply. How this is done will be highly specific to each country and highly dependent on the detail in which health policy is formulated in different countries. For example, the level of detail in plans for improving clinical quality will have a considerable impact on the accuracy of the projections. Similarly for health workforce planning. (An international comparative review of health care human resource planning carried out for the Canadian Health Services Research Foundation states that planning for the medical workforce in Australia, France, Sweden and the UK is “determined by relatively mechanistic estimates of demand for medical care...and that in Germany there is no control of the overall size of the medical workforce”.²⁸(p 3) Workforce planning for other health professional groups is no better in these countries according to this report.

Despite the difficulty of determining future activity rates, and future unit costs, whether we can monitor these factors will be crucial for our ability to assess sustainability.

Indicators proposed by Ruggeri for Canada

Ruggeri proposes the following indicators for economic sustainability:

- *Total health spending: GDP*
- *Total health spending: consumer spending*

To compute the second measure of economic sustainability, *Ruggeri* derived a measure of adjusted consumer spending which includes private expenditure on health care.^j This enables him to compare the proportions of each adjusted dollar of consumer expenditure spent on different elements of health care (hospitals, physicians, drugs etc.), with the proportions spent

^j He assumes that health care services are delivered by the private sector and are purchased at a price like any other private good, but that this change from public to private delivery does not affect the total amount spent. In effect the amount of government revenue collected to pay for publicly funded health care is returned to taxpayers, thus reducing the size of the government budget by the same amount on the revenue and spending sides. Similarly, taxpayers receive an increase in their budget equal to the amount of revenue forgone by government, but must pay directly for the health care they receive.²⁶ (p 4).

on other consumer expenditures (e.g. tobacco and store-bought alcohol, transportation and communications, recreation and entertainment).

It should be noted that the relation THE/GDP, however used as standard indicator by the OECD, does not properly measure the burden of the health system in relation to the available national income of a country. This is the case for countries with considerable differences between inflows and outflows of income. Therefore, a better indicator is the relation between THE and Gross National Income (GNI).^k

For fiscal sustainability *Ruggeri* proposes:

- *Total spending on health care: total government spending.*

For the fiscal capacity of provincial/territorial governments to finance health care spending this indicator is suggested:

- *Provincial health care spending: provincial health care revenues. This would be relevant for countries with devolved health systems.*

Ruggeri uses each of these indicators of *current* levels of health spending to answer the question, is health spending sustainable in the sense of whether Canadians can afford what they are currently spending. However he also examines the effect of future trends in the factors affecting health care costs, assuming first that the existing quality of health care services and the existing cost structure will persist into the future; and then relaxing these assumptions.

He calculates the following indicators of future expenditure:

Government spending on health care as percentage of total government spending, with and without population ageing, for selected fiscal years to the year 2026. To compute this he incorporates the projected growth of the total population, the assumed rate of inflation, and the escalation of real costs.

Health care spending as percentage of GDP, with and without population ageing, also forward to 2026.

Indicators for a basic package of care

Two indicators are proposed :

1. To answer the question, “Who is financing the basic benefit package?”: *Financing source by function* (for functions relating to selected disease areas). This would require activity data classified by diagnosis as well as function. It would enable monitoring of e.g. changes in the funding source for long-term care.

^k GDP measures the value added of the economy and is the proper denominator if the production side of the health system is compared with the value added of the health sector. However, in most countries the difference between GDP and GNI is small so that there is only a significant error in countries such as Luxembourg, or when regions within countries are compared with each other.

2. To answer the question, “Who is providing the health services in the basic benefit package?”: *Provider by function* (for functions relating to selected disease areas).

Both of these indicators could be monitored for disease areas which account for some agreed proportion of total morbidity or mortality, or agreed proportion of total spend, in the baseline year.

Health expenditures expressed in PPPs (Purchasing Power Parities)

Indicators for a basic package of care have to be compiled in a common currency. Many international comparisons and aggregation procedures use purchasing power parities to convert national currencies into comparable international data. This is done on the grounds that they eliminate differences in price levels between countries more effectively than exchange rates. Thus, they provide the preferred tool for cross-country comparisons of the volume of GDP, real income levels per capita, or labour productivity.

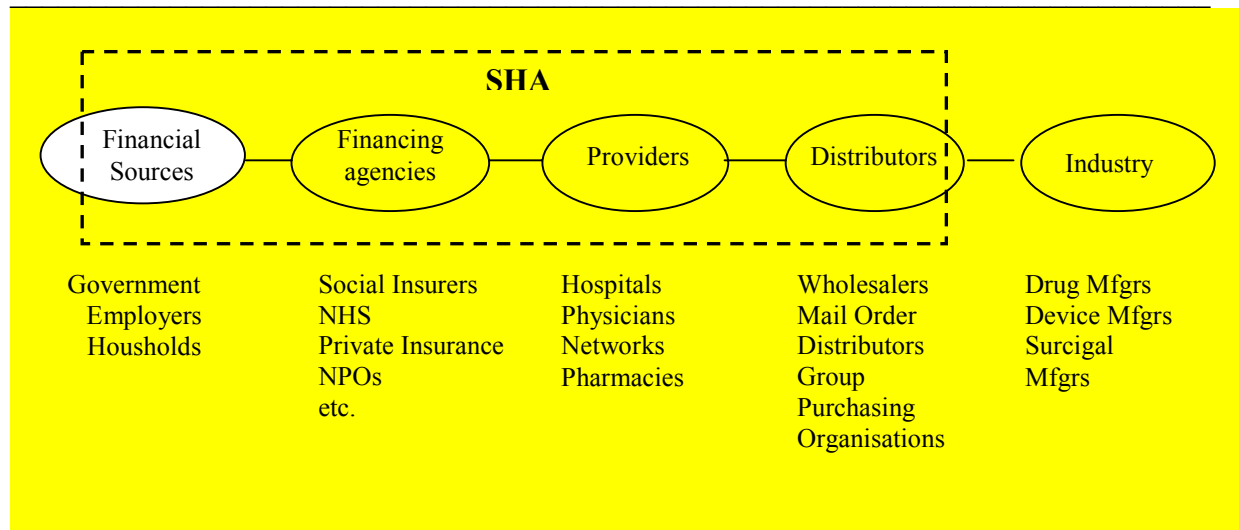
PPPs are relative prices, which show the ratio of prices in their national currencies of the same good or service in different countries. PPPs are spatial price comparisons which over time face the problem of changing product and consumption patterns. Goods and services that are characteristic in one country may be uncharacteristic in another one, and yet common ground has to be found to make meaningful comparisons.^{29;30}

Indicators of specific aspects of sustainability

The indicators of sustainability proposed so far are what might be termed high-level indicators of health system sustainability. But indicators which track specific factors contributing to sustainability may also be useful. One such factor is changes in productivity. “The efficiency with which the health service utilises its resources will be one of the most significant determinants of the cost of delivering high quality health care over the next 20 years”.²⁴ (p 61) The report identified four key drivers of efficiency improvements and hence improved productivity performance: better use of the skilled workforce; better use of information technology; more self-care by patients; and a redirection of existing health service resources towards cost-effective treatments. Combining data from SHA with labour accounting data could produce useful specific indicators of changes in work force skill mix, and therefore in one important aspect of productivity. Examples of indicators in this area are: health sector employment by provider; health sector employment by occupation; health sector employment by education; unemployment of health professions.

The Health Care Value Chain

One way to track specific factors contributing to sustainability is to look more closely at the Health Care Value Chain. The Wharton School Study of the Health Care Value Chain studied three major players at various stages of the value chain: producers (product manufacturers), purchasers (group purchasing organizations and wholesalers/distributors), and health care providers (hospital systems and integrated delivery networks). Manufacturers make the products, group purchasing organizations purchase them in bulk on behalf of hospitals, distributors take title to them and deliver them, and providers consume them in the course of rendering patient care.

Figure 3: The health care value chain

Source: Adapted from Burns et al, 2002 ³¹

Across firms engaged in trading relationships, a value chain is concerned with several theorized objectives:

- Optimizing the overall activities of firms working together to create bundles of goods and services;
- Managing and coordinating the whole chain from raw material suppliers to end customers, rather than focusing on maximizing the interests of one player;
- Developing highly competitive chains and positive outcomes for all firms involved;
- Establishing a portfolio approach to working with suppliers and customers i.e. deciding which players to work with most closely and establishing the processes and information technology (IT) infrastructure to support the relationships.

Hence, value chains are supposed to be collaborative partnerships between adjacent players engaged in economic exchange in order to facilitate transactions and/or reduce transaction costs.

Within the SHA framework, the analysis of the contributions of health care providers to the value chain is possible for all providers classified under ICHA-HP, which means that intermediate industries such as drug manufacturers are not included. Furthermore, the difference between value added and health expenditures for particular health care providers should be considered. ^{23;31}

3.2.4 Proposed indicators of sustainability

The table below summarises the indicators proposed in the foregoing discussion on sustainability of health systems.

Table 2: Proposed indicators of sustainability

Sub-dimension of sustainability	Indicator
Scale of health expenditure	Total health expenditure: Gross national income
	Provincial/regional health expenditure: provincial/regional health care revenues (for devolved health systems)
Scale of publicly financed health expenditure	Public health expenditure: Gross national income
Fiscal sustainability	Total health expenditure: total government expenditure
	Evolution of revenue/expenditure ratios
	Expenditure by age group or activity in relation to ability to pay
Productivity and efficiency ⁽¹⁾	Value added of HP: Health employment
	Unit costs of selected outputs
	Effectiveness indicators, with related health expenditure

⁽¹⁾ Productivity and efficiency are considered here as factors of financial sustainability; they are also discussed below in relation to efficiency (see Section 3.4 on efficiency and productivity).

The table below summarises the data available in databases or data collection projects for the indicators proposed in Table 2 above for sustainability.

Table 3: Data on sustainability available in databases or data collection projects

	System of Health Accounts (SHA) ⁵	Eurostat NewCronos ^{1 32}	European Community Health Indicators Project (ECHI) ¹⁰	OECD Health Data ³³	WHO database ³⁴ (European Health For All database, consulted 01/10/03)
Sustainability					
Scale of health expenditure	Existing: Total health expenditure ^m Future development: Regional health expenditure/regional health revenue	- -	Total health expenditure/GDP Total health expenditure by government, social security, households -	Total expenditure on health & total current expenditure on health as proportion of GDP, general government expenditure	Total health expenditure/GDP (official national estimates + WHO estimates)
Scale of publicly-financed health expenditure	Public health expenditure by programme (function)/total health expenditure	-	-	Public expenditure on health Public current expenditure on health	Public health expenditure/total health expenditure (official national estimates and WHO estimates)
Fiscal sustainability No data on current debt ratio currently available in international comparative databases	Future development: Expenditure by age group	-	Expenditure (%) 0-65 (m/f) “ 65-74 (m/f) “ 75+ (m/f)	Expenditure* 65+/0-64 Expenditure 75+/0-64 Expenditure 65-74/-64	-

¹ Eurostat (though not the NewCronos database) produces some statistics on health expenditure, but the source is OECD Health Data

^m SHA gives total expenditure, which must then be calculated as a proportion of total government expenditure /GDP/consumer expenditure

* To check whether this is expenditure data, or population data which must be used for a pro rata calculation of expenditure by age

3.3 Effectiveness

3.3.1 Theoretical definition

Effectiveness can be defined as the extent to which a health care system achieves goals. Assessing the effectiveness of health care systems thus first requires a definition of the goals or the expected outcomes of the system. A primary goal of the health care system is of course to improve health. But the difficulty here is to assess the contribution of the health care system to health gains, and to isolate it from other factors. To get round this problem, the quality of the process of care is often used as a proxy for health outcomes. Furthermore, responsiveness to patients is increasingly considered to be an achievement in itself, and can be included in an assessment of the effectiveness of the health care system.

3.3.2 Review of recent literature on measuring effectiveness

Health outcomes

The main goal of a health care system is to improve the health of the population. Its effectiveness should thus be measured in terms of **health gains**. But several difficulties arise when trying to evaluate the effectiveness of health care systems in terms of health outcomes.

Health, as we know, is not a straightforward one-dimensional concept. Mortality, morbidity, self assessment of health, functional status and quality of life are all part of health. To overcome the limits of crude measures of mortality, aggregate measures have been developed which incorporate morbidity and its impact on the quality of life. Disability adjusted life expectancy and disability adjusted life years (DALE, DALYs) are examples of such aggregate measures and are used by WHO in the World Health Report 2000.¹⁴ However there is ongoing debate on the appropriateness of such measures.

Another major difficulty is the problem of relating health status (whether it is measured by aggregate or disaggregated indicators) to the activities of health care system, in order to compare their performance. It is well-established that a lot of factors other than health care are involved in the production of health. (There is now a substantial literature on the contribution of health care to health.)

One way to solve the problem is to keep general measures of health status as a proxy for outcome, but to try to take into account other factors when assessing the performance of the health care system. This is the approach taken by WHO in the World Health Report 2000. Efficiency frontier analysis is used to estimate the maximum level of achievement that might be expected given the available resources. The resources considered are not only health care expenditure, but also the level of education (on the grounds that for a given level of expenditure, better results are achieved for a more educated population).

Another way is to focus on specific health status measures where health care activities have a clear impact, for example premature mortality, or more accurately, avoidable mortality (for diseases for which early diagnostic or timely and appropriate medical care should prevent death or increase survival rates). Nolte and MacKee³⁵ suggest the selection of a list of

causes of death considered amenable to health care (premature deaths). They show that comparing countries' performances on this basis leads to a ranking that differs substantially from the ranking obtained using DALE (disability adjusted life expectancy) as in the WHO report.

Health behaviours can also be the target of preventive programs and the results achieved can be monitored (e.g. tobacco and alcohol use), although the evolution of health behaviours cannot of course be related solely to health promotion interventions (as for health status).

In the review of health system performance measurement published by OECD, Hurst and Jee-Hughes mention several definitions of effectiveness and list indicators used in the corresponding national assessment framework.³⁶ They list the most frequently used health outcome indicators (see Table 4).

Table 4: Most frequently-used health outcome indicators

Health Outcome Indicators	OECD	Australia	Canada	United Kingdom	United States
Avoidable mortality by selected conditions	X	X	X	X	X
Infant mortality	X	X	X	X	X
Perinatal mortality	X	X	X	X	X
Low birthweight	X	X	X	X	X
Incidence of infectious diseases	X	X	X	X	X
Avoidable hospitalisations by selected conditions	X		X	X	X

Source : Hurst and Jee-Hughes, 2001 *ibid* (p 32)

Concerning avoidable mortality, Nolte and McKee³⁵ propose a revised list of selected causesⁿ considered to be amenable to health care, at least in certain age groups (see Table 6 below.)

ⁿ In 1976, Rutstein et al. suggested counting the number of “untimely and unnecessary deaths” for diseases from which effective public health and medical interventions are available and selected a first list of causes of death “amenable to health care”.⁷¹

Table 5: Selected causes of death amenable to health care

Cause of death	Age	International classification of diseases	
		9th revision	10th revision
Intestinal infections	0-14	001-9	A00-9
Tuberculosis	0-74	010-8, 137	A15-9, B90
Other infections (diphtheria, tetanus, poliomyelitis)	0-74	032, 037, 045	A36, A35, A80
Whooping cough	0-14	033	A37
Septicaemia	0-74	038	A40-1
Measles	1-14	055	B05
Malignant neoplasm of colon and rectum	0-74	153-4	C18-21
Malignant neoplasm of skin	0-74	173	C44
Malignant neoplasm of breast	0-74	174	C50
Malignant neoplasm of cervix uteri	0-74	180	C53
Malignant neoplasm of cervix uteri and body of uterus	0-44	179, 182	C54, C55
Malignant neoplasm of testis	0-74	186	C62
Hodgkin's disease	0-74	201	C81
Leukaemia	0-44	204-8	C91-5
Diseases of the thyroid	0-74	240-6	E00-7
Diabetes mellitus	0-49	250	E10-4
Epilepsy	0-74	345	G40-1
Chronic rheumatic heart disease	0-74	393-8	I05-9
Hypertensive disease	0-74	401-5	I10-3, I15
Cerebrovascular disease	0-74	430-8	I60-9
All respiratory diseases (excluding pneumonia and influenza)	1-14	460-79, 488-519	J00-9, J20-99
Influenza	0-74	487	J10-1
Pneumonia	0-74	480-6	J12-8
Peptic ulcer	0-74	531-3	K25-7
Appendicitis	0-74	540-3	K35-8
Abdominal hernia	0-74	550-3	K40-6
Cholelithiasis and cholecystitis	0-74	574-5.1	K80-1
Nephritis and nephrosis	0-74	580-9	N00-7, N17-9, N25-7
Benign prostatic hyperplasia	0-74	600	N40
Maternal death	All	630-76	O00-99
Congenital cardiovascular anomalies	0-74	745-7	Q20-8
Perinatal deaths, all causes, excluding stillbirths	All	760-79	P00-96, A33
Misadventures to patients during surgical and medical care	All	E870-6, E878-9	Y60-9, Y83-4
Ischaemic heart disease	0-74	410-4	I20-5

Source: Nolte and McKee, 2003³⁵

Outputs and quality of the process of care as a proxy for health outcomes

A third way to overcome the difficulty of relating health outcomes to health care resources is to focus on the process of care, especially in areas in which good quality of care has been

shown to produce better results. The idea is to assess whether care is given appropriately and according to existing clinical standards.

These approaches are increasingly being developed using clinical guidelines based on scientific evidence. They measure, for example, the appropriateness of care (and may highlight both overuse and underuse of health care), the degree to which protocols are followed for chronic diseases, the frequency of preventive care and the frequency of adverse events revealing system failures. These indicators of quality of care can be combined with indicators of avoidable mortality or morbidity.

For example, the UK NHS High-Level Performance Framework proposes a series of measures such as % of target population vaccinated, % of target population screened for specific cancers, age-standardised rates of inappropriately used surgery and admission rates for acute and chronic illnesses.³⁷ The Canadian Institute of Health Information proposes measures of prevention rates, extent of use of treatments known to be clinically effective and condition-specific survival rates.³⁶ Prevention rates are also proposed by the Australian National Health Performance Committee as indicators of effectiveness (NHPC, 2001; cit. by Hurst and Jee-Hughes (ibid)). In the USA several agencies have established lists of indicators to assess the quality of care provided by health care institutions (e.g. the National Committee on Quality Assurance for health plans and the Agency for Health Care Research and Quality).

Detailed examples of effectiveness indicators used in several performance assessment frameworks are given in annexes in Hurst and Jee-Hughes.

Table 6: Most frequently-used indicators of output or quality of process of care

Health Outcome Indicators	OECD	Australia	Canada	United Kingdom	United States
Survival rates from cancer	ARD		X	X	X
Survival rates from dialysis and transplants			X		
In hospital mortality due to AMI	ARD		X	X	
30-day perioperative mortality data			X	X	
28-day emergency readmission rates				X	
Vaccination rates	X				X
Breast/cervical cancer screening	ARD			X	X

ARD: Ageing Related Disease project of OECD

Source : Hurst and Jee-Hughes, 2001 (ibid p 32)

Responsiveness

There is an increasing interest in dimensions other than health outcomes, such as the responsiveness of the health care system. This is considered an end in itself, independently of any concurrent health gain. See for example WHO's World Health Report 2000¹⁴, which

states that “enhancing the responsiveness of the system to the legitimate expectations of the population (meet their expectations with dignified care)” is an objective of the health care system, together with two others (i.e. improving the level and distribution of health, and ensuring fair financial contributions). Responsiveness is weighted in the aggregate index with a weight of 25% (a weight of 50% being given to the disability adjusted life expectancy outcome).

For Hurst and Jee-Hughes, the dimension of responsiveness should also be included in a global performance framework. The difference between the frameworks proposed by WHO and OECD concerns expenditure rather than effectiveness, as shown in Tables 7 and 8.

Table 7: WHO Health System Performance Framework

	Components for assessment	Average level	Distribution
Goals			
	Health improvement	✓	✓
	Responsiveness to expectations	✓	✓
	Fairness in financial contribution		✓

Source: Murray, 2002³⁸

Table 8: OECD Proposed Health System Performance Framework

	Average level	Distribution
Health improvement/outcomes (+)	✓	✓
Responsiveness and access (+)	✓	✓
Financial contribution/health expenditure (-)	✓	✓
	Efficiency	Equity

Adapted from Murray, 2002³⁸,

Indicators used to assess the responsiveness of the health care system generally derive from interview surveys. Some of them may derive from administrative data (e.g. waiting times for surgical procedures).

Table 9: Most frequently-used responsiveness indicators

Responsiveness indicators	WHO	OECD	Australia	Canada	United Kingdom	United States
Patient satisfaction or acceptability (various):			X	X	X	X
- patient-rated dignity of treatment	X					
- patient-rated autonomy and confidentiality	X					
- patient-rated promptness of attention	X					
- patient-rated quality of basic amenities	X					
- patient-rated access to support networks during care	X					
- patient-rated choice of care provider	X					
Patient experience:						
- continuity (various)			X	X		X
- physician/patient communication (various)					X	X
- provision of information (various)					X	X
- waiting times (various)		X (waiting times project)	X		X	X
- privacy (various)					X	
- cancelled operations					X	
- delayed discharge					X	

Source : Hurst and Jee-Hughes, 2001³⁶(p 33)

3.3.3 Indicators available in SHA and other existing databases

There are no data available in SHA to describe outcomes, either in terms of health status or in terms of quality of care or responsiveness. Indicators of effectiveness are necessarily derived from other sources. Some are available in existing databases (Eurostat, OECD, WHO), or in data collection projects (ECHI). They are summarised in Table 10.

Table 10:Data on effectiveness available in databases or data collection projects

	System of Health Accounts (SHA)	Eurostat Newcronos	European Community Health Indicators Project (ECHI) (List of indicators provided in the ECHI final report of February 2001)	OECD Health data	WHO database
Effectiveness					
Health outcomes	-	<p>Health status Life expectancy; infant mortality and perinatal mortality. Standardized mortality rate by cause of death – selection of causes to built an indicator of avoidable mortality. Infectious disease: reported cases and incidence rates Disability free – life expectancy Self perceived health.</p> <p>Outcomes concerning risk factors: smoking, alcohol drinking, physical exercise...</p>	<p>Health status Life expectancy; infant mortality and perinatal mortality. Potential years of life lost for selected causes relevant for prevention or health care. Incidence and prevalence of selected diseases/disorders. Infant health: low birth weight. Generic health status: perceived health, functional status, quality of life. Composite health status measures: disability free – life expectancy, other Health adjusted life expectancy indicators? Health outcomes of the health care system Avoidable causes of death, cancer survival rates Iatrogenic disease/death, antibiotic resistance 30 days in-hospital mortality Surgical wound infection, nosocomial infections Incidence of end-stage renal failure in diabetes Outcomes concerning risk factors: health behaviours.</p>	<p>Health status Life expectancy; infant mortality and perinatal mortality. Potential years of life lost for selected causes relevant for prevention or health care. Infant health: low birth weight. Decayed-missing-filled teeth. Incidence of cancer and AIDS. Perceived health. Outcomes concerning risk factors: smoking, alcohol drinking, overweight and obese population.</p>	<p>Health status Life expectancy; infant mortality, different indicators concerning perinatal mortality and maternal deaths, probability of dying before age 5 years Reduction of life expectancy through death before 65 years. Disability adjusted life expectancy. Standardized mortality rate by cause of death – selection of causes to built an indicator of avoidable mortality. Incidence of selected diseases/disorders. Outcomes concerning risk factors: lifestyles concerning smoking habits, food. Health outcomes: Surgical wound infection</p>
Output or quality of the process of care	-	Preventive measures (dental exams, screening for breast cancer etc.)	Disease prevention (vaccination, screening for cancer etc) Waiting lists/times # of appropriate interventions 28-day emergency care readmission rate Quality of blood products		% of children vaccinated for selected infectious diseases.
Responsiveness	-	Satisfaction with Health System ^o	Perception of the health system Complaints		

^o Not available in NewCronos but is in Eurostat's *Key figures on health Pocketbook* for the year 1999⁷²

3.3.4 Proposed indicators of effectiveness

To assess effectiveness with a one-dimensional indicator seems to be impossible and we suggest a list of indicators, based on two principles:

- choosing outcomes that can be attributed, as far as possible, to health system interventions (preventive or curative);
- choosing indicators for which data are available, at least in the majority of Member States.

We recommend the collection of:

- (1) indicators which measure mortality avoided by health interventions, such as: infant mortality, potential years of life lost for selected causes known to be sensitive to health care/prevention interventions (for example causes of death amenable to health care);
- (2) indicators of process or quality of care, such as: vaccination rates, % of appropriate screenings for cancer;
- (3) indicators of changes in personal behaviour which can be attributed to public health interventions (smoking, physical exercise);
- (4) data on the perception of the health system by the population as an indicator of responsiveness of the system.

3.4 Efficiency and productivity

3.4.1 Theoretical definition

Concepts used in general economics

We will first discuss the meaning of these concepts in general economics where they were originally developed, before applying them to the health care system.

Productive efficiency occurs when firms deliver the highest possible output from given inputs and so produce at lowest unit cost. Productive efficiency can be defined as: “using the least amount of resources to produce a given good or service”, or equivalently “producing output at the lowest possible unit cost” (for example using the best available technology, the best production process, minimizing the waste of resources).

Allocative efficiency occurs when firms produce those goods and services most valued by society i.e. scarce resources are allocated to the production of goods and services so that consumer wants and needs are met in the best way possible.

A firm or a system may be productively efficient, i.e. the goods are produced at the lowest cost possible, and yet those goods may not be the goods that consumers desire the most, i.e. their satisfaction might be higher with a different mix of goods produced.

Economic efficiency occurs when society is using its scarce resources to produce the highest possible amount of goods and services that consumers most want to buy. Economic efficiency requires both *productive* efficiency and *allocative* efficiency.

Productivity is generally defined as the amount of output (what is produced) per unit of input used. Since a production process requires different inputs, e.g. labour and capital, different productivity measures can be assessed. Very often productivity measurement is restricted to labour productivity, i.e. the quantity of output produced by a given quantity of labour input (e.g. person-hour worked).

Applying these concepts to health care systems

In the health care sector, in which consumers’ preferences are not expressed by demand in a market, maximizing the well-being of the population is considered to be equivalent to maximizing the outcome^p of the health care system.

^p The notion of outcome does not exist in general economics, which uses the concept of “utility”. In the health care sector, outcome is distinguished from output, which are labeled activities, or services produced. See SNA 93, para. 16.135-136⁷³: “The output of health services needs to be clearly distinguished from the health of the community. Indeed, one reason for trying to measure the output of health services may be to assess the effect of an increase in the volume of health services on the health of the community. This obviously requires a measure of the volume of health services that is different from health itself. It is well-known that there are many factors such as sanitation, housing, nutrition, education, consumption of tobacco, alcohol and drugs, pollution, etc., whose collective impact on the health of the community may be far greater than that of the provision of health services.”

We may then define an efficient health care system as one which maximizes the outcome obtained for a given level of resources (i.e. expenditures). The efficiency of different health systems can thus be compared on the basis of the relationship between outcomes on one hand, and expenditures on the other hand.

The translation to the health care field of the concepts of *productive efficiency* and *allocative efficiency* can also help to capture different sources of inefficiency. It might be conceivable that a health system produces heart transplants at the lowest cost possible, and smoking counselling at the lowest cost possible, and yet that the health gains achieved might be higher if resources were transferred from the first type of intervention to the second: the explanation of global loss of efficiency in this case is not due to productive inefficiency, but to allocative inefficiency.

A few remarks on the translation of the concepts of productive efficiency and allocative efficiency in health care :

1) In the example given above, productive efficiency is assessed in terms of cost of health care interventions (such as heart transplants, smoking cessation counselling), i.e. in terms of *outputs* and not *outcomes*. On conceptual grounds, there is no reason why outcomes could not be used instead of outputs. The example is still valid if we say: the hospital saves lives at the best possible cost when it performs heart transplants (it could not do better), yet at the level of the entire system it would be more efficient to reallocate resources.

Indeed some authors define productive efficiency in terms of cost/outcome, as do Palmer and Torgerson in an article published in the BMJ :” Consider, for example, a policy of changing from maternal age screening to biochemical screening for Down's syndrome. Biochemical screening uses fewer amniocenteses, but it requires the use of another resource, biochemical testing. Since different combinations of inputs are being used, the choice between interventions is based on the relative costs of these different inputs. The concept of *productive efficiency* refers to the maximisation of health outcome for a given cost, or the minimisation of cost for a given outcome. If the sum of the costs of the new biochemical screening programme is smaller than or the same as the maternal age programme and outcomes are equal or better, then the biochemical programme is productively efficient in relation to the maternal age programme. In health care, productive efficiency enables assessment of the relative value for money of interventions with directly comparable outcomes. It cannot address the impact of reallocating resources at a broader level for example, from geriatric care to mental illness, because the health outcomes are incommensurate.”³⁹

2) In the article cited above, Palmer and Torgerson distinguish between interventions with directly comparable outcomes, and interventions for which health outcomes are incommensurate. Productive efficiency can be compared within the first category, but not in the second case. A lot of research in health economics or public health in the last decade has aimed precisely at developing measures of outcomes that could be the same across the whole health care system: costs per DALY or costs per QUALY are now published regularly for all kinds of interventions. If one accepts that all activities can be compared on that basis, then there is no need to separate productive efficiency and allocative efficiency (the total efficiency of the health care system, as defined above, is the same as its productive efficiency).

3) But as stated above (see chapter on effectiveness), these aggregate measures of outcome and their relevance for assessing the utility of health care are still very controversial.

We should thus remain cautious and assess a variety of outcomes (including intermediary outcomes) produced by a variety of interventions. Productive efficiency can then be assessed with reference either to the output (i.e. the activity e.g. number of surgical procedures of a certain type, number of screenings performed,...), or to the outcome of this intervention, when comparable outcomes are available for assessment.

This means that the notion of productive efficiency is of interest particularly when analyzing a sub-component of the health care system. For example, by analogy with the firm in a market economy, one can assess the productive efficiency of a unit of production: productive efficiency then means running medical institutions as efficiently as possible.¹⁷ It combines both the productivity of the production process and the costs of the production factors. First, more inputs than are necessary to produce an output are not used, and less output than could be produced from given inputs is not produced. Second, input factors are paid at the lowest prices.⁴⁰ Not only institutions, but also interventions or activities, can be assessed in terms of productive efficiency.

We will then refer to the following definitions :

Productive efficiency means producing the maximum possible quantity of a specific output (or outcome of this specific output) for a given level of expenditure, i.e. producing at lowest unit cost.

Allocative efficiency means allocating resources among activities / interventions within the health care system in order to maximise outcome. In fact, allocative efficiency is not assessed in isolation, but jointly with productive efficiency, the result being total efficiency.

Efficiency (or total efficiency) combines productive and allocative efficiency. The maximum possible outcome is produced for a given level of expenditure.

Productivity can be viewed as a subcomponent of productive efficiency. As in other sectors, it can be defined as the ratio output / input, i.e. the amount of output per unit of input used. It can be evaluated at different levels of the system.

In the production of health several factors are usually used. According to economic theory the relative (not absolute) productivity determines (jointly with relative marginal costs) the optimal input of factors in production of health.⁴¹

Productivity is needed to achieve productive efficiency, but productive efficiency goes beyond productivity, 1) because it has to do with the combination of inputs (the production process), and 2) because it considers input prices too, which is not the case when assessing productivity (where only the volume of inputs is considered).

Definition of productivity:

Productivity is the amount of output per unit of input used.

The relationships captured in the definitions above can be summarized as following :

Efficiency	Outcome / expenditure
Productive efficiency	Output (or outcome) /expenditure (for an element of the health care system)
Input-productivity	Output / input
System-productivity	Outcome / expenditure
Program productivity	Program output/program expenditure

3.4.2 Review of recent literature on methodological problems in measuring efficiency and productivity

Total efficiency

Following the definitions given above, the efficiency of different health systems can be compared by examining the relationship between outcomes on one hand, and expenditure on the other.

Two methodological issues arise when translating this notion into comparative indicators :

- 1) What relationship between outcome and expenditures ?

Most often efficiency will be expressed as a simple ratio “outcome / expenditures”, which underlies the assumption of a linear relationship between outcomes and expenditures. This is probably false when comparing countries with very different levels of expenditures in health care : it is likely that one euro of further expenditures will generate a much higher additional outcome where the expenditures per capita are very low. It is less of a problem when comparing performances within Europe and the use of a ratio, though not quite satisfactory, might be more relevant in that framework than when comparing a wide range of countries as WHO did in the 2000 report.

Other methodological approaches have been developed recently in this field, with the notion of “efficiency frontier”: these approaches use statistical analysis to estimate a curve representing the maximum outcome achievable according to the level of resources used. This enables the comparison of what the health care system *actually* produce with its *potential* production – what it could do, if it used the same level of financial resources to produce and deploy different numbers and combinations of professionals, buildings, equipment and consumables. In these comparisons, the right measure of resources is money, since that is used to buy all the real inputs.¹⁴ (p 6)

WHO 2000 used a production frontier approach to measure relative efficiency.⁹ With this scale it is possible to see how much of this potential has been realized. In other words, comparing actual attainment with potential shows how far each country's health system is from its own frontier of maximum performance. WHO has estimated two relationships between outcomes and health system resources. One estimate relates resources only to average health status (disability-adjusted life expectancy, DALE), which makes it somewhat comparable to many previous analyses of performance in health. The other relates resources to the overall attainment measure based on all five objectives.

2) Defining and measuring the outcome

The measurement of allocative efficiency aims to relate the achievement of the health care system to the resources that are consumed by the system. The question of what achievements should be considered (what dimensions, and the way to aggregate them) has been debated above. So too has the question of the coherence between the two elements of the relationship. The latter refers to the amount of resources available for the health care system (which can be easily assessed). However as stated above, the outcomes included in the former, especially when health status is considered, are partly attributable to other factors than the health care system, which may blur the evaluation of its performance.

Some solutions to this problem have been listed above. The remaining issue is that, if effectiveness is evaluated through a set of various indicators which cannot be combined into one single measure (such as: avoidable mortality, childhood immunization, breast cancer screening, 30-days mortality following AMI, etc.), the calculation of an efficiency score is not possible.

Productive efficiency and productivity

In the conceptual framework developed above, it was argued that productive efficiency could be assessed in relation to outputs (i.e. quantity of services provided) or outcomes (for example final outcomes such as health gains, or intermediate outcomes, such as biological results or number of cancers detected).

In practice, the indicators developed to measure productive efficiency are often focused on outputs, as for productivity. The methodological problems are thus the same as far as the measurement of outputs is concerned.

1) Quantifying and measuring the output

The first difficulty concerning all non-market services is the measurement of the output. According to national accounts conventions, the output of non-market "industries" is measured by reference to the inputs used in the production process. In the health sector, where non-market services are predominant in a lot of countries, using data from national health accounts as a denominator in an output/input ratio is problematic. To solve this problem, an international group of experts formulated recommendations to measure the output of non-

⁹ The term efficiency was used interchangeably with performance in the WHR2000, and interpreted as the extent to which the health system makes the maximum achievable contribution to defined social goals given available health system and non-health system resources.

market industries in the context of productivity assessment.^{42;43} They advocated a measure based on physical quantities of services delivered, grouped in homogeneous categories of services.

The second difficulty, known in other sectors delivering intellectual and personal services (in the education sector for example), is that of measuring the quantity of services delivered. For example, shall we count the number of in-patient days, or the number of in-patient stays. Should we weight them by an index of complexity? To count and classify manufactured goods according to their relative value seems to be easier than for medical services, since the duration and the content of a physician contact (currently considered as an output unit) can in fact be very different from one person to another.

The third difficulty is to weight the different outputs. In health services, prices are mostly administered prices, or negotiated prices based on public accepted fee schedules such as Nord-DRGs, HRGs. Therefore, there is no guarantee that prices reflect objective differences in the technical level or quality of the intervention.

The recommendations of the group of experts mentioned above are:

- a) To decompose the services into broadly homogeneous classes. In the context of health services, they advise an initial separation of acute hospital services, nursing home services, medical practitioners services ... and a further breakdown of these categories (e.g. inpatient care by DRG).
- b) Then to seek indicators of the volume of services of each class (e.g. in-patient stays, contacts with professionals).
- c) To seek weighting data in order to aggregate the volume indicators. Most often, prices are not available, but cost data exist (e.g. DRG weights).
- d) To construct output volume indexes.

These indexes can then be compared to the inputs consumed in the production process.

Weighing outputs is easier for inpatient acute care (where DRG classifications are widespread) than for other sectors where classifications of services are less developed.

2) Measuring the inputs: productivity indicators

The health production function is complex and includes several factors such as labour, medical technology and pharmaceuticals. It would be interesting to take into account all inputs of the production process, i.e. capital, medical goods and labour, but there are no available data for the measurement of either capital input or consumption of goods in the production process. Therefore, analysts often concentrate their effort on the measure of the apparent productivity of labour.

To measure labour input, the ideal indicator would be a number of worked hours, weighted by the skill-mix of qualifications. Usually, the only available data on labour are the numbers of professionals of different categories (sometimes in "Full Time Equivalent"). Perhaps we should consider proposing a synthetic indicator taking into account the skill-mix to obtain a total amount of weighted hours worked. The real difficulty here is to define weights for the different categories of personnel.

3.4.3 Examples of efficiency and productivity indicators

In practice, efficiency indicators proposed are often limited to very partial measures of efficiency.

Not surprisingly, it is in the hospital sector that the efficiency indicators proposed are more numerous: for example cost per case-mix-adjusted hospital discharge, cost of treatment per outpatient and average length of stay by DRG and ratios of day case surgery to all surgery.⁴⁴ Outside the hospital sector, frequently used indicators include unit costs of services and % of generic prescriptions.

There follow a few examples of sets of indicators considered in various systems reviewed by Jee-Hurst and Hughes in their comparison of concepts of health system performance of indicators proposed by OECD, WHO, the Australian, Canadian and UK governments and three US organizations concerned with performance and quality assessment. (See Annex B for a summary of the measures reviewed in their report.)

The Canadian Institute of Health Information defines efficiency as “achieving desired results with the most cost-effective use of resources” and examples of existing indicators are :

- actual versus expected length of stay in hospital;
- hospital stays for patients who may not have needed admission;
- comparative data on the cost of physician services;
- local/provincial costs of particular services.⁴⁵

The UK NHS High-Level Performance Framework proposes several indicators allowing specific aspects of efficiency to be monitored :

- day case rate;
- casemix adjusted length of stay;
- unit cost of maternity;
- unit cost of caring for patients in receipt of specialist mental health services (adjusted for case mix, quality and market forces);
- % generic prescribing.⁴⁶

From these examples, it is clear that the routine production of efficiency indicators falls far short of the theoretical framework and methodological developments developed above.

The recent report of the Hospital Data Project⁴⁷ (part of the European Health Monitoring Program, 2003) gives a solution to the first problem. It proposes two shortlists of diagnosis (149 items) and procedures (18) to be collected by all EU members in order to compare hospital activity (see annex 6 of the report, pp. 122-130). This report recommends the collection of data on costs as an option to be considered in the future.

Concerning drug consumption, the costs per Daily Defined Dose (DDD) are not yet available, but the Euromed-stat project proposes a methodology for collecting data on pharmaceutical prescriptions and costs on a regular basis, allowing, among other things, the comparison of costs per DDD of selected treatments.

A new European project, called BASCET (for Benefits and Service Costs in Europe) will begin in 2004, which aims to compare the cost of similar services in EU countries. The project will select a list of “episodes of care” (which can be procedures, prescriptions, or complete treatments for a given symptom) and will elaborate a methodology to compare costs and prices of these episodes of care across countries.

All of these projects notwithstanding, during the next few years, unit average costs of medical goods and services will not be directly available, and other indicators must therefore be defined. The number of hospital cases or doctors’ visits could be selected as a proxy for output as a first step.

Ratios of day case surgery are not routinely calculated in all European countries. Some figures are presented in a paper published by Lathouwer and Poullier in 2000⁴⁸ for some countries for the period 1994-1997, for 18 surgical procedures eligible for ambulatory surgery. The intersection between this list and the shortlist of procedures proposed by the Hospital Data Project to be collected by Member States contains seven procedures^f. This set of procedures could be selected to present ratios of day case surgery.

No global measure of efficiency is proposed at this stage.

As efficiency relates system outcomes to inputs, the difficulties encountered in relating effectiveness to outcome arise here also. It has been suggested that a series of indicators reflecting different aspects of effectiveness be used, without seeking to combine them in a unique indicator. So, a single measurement of efficiency (cost-effectiveness) is not suggested either. Total expenditure on health, as a measure of inputs, could only complete the set of data to assess efficiency presented in the last part.

Productivity

Input-productivity measures such as labour productivity are already included in the SHA concept. Nevertheless, neither data for the denominator (employment) as FTE, nor valid price indicators, exist at present in all MS. However, some figures are available in Health Labour Accounts (HLA), even if it is difficult to weight different types of professional interventions. It would appear to be more difficult to measure the global system-productivity of health systems.

^f Namely: release of carpal tunnel, cataract surgery, myringotomy, ligation and stripping of varicose veins, cholecystectomy, repair of inguinal hernia, diagnosis dilatation and curettage.

3.4.4 Data available in existing databases or data collection projects

Table 11:Data on efficiency available in databases or data collection projects

	System of Health Accounts (SHA)	Eurostat NewCronos	European Community Health Indicators Project (ECHI)	OECD Health data	WHO database
Efficiency	Total expenditures Expenditure by function and by provider	Measures of effectiveness to relate to expenditure (see 2.2.2)	Measures of effectiveness to relate to expenditure (see 2.2.2)	Measures of effectiveness to relate to expenditure (see 2.2.2) Average length of stay by disease categories	Measures of effectiveness to relate to expenditure (see 2.2.2)
Productivity	Numerator: Expenditure at constant prices Denominator: total employment (FTE) and breakdown by function (to assess the productivity by function)	Numerator: weighted index of outputs (in-patient days and physicians contacts) Denominator: health care personnel	Numerator: beddays, discharges (by disease group) and outpatient contacts. Denominator: health care personnel	% of day-cases / total surgical procedures for selected procedures.	

3.4.5 Final suggestions on data collection and analysis

Efficiency

Partial measures of efficiency could be compiled for international comparisons in the hospital sector, such as :

- Average cost for selected outputs for which data are available (e.g. cost per case-mix-adjusted admissions, cost per GP visit, cost for selected procedures, cost per daily defined dose of treatment, etc.);
- ratios of day case surgery to all surgery for a selected list of procedures.

As far as we know, data on the cost of outputs are not yet available. Concerning hospital output, a lot of european countries (but not all) collect data on hospital case-mix on a regular basis, together with some unit “costs” evaluation. However, two issues complicate the task of using national data to compare average costs of output. First, classifications of diagnosis related groups vary from one country to another and secondly, the measurement of “cost” is

far from homogeneous between countries - in the majority of cases “costs” are in reality “ex-post prices” of the services.

However, experts such as Talli suggest the construction of composite indicators with crude indicators of output (e.g. bed-days and contacts), weighted by their “relative costs” (which are currently not available).⁴³

3.5

e through a lump-sum tax would ensure equal access and would not
d not result in health care being financed according to people’s ability

3.5 Equity

3.5.1 Theoretical definition

Beginning with a theoretical definition of equity is not straightforward because, as Wagstaff and van Doorslaer note, the concept of equity is related to the values of a society.⁴⁹ A libertarian perspective emphasizes respect for individual liberty (including the right to life and to personal property), while an egalitarian approach emphasizes the meeting of needs.⁵⁰

The egalitarian approach is dominant in European health care systems, where equity is understood as access to care for all according to need and not ability to pay. A practical definition could be, as Barr proposes “that any individual should receive as much health care as anyone else in the same medical condition, regardless of any factors thought to be irrelevant – for example, income.”¹⁷

However this general definition raises a lot of questions. Is the objective to ensure **equity of access** or **equity of utilisation** (i.e. effective consumption of care) ? Or going even further, is the final objective the **equality of outcome**, and should a system be judged by the degree of inequality (e.g. among social groups) in the distribution of health ?

The debate is far from being closed on these issues. For instance, it may be argued that the concepts of equality of utilisation (implying that everyone in a given condition should receive the same care) or the search for equality of health override consumer preferences: people may have the same access to care, and yet may differ in how they choose to consume health care. He advocates the adoption of the principle of equity of access.^{17 49} Sen draws a distinction between functionings and capabilities to function, and argues for equality of capabilities.⁵¹ Being in good health is a functioning. The underlying reasoning is that if individuals do not achieve the same level of health than others, if they die prematurely, it is because they do not have the same capabilities. So that in fact health in itself is viewed as a capability. The application of Sen’s theory suggests that we consider equity of health as an objective.

Another problem with the concept of equity of utilisation is that it refers to the concept of need (as the criteria for an equitable health care allocation), another debateable concept with no straightforward meaning.

But equity of access is not a straightforward concept either: equitable access can refer to the availability of health care supply (in a geographical sense), or to the lack of financial barriers, which means that the cost an individual faces when seeking care should not be too high in relation to his income.

This relates to another dimension of equity which is equity in health care finance. The underlying idea is that health care should be financed according to ability-to-pay, which goes beyond the objective of ensuring equal access to care.¹ To what extent should it be financed progressively? To what degree should health care redistribute from rich to poor? ¹⁷The issue of what is the optimum level of redistribution and whether transfers should be in cash or in kind is complex, and also a matter of ideological choice. But even in the absence of a norm or a benchmark it is instructive to know the degree of equity of financing which exists and to be able to compare this for different health systems.

These **different dimensions of equity** are not identical, and may not be quite compatible with one another. There is now widespread evidence that ensuring equal access to health care does not result in equal utilisation and that the remaining or even growing inequalities in health which can be observed are not explained by differences in access to care or health care consumption. In fact they result from a variety of factors (with a part remaining unexplained).

The role of this study is not to make a choice between equity principles, which are not neutral in terms of policy implications. Thus we will not give a single theoretical definition, but a set of definitions covering the different components or dimensions of equity, i.e. : health care finance, access, health care utilization (effective receipt of medical care), and health.

To avoid the difficulties raised by the concept of need (because the demand for health care is seemingly limitless), we will follow Barr's proposition and assume that equal need means "same medical conditions".

- Health care finance

Definition

An *equitably financed health system* is one which is financed according to ability-to-pay.

- Access

Definition

A *health system ensuring equitable access to health care* is one in which all persons facing the same medical conditions have the same opportunity to consume health care, regardless of any factors thought to be irrelevant e.g. income, race, sex, age.

- Health care utilisation (effective receipt of medical care)

Definition

A *health system ensuring equitable utilisation of health care* is one where anyone receives as much health care as anyone else in the same medical condition, regardless of any factors deemed irrelevant e.g. income, race, sex, age, etc.

- Health.

Definition

A *health system aiming at equitable health* is one which is striving to reduce unacceptable disparities in health status.

Inequalities in health status between groups (differing in e.g. socio-economic status, income, gender) are the result of a variety of factors, the health care system being only one of them. Ideally what should be considered is the contribution of the health care system to the reduction of health inequalities. Indicators can do no more than monitor changes in health status, and therefore inform policy in health and other sectors.

3.5.2 Review of recent literature on attempts to measure equity

3.5.2.1 Equity in health care financing

We will mainly refer here to two sets of empirical work :

- First, that of Wagstaff and van Doorslaer, who have built on the work done in different countries in the framework of the ECuity program, funded by the European commission;⁴⁹
- Secondly, that of WHO⁵², who proposed an index of fairness of financial contribution in the WHO report 2000.¹⁴

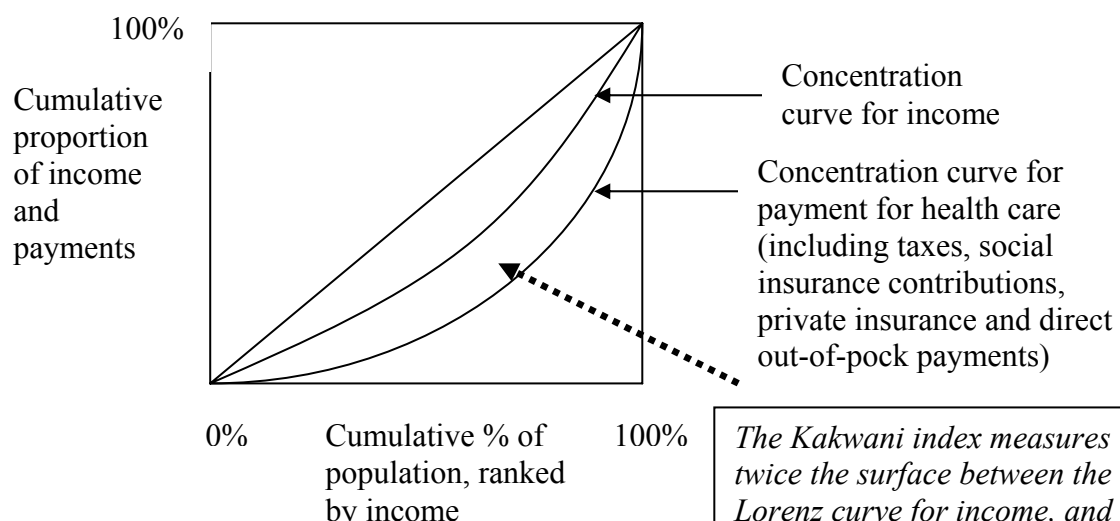
It is usual to distinguish between vertical equity and horizontal equity.

Vertical equity refers to the fact that the higher the ability to pay is, the higher the financial contribution should be (unequal treatment of unequals).

Horizontal equity refers to the equal treatment of equals, i.e. people with the same ability to pay should actually end up making the same payments, regardless of their characteristics (e.g. gender, marital status and medical conditions). A source of horizontal inequity in European countries is the fact that out-of-pocket costs, or premiums for private insurance, (supplementary) are often related to risk. It may also be that social insurance premiums vary among households with similar gross incomes, due to premium exemptions or reductions on the basis of criteria other than income.

To measure the degree of *vertical equity*, Wagstaff and van Doorslaer propose to use the Kakwani's index.

The Kakwani's index provides a measure of the degree of progressivity of the financing scheme in any country.



Based on that index, Wagstaff, Van Doorslaer et al have performed international comparisons. They show that direct/indirect taxes used to finance health care are respectively progressive / regressive in all countries, whereas the situation is mixed for social insurance (regressive in countries where the rich are not included such as Germany and the Netherlands, progressive in other countries). The situation is mixed for private insurance, the scope and content of which is highly variable among countries, and out-of-pocket payments are regressive.⁴⁹

There has been some empirical work on *horizontal equity*, but there is no simple measurement tool.

The 2000 WHO report incorporates both *vertical* and *horizontal* equity in its fairness of financial contribution index.

This index is based on the assumption that the total payment to the health system of a household (including taxes, social security contributions, private insurance premiums and out-of-pocket expenses) should be proportional to capacity to pay, i.e. the total expenditure (as a proxy for income) net of subsistence expenditure (taken to be food expenditure in the WHR2000).

This approach has been criticised on different grounds⁵³ :

- it does not enable a distinction between vertical and horizontal equity ;
- the way it is built makes it relatively insensitive to vertical equity and very sensitive to horizontal equity ;
- any departure from proportionality is considered as non optimal, whether it is progressive or regressive. Wagstaff points out that the degree of progressivity is a choice of Governments and that proportionality cannot be considered as an absolute general goal;⁵⁴
- measuring capacity to pay as total expenditure minus food consumption is open to criticism because much of the food consumption of the rich is not subsistence spending, which may underestimate the capacity to pay of rich households.

WHO responded to these criticisms by reporting on three other indicators of the fairness of financial contributions: a threshold measure – the proportion of households facing catastrophic expenditures due to health payments ; the impact of health payments on the overall income distribution ; and the percentage of households which fall below the poverty line due to health payments. It was also agreed to switch from using actual food expenditure to the poverty line.⁵²

3.5.2.2 *Equity of access or health care utilization*

As stated above, access to health care is not the same thing as effective receipt of medical treatment. But accessibility is a necessary condition in order to ensure equity of consumption, and both will be considered below.^u

Again, **accessibility** can refer to different dimensions: financial (lack of financial barriers deterring people from seeking care), geographical (availability of services and thus equitable territorial distribution), or organisational (for instance the least well-off may be enrolled in

^u Furthermore, in practice, what is called “access” in the performance frameworks designed by some countries generally refers to effective utilisation of care, as is shown below.

health plans with fewer services available or more constraints, or the waiting times for surgery may be inequitably distributed).

The first dimension (financial accessibility) goes back to the question of equity of financing – the focus there being on the fact that health care should be affordable for everyone, i.e. the payment for health care should not exceed a fraction of the household income. The indicator proposed by Murray et al on catastrophic spending (% of households who contribute 40% or more of their capacity to pay to the health system) could be adapted with a threshold defined to capture the idea of affordability. Another indicator could be the % of population deterred from seeking health care for financial reasons.

The second dimension is linked to the geographical distribution of health care supply. In all member states statistical data of that kind are available, and territorial inequalities are analysed. But if it is easy to build indicators in each country, the comparability is limited by the different sizes of the geographical areas considered, which are generally administrative areas. The level of the region could be used for a first attempt as it exists in most member states, and regional data on physician and hospital beds are available and gathered by Eurostat (see below).

Equity in effective health care utilisation may also be assessed according to geographical location or socio-economic status.

Geographical inequalities

The schemes proposed by some countries for routine reporting on their system's performance focus essentially on the geographical aspect.

An example is the set of indicators of “fair access” proposed for the UK NHS Performance Framework (see box below) :

Box 3: UK NHS Performance Framework

Dimension “Fair Access”

- (i) Surgery rates, composite consisting of age-standardised elective rates for:
 - CABG and PTCA;
 - hip replacement (aged 65 or over);
 - knee replacement (aged 65 or over);
 - cataract replacement.
- (ii) Size of inpatient waiting list per head of population (weighted).
- (iii) Adults registered with an NHS dentist.
- (iv) Children registered with an NHS dentist.
- (v) Early detection of cancer, composite consisting of:
 - % of target population screened for breast cancer;
 - % of target population screened for cervical cancer.

Source: Smee, 2002 ³⁷

The Canadian Institute of Health Information considers an equitable health system to be one in which clients and patients can obtain care and services at the right place and time, based on needs.⁴⁵ The Canadian Institute for Health Information's Performance Framework gives examples of existing measures of health system performance which are also mainly focused on geographical equity :

<p>Accessibility Whether or not we can obtain the services we need at the right place and time</p>	<ul style="list-style-type: none"> • <i>Use of prevention services (e.g., pap smears and flu shots) by province</i> • <i>Studies on who has access to particular types of care</i> • <i>Local/provincial waiting time data</i> • <i>Average distance travelled to hospital</i>
---	--

Source: Hurst & Jee- Hughes, 2001⁴⁶

The Australian National Health Ministers' Benchmarking Group defines an equitable health system as one in which clients and patients obtain health services at the right place and time, irrespective of income, geography and cultural background.⁵⁵ Australia's Acute Hospital Performance Framework has a chapter "access". It focuses on regional inequalities and compares the different regions on the basis of the following indicators :

- waiting times for elective surgery;
- accident and emergency waiting times;
- outpatient waiting times;
- variations in age-standardised intervention rates (appendicectomy, cabg, caesarean, cholecystectomy, endoscopy, hip replacement, hysterectomy, lens insertion, tonsillectomy).
- admissions (same-day, overnight) per 1000 population.⁴⁴

As for accessibility, if the geographical distribution of health care may be monitored easily within each country, cross-country comparisons are hampered by the heterogeneity of geographical divisions between countries. A first attempt could be made at the regional level.

Socioeconomic inequalities

The performance frameworks designed in some countries do not report routinely on socioeconomic inequalities of health care consumption, and the empirical work conducted in this field is mainly research work.

Three main studies provide recent cross-national analysis on health care utilisation :

1. the Commonwealth study, comparing five English speaking countries (the US, Canada, the UK, Australia and New Zealand);⁵⁶
2. the ECuity study, updating and developing earlier work on 10 European countries and the US;^{57;58,}
3. the 2000 WHO report (and following work) which puts forward the notion of responsiveness of the health care system (i.e. the differences in responsiveness between different population groups).¹⁴

The Commonwealth study, based on a similar household survey in the 5 countries, shows that the greater the role of out-of-pocket costs and private market competition, the more

inequitable the system is i.e. the greater the difference between low income and high income on measures of access to care such as:

- not receiving needed care;
- difficulty in receiving needed care;
- difficulty in seeing a specialist;
- experience of worsening access to care;
- no regular doctor;
- no doctor visit in past year;
- waiting time of 4 months or more for non-emergency surgery;
- measures of cost burden or perceived quality of care.

The ECuity study compares health care utilisation (GP visits, specialist visits and hospitalisation) across countries, according to income and need, to test the hypothesis of “equal treatment for equal need”.

The study demonstrates that comparing health care utilisation by level of income alone, without standardizing for need, is not sufficient. It seems to demonstrate a “pro-poor” inequity in the distribution of care, i.e. the poor use more care than the rich, especially hospital care and GP visits to a lesser extent.

To take into account need, it is necessary to compute individual data from surveys, which collect information on health status. When standardising for need (using age, gender, self-assessed health and the presence of chronic illness), a different picture emerges : the distribution of GP care is equitable whereas specialist care is more often used by rich people. The distribution of inpatient care is more concentrated in the lower-income groups, but the results are not significant given the wider confidence intervals.

In terms of implications for data requirements, this study shows that a simple measure of health care utilisation by income (through a concentration index for instance) can be misleading.

The approach of the World Health Report 2000 is somewhat different. Equity of access is not considered by WHO in itself because “how the system responds to health needs shows up in health outcomes” (see below). Instead the analysis on the responsiveness of the health care system and its distribution. “Responsiveness is a measure of how the system performs relative to non health aspects, meeting or not meeting the population’s expectations of how it should be treated by providers or prevention”. As stated above (see effectiveness), the general notion of responsiveness is separated into several dimensions : dignity of treatment; autonomy and confidentiality; promptness of attention; quality of basic amenities; access to support networks during care; and choice of care provider. For the world health report 2000, the data were collected through key informants surveys, which were asked to identify marginalized groups.

As for other aspects of performance measurement in the World Health Report 2000, this approach of equity of responsiveness raised a lot of criticism, essentially because of the method of obtaining information. To improve this, WHO aims to develop surveys in countries to capture patient experience and patient satisfaction.

Equity in health

As Hurst and Jee-Hughes note, “there is a considerable body of evidence on equity of health status (mortality and morbidity) in different OECD countries suggesting disparities across a variety of population groups”.⁴⁶

Yet there are methodological debates on :

- which inequalities should be measured;
- the relevance of the measures of health status;
- the breakdown by groups of population;
- the equity indicator to choose.

Which inequalities ?

One approach examines overall inequalities between individuals, irrespective of the other characteristics of the individuals.^{59;60} Another one looks at a subset of health inequalities: those occurring between social groups. Some recent work seeks to bring together the two approaches in a unified measurement. (Wagstaff and van Doorslaer, 2002, working paper ?)

Murray et al strongly advocate the analysis of total health inequalities, and not only social group differences. They have supported this approach in the World Health Report 2000, which considers total inequality, measured by inter-individual variation in healthy life expectancy (with a proxy, given the absence of data to measure this) being the probability of survival of a child to age 2).

Most empirical work focuses on either gender or socio-economic inequalities (by income, social status, level of education, ethnic group etc). A lot of evidence has been gathered through various studies, among others by two groups supported by European grants (ECuity and the European network on interventions and policies which aims to reduce socio-economic inequalities in health).

Choice of health status variables and groups of population

Various measures of mortality and morbidity can be used, as well as different methods of subdividing the population (by level of income, by social status, by level of education). Mackenbach argues that all of these raise methodological issues of comparability as far as socio-economic status is concerned.⁶¹

Examples of indicators used by Mackenbach are :

- the ratio of standardised mortality between blue collar and white collar workers, and the contribution of different causes-of-death to the difference,
- the odds ratio for prevalence of “less than good health” in self-assessed health, comparing the lowest income quintile to the highest income quintile.⁶²

Wagstaff and Van Doorslaer rely on a concentration index.^{49 63} Other indicators have also been proposed by other authors.

3.5.3 Data available in databases or data collection projects

As Hurst and Jee-Hughes point out, “the construction of a full set of equity indicators for a health system is very demanding of data”.

Not only average results but disaggregated data are necessary, i.e. information by population groups, which can be organised in various ways : age, gender, ethnic group, income, social status, place of residence, etc. Individual data may even be necessary (to measure horizontal equity for instance).

These data have to cover different dimensions of equity (such as financing, health care utilisation and health status) and often, other kinds of data are needed to standardise or compare the distribution observed. For instance :

- as shown above, to assess equity in health care utilisation, using crude distribution of health care, without standardising for health need, can be misleading ;
- to assess equity in health care finance - knowing the distribution of health care expenditure is insufficient - this must be related to the distribution of income, etc.

Thus it is not surprising that the empirical evidence gathered on these issues of equity has mostly been gathered in the context of research. It is not obvious how to develop routine monitoring in this area.

Table 12:Data on equity available in databases or data collection projects

	System of Health Accounts (SHA)	Eurostat NewCronos	European Community Health Indicators Project (ECHI)	OECD Health data	WHO database
Equity					
Equity of health care financing	Existing: % of Out-of-pocket/ total expenditures (1) % private insurance / total expenditures	-	Insurance coverage by socio-economic status (SES) Distribution of household expenditures on health (would have to be compared to the household disposable income to built an equity indicator).	Existing: % of Out-of-pocket/ total expenditures % private insurance / total expenditures % of population covered for in-patient acute care, outpatient care, pharmaceutical goods and total health care.	-
Access / Equity of health care utilization	Further suggested developments: consumption of health care by deciles of households income, but should be standardized according to need .(2)	By social group: # of physicians' visits and hospital bed-days by level of education. Possible standardization with self-assessed health (SAH). By geographical zone: supply of physicians and beds, # of physicians(visits and hospital bed-days by region.	Disease prevention by region and by SES. Supply by region Outpatient contacts and bed-days by region. Medicine use by region and SES. Surgical procedures by region, # of specific interventions by region. Waiting lists/time by region.		-
Health inequalities	-	Self-assessed health by level of education, standardized by age and gender.	Inequality in death (rate ratios and absolute rate differences, by SES and region) Inequality in health behaviours, by region, gender and SES. Inequality in generic health status: perceived health, functional status, quality of life, by gender, region and SES.		-

1. Studies show that (a) these sources of financing are the most regressive and (b) countries where the role of OOP costs and private markets is important are more inequitable in terms of access.
2. As shown in Wagstaff and van Doorslaer⁴⁹ and Wagstaff⁵⁴

3.5.4 Final suggestions for data collection and analysis

Equity of finance

A two step approach could be taken :

1. Using crude indicators such as the % sources of funding of health care (public financing versus out-of-pocket expenditures and private insurance), or % of population covered by public insurance, as a proxy of the degree of progressivity in financing (relying on the empirical evidence gathered in this area) .
2. Using surveys to analyse health expenditure and how it is financed by decile of income (the breakdown by level of income being a further dimension suggested for classifying personal health services in SHA).

Equity of access and utilisation

The geographical aspect could be dealt with (in terms of supply, physician visits and hospital bed-days, controlling at least for age and gender), but only at the regional level.

Monitoring equity between social groups appears to be far more difficult. It has been suggested that “consumption of care by deciles of household income” be included in SHA. However, as argued above, a crude distribution of health care without standardising for health need can be misleading, showing a pro-poor inequity because the poor are generally in worse health.

Equity of health

Health inequalities by level of education (three levels) are available in Newcronos (Eurostat). ECHI proposes to go further in terms of breakdown by SES, but the precise indicators have still to be defined, and require household surveys.

3.6 Global health system performance

Different dimensions of performance have been analysed in this chapter. Is it then possible to combine these dimensions to produce an aggregate measure of health system performance?

This is the option chosen by WHO in the 2000 report. Not only does the performance indicator aggregate different aspects of effectiveness, but it also balances global average achievements and their distribution within the population: equity is thus directly incorporated as a dimension of health care system performance. Among the five components of the aggregate index of performance constructed by WHO, three refer to equity: the distribution of health, of responsiveness, and the fairness of financial contribution.

This conception is rather unusual. It is more traditional to separate effectiveness (in the sense of global quantity of outcome(s)), and equity (i.e. their distribution among the population).

But it is interesting to note that for some authors the concept of efficiency actually includes equity.

- 4 THIS SEARCH FOR A MEASUREMENT OF “GLOBAL PERFORMANCE” RAISES THE QUESTION OF HOW TO INCORPORATE DIFFERENT DIMENSIONS IN AGGREGATE MEASURES AND INDEXES OF PERFORMANCE. THE WHO REPORT HAS TAKEN A SIGNIFICANT STEP IN THIS DIRECTION, BUT THESE COMPOSITE INDICATORS HAVE BEEN THE SUBJECT OF WIDE CRITICISM, BECAUSE VALUE JUDGMENTS ARE REQUIRED IN ORDER TO WEIGHT VERY DIFFERENT DIMENSIONS OF PERFORMANCE.⁶⁴**

4 INDICATORS PROPOSED FOR THE MINIMUM DATA SET

4.1 Summary of proposed indicators

The following table summarises the indicators proposed for the Minimum Data Set on the basis of the foregoing review of the literature and of indicators currently used by international organisations and at the national level.

Table 13: Summary of indicators proposed for the MDS of the System of Health Accounts

Policy dimension and sub-dimensions	Indicators for immediate compilation	Indicators for future development
1. SUSTAINABILITY		
Scale of health expenditure	Total health expenditure/Gross National Income	
Scale of publicly-financed health expenditure	Public health expenditure/Gross National Income	
Fiscal sustainability	Public health expenditure/total government expenditure ^v	Evolution of revenue/expenditure ratios
2. EFFECTIVENESS		
Outcomes	Infant mortality PYLL ^w for selected causes	Mortality and PYLL for causes of death amenable to health care Disability adjusted life expectancy ^x Changes in the prevalence of risk factors linked to health behaviours
Process/quality of care		Preventive care (vaccination and cancer screening rates)
Responsiveness		Further discussion needed to define suitable indicator
3. EFFICIENCY/PRODUCTIVITY		
System productivity		Effectiveness indicators with related health expenditures
Unit cost	Average unit costs for selected outputs where data is immediately available (e.g. hospital inpatient cases)	Unit costs of selected outputs (such as case-mix adjusted hospital admissions, Defined Daily Doses)
Mode of production	Ratios of day-care surgery to all surgery for selected procedures	
Input productivity		Value added per employee
4. EQUITY		
Equity of finance	% of private financing (for out-of-pocket expenditure and for private insurance) for selected health care functions (HC.1 to .5)	Financial burden of health care by decile of income (all payments) i.e. direct payments by households for health care including direct taxes, contributions, OOP, private health insurance premiums
Equity of access and utilisation of the health care system		Geographical disparities (standardised by age and gender of the population) in: <ul style="list-style-type: none"> - Health sector employment per inhabitant - Hospital admission rates for selected diseases / interventions Health care expenditure, breakdown by function, by deciles of household income (if possible standardisation by health status, see below)
Geographical		
Between socio-economic groups		
Effect of health care system on health inequalities		Disparities in health status by: Socio-economic status or decile of income Level of education By geographical area

^v Total government expenditure as defined in the System of National Accounts

^w Potential years of life lost

^x See REVES report⁷⁴

PART II. HOW TO PRODUCE THE INDICATORS

5 DESCRIPTION OF SHA

5.1 Review of health accounts manuals

National and international manuals of health accounts give the following reasons for compiling health accounts:

- To provide basic financial information on health systems;
- To provide information on how health funds are distributed across the different services, interventions and activities that the health system produces;
- To facilitate valid spatial and temporal comparisons of health expenditure;
- To show who benefits from health expenditure in terms of its financial value and fairness in distribution;
- To inform health policy and thus help to improve the performance of health systems.

In introducing its SHA manual, OECD states that the demand for improved health accounts is driven by the increasing complexity of health care systems in many countries and the rapid evolution of medical technology. Policy-makers and observers of health care systems and recent reforms have raised the question of the adequacy of current accounting practices, and the ability of existing health accounts to monitor fast changing health care systems. The rising expectations of consumers of health care contribute to the demand for up-to-date information on health care systems.⁵

The main objectives of the OECD System of Health Accounts are:

- to provide a set of internationally comparable health accounts in the form of standard tables;
- to present tables for the analysis of flows of financing in health care together with a classification of insurance programs and other funding arrangements;
- to provide a framework of main aggregates relevant to comparative research into the meso and micro structure of health care services;
- to propose a framework for consistent reporting on health care services over time;
- to monitor the economic consequences of health care reform and health care policy;
- to provide a framework for analysing health care systems from an economic point of view, consistent with national accounting rules.

In a draft of *A Guide to the Producer's Guide* (on producing national health accounts)^y it is argued that health accounts data provide basic health system information in the same way that information on the level and composition of population mortality is basic information about health. Policy analysts are ill-served trying to do public health planning without

^y The *Guide* itself was published in 2003 by the World Bank, WHO and USAID under the title *Guide to producing national health accounts with special applications for low-income and middle-income countries*.⁷⁵

understanding the health conditions in a country. So, too, are they ill-served trying to plan system expansion or reform without a good understanding of the financial condition of the entire health system. National health accounts information is basic health system information, just as information on the level and composition of population mortality is basic information about health.

Table 14: Questions which can be answered by NHA

Dimension	NHA cross-classifications	Questions which can be answered with NHA data	Questions which can be answered with additional information
Sustainability	S x FA	Where does the money come from? How does the distribution of expenditure by financing source change over time? What is the relative contribution of direct payments and contributions through third-party payers? What is the “incidence of financing” (if proportions of taxes paid by firms, households & the rest of the world can be identified)? What is the role of general revenue financing?	+ demographic projection data - Is the current distribution of proportion of revenue by source sustainable? And the current level of revenue sustainable? + strategic policy statements – Will the distribution of expenditure by source change in future?
Efficiency	FA x P	How are funds distributed across different types of providers e.g. hospitals versus ambulatory care?	+ measures of service throughput – What is the average spend per unit of service delivered? What is the relative cost-efficiency of different service providers?
Effectiveness	FA x P P x F	“ What is the contribution of different types of provider to total spending on specific types of goods and services? e.g. where is spending on public health programmes located i.e. which providers receive what proportion of funds for this service?	+ diagnostic and activity info – Which providers and financing agents are contributing to treatment of diseases/conditions identified as priorities for intervention?
	FA x F	Who finances what types of service? What share of total resources is allocated to specific types of health care and healthcare- related activities?	+ norms for appropriate distribution of expenditure – To what extent are health policy aims being achieved e.g. for expenditure on preventive health?
Equity/access	FA x age/gender	How are financial resources allocated from different payers/purchasers to different age/gender groups of the population? What is the coverage with expenditure benefits under insurance for specific groups e.g. older women?	+ info on policy on age/gender group targeting – Are policy objectives being met?
	FA x location of residence	Who pays for higher expenditure at regional level? How is expenditure distributed by region/province?	

A summary of questions, which can be answered by NHA data and NHA indicators with respect to the policy dimensions “Sustainability”, “Efficiency”, “Effectiveness”, and “Access”, is presented in Table 14. In contrast to SHA, the NHAs proposed by the *Guide* also include a classification of sources of health care finance. In order to achieve transparency on all financing flows through the health system, reporting from various perspectives is necessary. SHA focuses mainly on the financial intermediaries which pay providers, while

noting the importance of analysing financing sources. (For health expenditure, the SHA manual does not include a formal financing sources classification scheme in the ICHA. However, it gives an overview of the sources of funding.⁵

Another classification proposed by the *Guide* deals with the resources being used to create health care outputs. An analysis of resource spending has many policy uses, including development of policies regarding human resource remuneration, for investment, expenditure on pharmaceuticals, and other significant inputs. The *Guide* refers to the manual of *Government finance statistics* of the International Monetary Fund (IMF), which contains an economic classification of expenses.

5.2 SHA AS INDICATOR FRAMEWORK

5.2.1 Variables provided by SHA and other sources

Among the variables needed to supply the indicators proposed for the MDS:

- some can be provided by SHA;
- some may result from future developments of SHA;
- some are available through other sources of data;
- some are not available in any existing database.

The following table shows the different sources by group of indicators.

Table 15: Potential sources for MDS data

Policy dimension	Sub-dimension	Indicators	SHA	SHA future developments	Other sources	Non available
Sustainability	Scale of health expenditure	Total health expenditure/ Gross National Income Total health expenditure: consumer spending	X			x
	Scale of publicly-financed health expenditure	Public health expenditure/Gross National Income	X			
	Fiscal sustainability	Public health expenditure/total government expenditure ^z Evolution of revenue/expenditure ratios	X		X	
Effectiveness	Outcomes	Mortality and PYLL for causes of death amenable to health care			X	
		Disability adjusted life expectancy			X	
		Changes in the prevalence of risk factors linked to health behaviours			X	
	Process/quality of care	Preventive care (vaccination and cancer screening rates)			X	
Responsiveness	Further discussion needed to define suitable indicator			X		
Efficiency / productivity	System productivity	Effectiveness indicators, with related health expenditures	X (for expenditures)		X (for effectiveness indicators)	

^z Total government expenditure as defined in the System of National Accounts

Policy dimension	Sub-dimension	Indicators	SHA	SHA future developments	Other sources	Non available
	Unit cost	Average unit costs for selected outputs where data is immediately available (e.g. hospital inpatient cases) Unit costs of selected outputs (such as case-mix adjusted hospital admissions, Defined Daily Doses)	X	X	X	
	Mode of production	Ratios of day-care surgery to all surgery for selected procedures			X	
	Input productivity	Value added of HP: Health employment		X		
Equity	Equity of finance	% of private financing (out-of-pocket expenditure and private insurance) % of population covered by public insurance Financial burden of health care by decile of income	X		X	X
	Equity of access and utilisation of the health care system	Regional breakdown (standardised by age and gender of the population) of : – Health sector employment per inhabitant – Number of hospital beds – Physician visits – Hospital bed-days – Rates of hospital admissions for selected diseases / interventions			X X X X X	
	Geographical					
	Between socio-economic groups	Health care expenditures, breakdown by function, by deciles of household income (if possible standardise by health status, see below)		X	X	
	Health inequalities	Regional breakdown of health outcomes measures (see effectiveness) Health status measures by decile of income Health status measures by level of education			X (for some measures) X	X (for some measures) X

5.2.2 Core SHA indicators

If we want to select the most important indicators from the list above we can ask a group of experts to do this. The critical point here is who determines and selects the composition of the expert group. Another approach, that used in a project to assess the current state of implementation of SHA in MS, was to ask statistical offices in each country which indicators are most frequently used.⁷ The questionnaire used in this project asked about use of the six indicators in the following table.

Table 16: Core Indicators used by MS

Country	Total Health Expenditure as % of GDP	Health Expenditure per Capita	Share of private financed health expenditure	Share of employer financed health expenditure	Productivity	Health care prices
A	X	X				
B	X					
D	X	X	X		X	
DK	X	X	X	X		
E	X	X	X			
F	X	X	X			X
GR	X					
IRL	X	X	X		X	
I	X	X	X			
L	X					
NL	X	X				X
SF	X	X	X	X		
S	X	X	X			
UK	X		X	X		
CH	X	X		X		X
N	X	X	X			

Source: BASYS, 2003 ⁷

Clearly, all countries view total health expenditure as % of GDP as the most important indicator. Most countries also use health expenditure per capita and “share of private financed health expenditure”. However this is not the case for the three indicators: “Share of employer financed health expenditure”, “Productivity”, and “Health care prices”.

A third approach to selecting SHA indicators is to apply economic theory and review indicators used by national health administrations and international organisations, or developed by academic researchers. We have used this approach in the two projects which are the subject of this interim report. In Part I of this report a conceptual framework for health care indicators using SHA data was presented.

The following variables are provided by SHA, ideally compiled in co-ordination with SNA.

THE	Total health expenditure by functions (ICHA-HC) and providers (ICHA-HP) including
PREV	Expenditure for health prevention
CURA	Expenditure for personal curative health services excluding CARE
CARE	Expenditure for dependency care (long-term care)
THE	Financing of total health expenditure (ICHA-HF) including
PHE	Public health expenditure and
PRHE	Private health expenditure including
C	Cost-sharing by households (Out-of-pocket expenditure)
HL	Health employment by providers (ICHA-HP)
HPRI	Health care prices
THRE	THE/HPRI, Current health expenditure in real prices.
GNI	Gross National Income
GOV	Government expenditure

The following table describes the indicators proposed for the MDS using these variables. It presents the indicators for sustainability and productivity as growth rates, because changes are of particular interest for monitoring developments in fiscal stability and efficiency gains.

Table 17: Selected SHA Indicators

Dimensions (Indikanda)		Indicators	Provision by SHA
Financial Sustainability	(1)	$W(TFR) = \frac{W}{W(THE/GNI)}$	In combination with SNA
	(2)	$W(PFR)$	In combination with SNA In combination with SNA
	(3)	$W(PHE/GOV)$	
Efficiency/productivity	(4)	$W(HOS/CASES)$	Curative inpatient expenditure in relation to hospital cases
	(5)	$W(\Pi)$ by type of provider = $\frac{W}{W(THER/HL)}$	Yes, if prices and health labour available
Effectiveness, quality		-	-
Equity and Accessibility	(6)	C by type of service/disease	Mainly out-of-pocket expenditure, cost-sharing by type of service (HC)

5.2.3 Additional variables

SHA is limited with respect to three types of information in particular:

- a) patient information such as patient:staff ratios, disease prevalence and incidence, and synthetic variables such as healthy life days, QALYs and HALE;
- b) determinants of health;
- c) volume of service information and related information on unit costs.

However, it provides a framework for including some of this information, particularly (c), at the macro-level. SHA is not designed for reporting trends in health status and determinants of health. But for health policy reasons it is essential to relate epidemiological information to economic information.

Volume of service information and related information on unit costs are also of interest in order to evaluate the consistency of health accounts. Furthermore, an activity based approach which splits output into volume and prices is important for describing health expenditure development at current prices.

The future development of health systems will depend on policies in different areas including health, employment, public finances and social protection. This calls for an integrated approach and close co-ordination among policy makers in these different areas. Therefore, it is essential to link epidemiological information to economic information in a consistent and coherent way.

The following areas have not been explored in this paper:

- Capital development of health care providers;
- Human capital development of health professions;
- Generational accounts;
- The relation between preventive services and curative/rehabilitative services and care.

6 ASSESSMENT OF AVAILABILITY OF EXISTING SHA DATA

All European Member States have developed health monitoring systems and report on the development of their health systems, although the frequency and content of these reports varies.

We will distinguish in the following between SHA data, SHA indicators and meta-data on health systems and data resources.

6.1 Supply of SHA Data

Table 18 shows the structure of SHA data available at the beginning of 2003. It shows that basic figures are available for all countries only with respect to the ICHA-HF at the one-digit level. However, the results of the SHA project show, in particular, high variations in the privately funded share of expenditure, which are not consistent with information about cost-sharing regulations in MS (as reported in MISSOC).⁶⁵

Table 18: Preliminary assessment of SHA data in MS (December 2003)

Country	Financing	Production	Functions	Complete -ness SHA	Consist- -ency SHA	Timeliness	Compara- -bility SHA
A	1-digit NHA	2 digit NHA	1 digit NHA	not yet	not yet	yes	not yet
B	2-digit SHA	2 digit NHA	1 digit Estimates	limited	not yet	not yet	not yet
D	2 digit SHA	2 digit SHA	2 digit SHA	yes	yes	yes	limited
DK	2 digit SHA	2 digit SHA	2 digit SHA	yes	yes	yes	limited
E	1 digit SHA	2 digit NHA	2 digit SHA	limited	yes	yes	not yet
F	2 digit NHA	2 digit NHA	2 digit NHA	not yet	yes	yes	not yet
I	2 digit SHA	1-digit NHA	1 digit Estimates	limited	yes	yes	not yet
IR	2 digit NHA	2 digit NHA	1 digit Estimates	limited	not yet	yes	not yet
GR	1 digit NHA	1 digit Estimates	1 digit Estimates	not yet	not yet	not yet	not yet
L	2 digit SHA	1 digit	1 digit Estimates	limited	limited	not yet	not yet
NL	2 digit SHA	2-digit SHA	2-digit SHA	yes	yes	yes	limited
P	1 digit SHA	1 digit Estimates	1 digit Estimates	limited	not yet	not yet	not yet
S	1 digit SHA	1 digit NHA	1 digit Estimates	limited	not yet	not yet	not yet
SF	2 digit SHA	2-digit SHA	2-digit SHA	limited	yes	yes	limited
UK	2 digit SHA	1 digit Estimates	1 digit Estimates	limited	yes	yes	limited

Source: BASYS, 2003⁷

Although MS are not able to supply the full set of SHA tables, they are for the most part able to provide the basic SHA figures, if sufficient resources are made available for their compilation.

6.2 Supply of SHA Indicators

Health information systems of Member States often supply indicators based on calculations of international organisations such as OECD or WHO. Tables 3, 10, 11 and 12 provide information on indicators in international databases. If we compare the abstract availability with the actual availability, we can draw some preliminary conclusions.

Table 19: Preliminary assessment of supply of SHA Indicators (December 2003)

Policy dimension	Indicators	In principle computable with available information	Actual availability
Sustainability			
Scale of health expenditure	Health expenditure as % of GNI	Yes	Available, but still not sufficient comparability of private health expenditure
Scale of publicly-financed health expenditure	Public health expenditures as % of GNI	Yes	Available and sufficient quality
Fiscal sustainability	Public health expenditure as % of government expenditure	Yes	Available and sufficient quality
Effectiveness			
Outcomes	Infant mortality PYLL ^{aa} for selected causes Mortality and PYLL for causes of death amenable to health care Disability adjusted life expectancy Changes in the prevalence of risk factors linked to health behaviours	Not available in the context of SHA	
Process/quality of care	Preventive care (vaccination and cancer screening rates)	Not available in the context of SHA	
Responsiveness	Further discussion needed to define suitable indicator	Not available in the context of SHA	
Efficiency, productivity			
System productivity	Data on expenditure available, but not on effectiveness		
Unit cost	Average unit costs for selected outputs where data is immediately available (e.g. hospital inpatient cases)	Yes	Comparability to be checked
Mode of production			

^{aa} Potential years of life lost

Input productivity	Curative outpatient expenditures as % of total curative expenditures	Yes	Comparability to be checked
	Value added per health employee	No	Comparability under review
Equity			
Equity of finance	% of private financing (out-of-pocket expenditures and private insurance) for selected health care functions (HC.1 to .5)	Yes	Comparability to be improved

6.3 Meta-data on health systems

EUCOMP II intends to update meta-data on actors (both provision and financing). In order to compare it with health expenditure the data must be available on an annual basis. EUCOMP II intends to close this gap.

The Health Labour Accounts project has developed software which enables meta-data on health systems and data sources to be linked with actual expenditure data and health labour data for actor groups.

6.4 Data sources

Information about data sources is helpful for assessing data quality. At present these meta-data are not available for SHA. The importance of SHA data in the public domain in particular necessitates their transparent calculation.

7 CONCEPT FOR A MINIMUM DATA SET

The MDS approach requires the pre-selection of indicators, the identification of the most important common health issues, specification of the data and guidelines on their compilation and collection. We define SHA MDS as the data set which all countries should provide in order to be able to compile SHA indicators over time. This means that both the conceptual approach and the situation in MS should be used to define the MDS, whereas country-specific conditions should determine only the detail of the breakdown of the indicator, but not the indicator as such.

The conceptual discussion in the last chapter demonstrated the value of SHA for compiling selected indicators of sustainability, efficiency, and equity. However the dimension of effectiveness is rather difficult to address using SHA.

7.1 Type of data

To be able to observe the quality of reported SHA data it is essential to have current information on the context of the data. Therefore an MDS for SHA must include information at various levels:

- SHA data
- Data on utilization of health services and prices
- Manpower data
- Metadata on health systems
- Metadata on statistical resources
- Metadata on the compilation of SHA
- Metadata on regulations concerning the financing and provision of health services.

Table 20: Indicators and types of data

Indicator	SHA data	Data on utilization of health services and prices	Manpower data	Metadata on health systems	Metadata on statistical resources	Metadata on the compilation of SHA	Metadata on regulations
Total health financing rate	ICHA-HF 1digit			EUCOMP	To be developed	To be developed	
Public health expenditure	ICHA-HF 1digit			EUCOMP	To be developed	To be developed	To be developed
Revenue/expenditure ratio	Not provided by SHA				To be developed	To be developed	To be developed
Unit cost for selected outputs	To be developed, except hospitals	To be developed, except hospitals			To be developed	To be developed	To be developed
Productivity by type of health care provider	ICHA-HP 1digit		ICHA-HP 1digit	EUCOMP	To be developed	To be developed	
Cost-sharing	ICHA-HF 2				To be	To be	To be

by type of disease/ service	digit to be developed in relation to diseases				developed	developed	developed
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7.2 Approaches to collecting MDS data

Eurostat may consider various options for collecting SHA data from Member States. Here we present two approaches:

- A. Standard Tables
- B. Integrated Data Sets

A: Standard tables represent the traditional approach to data collection from Member States. The procedures for the collection of the data are defined and described in guidelines. The compilation is done in the Member States.

B: The Integrated Data Set Model collects all data needed to compile the tables. The Set is based on transactions (activities) and actors. The core indicators or tables are derived by procedures of aggregation of the transactions.

7.3 MDS standard tables

Table 21: Draft MDS Standard Table

		Consumption total	Production total	HP1 Hospitals HP1-	HP2 Nursing homes	HP3 Ambulatory medical actors	HP4 Distribution of medical goods	HP5 Public health programme	HP6 Administra- tion	HP7 Other industries	HP9 Abroad
	Total Financing		7								
HF1	Public										
HF11	Public Financing Govern-ment										
HF12	Public Financing Social Insurance										
HF2	Private Financing										
HF21+ HF22	Private Insurance										
HF23	Out of pocket										
HF24+HF25	Other private financing										
HF3	Abroad										
HC1+HC2	Curative and reha-bilitative services					SHA					
HC3	Services of long- term care										
HC4	Ancillary services to health care										
HC5	Medical goods to outpatients										
HC6	Prevention and public health										
HC7	Health administra-tion										
HCR1	Investements										
HI1	Intermedi-ate consumption										
HI2	Value added										
HPRI	Price index										
HL1	Health Labour Jobs										
HL2	FTE										
HL3	Health Professions										
HL31	Physicians					HLA					
HL32	Pharmacists										
HL33	Nurses										
HL39	Others										
HL4	Nonhealth Professions										
HPR	Productiv-ity					SHA+HLA					
	GDP										
	Population										
	EXR EURO										
	PPP EURO										

Other data, particularly on volume and prices, should be included in order to explain and to assess differences in expenditure.

7.4 Integrated database

The advantage of an integrated database is not only that the reconciliation of variables and related data is facilitated, but also that there is greater flexibility of information presentation for users.

As a first step the objectives of the integrated database must be defined, after which variables and related data should be specified. As stated above data on expenditure, prices, volumes, manpower and metadata should be included.

7.5 Software for data collection

The software for the collection of the MDS might be integrated in the ongoing development of EUCOMP. The example in Figure 4 was developed in that project.

Figure 4: Software for collecting data and metadata on actors

This questionnaire aims to gather data on health employment in the EU Member States. It is divided into two parts:
 * information about meta-data on employment
 * data on employment

Please select the kind of information you would like to edit: **employment**

Please select a language: **nederlands**

Exit

ActorID: 15002 Actor: Academisch ziekenhuis HP-Code: 1110

Description: Aan universiteiten verbonden medisch specialistische centra voor behandeling, verpleging en verzorging gedurende dag en nacht, toegerust voor topklinische functies, wetenschappelijk onderzoek en opleiding.

Record 1 of 84

Your task in this area is to give the number of head counts and full-time equivalents for the actors according to the EUCOMP project. Please select one actor after the other and edit the different tasks.

Please enter the number of employees in thousands

Please select a year: 2000

Head Count: [] Source: []

This number:
 is from a given source
 is computed

Comment: []

Full-time equivalents: [] Source: []

This number:
 is from a given source
 is computed

Comment: []

To edit a text or comment please double-click on the corresponding field.

Which data-sources are available for this actor?

Linked Sources		Available Sources	
Source	Comment	Source	Name
15010	Beid : identificatie van bedrijf vol	15000	Huisartsenregister (NIVEL)
15050		15010	Loonstructuuronderzoek
		15020	Enquete Beroepsbevolking
		15030	Enquete werkgelegenheid en lonen
		15040	Arbeidsrekeningen
		15050	Intramurale gezondheidszorg
		15060	Extramurale gezondheidszorg
		15070	Geestelijke Gezondheidszorg
		15080	Algemeen Bedrijfs Register
		15090	Praktijken in de gezondheidszorg
		15100	Register fysiotherapeuten (NIVEL)
		15110	Semimurale voorzieningen voor gehandicap
		15120	Verzorgingshuizen
		15130	Verloksundigenregister (NIVEL)
		15140	GGZ Personeels Informatiesysteem
		15150	Vereniging van revalidatie instellingen
		15160	Rijksbegeerting VWS

New Source Edit Source Delete Source

8 COORDINATION WITH OTHER PROJECTS

The MDS project is one of a series of European projects aiming to improve information on health care in MS. The approach of this project has been developed taking into account ongoing or completed work in the projects listed in Table 22. With respect to ECHI we see this project as input. The list of indicators produced by ECHI as of February 2004 is given in Annex C (for ECHI Class 4: Health Systems). It is planned to present the indicators proposed for the MDS in co-ordination with the Core group “Care” of Eurostat.

Table 22: List of relevant EU projects and expected output

Short Title	Project Title	Institutes	Expected Outputs	Need for coordination
METHOD	Development of a Methodology for Collection and Analysis of Data on Efficiency and Effectiveness in Health Care Provision Eurostat Grant: 20023510004 ESTAT7R-3	BASYS CREDES	<i>Evaluation of</i> a) the demand for information and analysis relating to efficiency and effectiveness and to <i>evaluate</i> b) the MS’ ability to supply the data needed for this demand. Based on the findings of the evaluation, development of a <i>methodology for collection and analysis of data</i> , consisting of a <i>framework concept</i> (c) of efficiency and effectiveness analysis, a <i>suggested list of detailed data needed</i> for applying that conceptual framework (d), and of <i>recommendations on data collection and analysis</i> (e)	With respect to macroefficiency, with Eurostat Grant MDS and Eurostat Projects SHA and HLA
MDS	System of Health Accounts (SHA) in the EU: Definition of a Minimum Data Set and of Additional Information Needed to Analyse and Evaluate SHA Eurostat Grant:20023510003 ESTAT	BASYS CREDES CEPS/ IGSS	a) <i>Evaluation of</i> the demand for SHA data and MS’ ability to supply these data b) Development of a <i>concept</i> for a minimum data set (MDS) and of additional data considered necessary, based on the findings of the evaluation c) <i>Co-ordination</i> with other relevant projects and activities	MS’ ability to supply SHA data is also part of Eurostat Project SHA and HLA
SHA	Statistical Analysis and Reporting of Data on Health Accounts Eurostat Project: Reference: 2001/S 144-0989/EN ⁶⁶	BASYS	a) Evaluation of existing statistical data and meta information in the Member states relating to Health Account data and health expenditure b) A comprehensive proposal for how to improve the calculation of SHA-based health expenditure data in the MS, based on the findings of the evaluation c) Proposal for procedures which could contribute to greater synergies in the implementation process	Procedures to implement SHA also form part of the Eurostat Grant GUIDE
HLA	Implementing the Concept of Health Care Manpower in Member States on a Prototype Basis Eurostat Project: Reference: 2002/S 170-136143	BASYS HIVA NIVEL	a) Evaluate all existing statistical data and meta information in Health Care Manpower in MS as described in the final report of the predecessor project (EVALUATION OF DATA SOURCES), including a potential update of the data sources. Start the INITIAL COLLECTION OF SAMPLE DATA, the evaluation of the associated data quality and comparability and draft the recommendation of data sources to be included in the FINAL COLLECTION OF PROTOTYPE DATA b) Develop a draft concept for improved Health Care Manpower data in Member States c) Prepare a draft electronic file (MS Access or MS Excel) containing the FINAL COLLECTION OF	With respect to metadata and updating, co-ordination with SHA and EUCOMP is necessary

Short Title	Project Title	Institutes	Expected Outputs	Need for coordination
			PROTOTYPE DATA on Health Care Manpower and draft a manuscript for a Eurostat publication, which contains the final draft concept for improved Health Care Manpower data in Member States under b) and the results obtained on its basis d) Delivery of the final data file and final manuscript for publication as described under c)	
GUIDE	SHA Guidelines Eurostat Grant ⁸	ONS	Practical guidance, illustrated where possible with examples, to aid compilation of SHA	With respect to recommendation for implementation with Eurostat project SHA
EUCOMP	Towards Comparable Health Care Data in the EU Eurostat Grant	ESHB	Metadata on functional breakdown of health care systems in Member States, by reference to international health care classifications, detailing health care functions performed, as well as the activities linked to these functions.	EUCOMP I completed; EUCOMP II; with respect to metadata collection, with SHA and HLA
AGESEX	Age and gender-specific functional health accounts Eurostat Grant ⁹	CEPS-IGSS	a) Experimental curative care & pharmaceutical expenditure data classified by function, age & gender for selected European countries for 1999 & 2000 collected b) Analysis of these data for quality, consistency & international comparability c) Recommendation for routine collection of SHA functional data classified by age and sex for curative care & pharmaceutical expenditure; likewise for other functions following a feasibility check	AGESEX completed; results are important with respect to Eurostat Grants METHOD and MDS and EU Grants GUIDE and ECHI
ECHI	Integrated approach to establishing European Community Health Indicators EU Grant	RIVM	Comprehensive list of health indicators <i>'to contribute to the establishment of a Community health monitoring system'</i> , in order to: o Measure health status, its determinants and the trends therein throughout the Community; o Facilitate the planning, monitoring and evaluation of Community Programmes and actions, and o Provide MS with appropriate health information to make comparisons and support their health policies.	Co-ordination with ECHI 2 necessary after decision on indicators to be included in ECHI Class 4: Health Systems

Table 23: Methodologies used in related EU projects

Short Title	Objectives of methodology development	Methodology for analysis and compilation of data	Methodology for data collection
METHOD	Based on the findings of the evaluation, to develop a <i>methodology for collection and analysis of data</i> , consisting of a <i>framework concept</i> of efficiency and effectiveness analysis	Production of health according to health economic and public health approaches as well as health system analysis	Reporting in the framework of SHA and existing instruments used by EUROSTAT and MS
MDS	To develop a <i>concept</i> for a minimum data set (MDS) and of additional data considered necessary, based on the findings of the evaluation.	Macroeconomic framework of health system according to SHA and WHO 2000; compilation of indicators in relation to basic health policy objectives	Reporting of MDS by an annual electronic data file a) data b) indicators c) metadata
SHA	a) comprehensive proposal on how to improve the calculation of SHA-based health expenditure data in the MS, based on the findings of the evaluation, b) proposal for procedures which could contribute to greater synergies in the implementation process.	Macroeconomic framework behind SHA	Definition of links and interfaces to other data reporting systems as EUCOMP or MDS; reporting of accounting data and meta data on accounting
HLA	a) Develop a draft concept for improved Health Care Manpower data in Member States b) Prepare a draft electronic file (MS Access or MS Excel) containing the FINAL COLLECTION OF	Macroeconomic framework behind System of Health Accounts (SHA) and Health Labour Accounts (HLA) and their links to ESA	Reporting of HLA data by an electronic file with interfaces to EUCOMP and HLA

Short Title	Objectives of methodology development	Methodology for analysis and compilation of data	Methodology for data collection
	PROTOTYPE DATA on Health Care Manpower		
GUIDE	Develop guidelines for compilation of SHA	Interpretation of Manual of System of Health Accounts (SHA) including experiences in MS	
EUCOMP	Update metadata on health care provision and financing in MS	Health systems approach	Reporting of Metadata on health systems
ECHI	Methodology for health indicators to contribute to the establishment of a Community health monitoring system	Delphi	?

Table 24: Approaches to data and meta data evaluation

Short Title	Objectives of data evaluation	Approach	Expected Output
METHOD	a) Assessment of demand for information and analysis relating to efficiency and effectiveness and b) Evaluation of MS' ability to supply the data identified in this demand analysis	a) Literature review on indicators for efficiency, effectiveness, access and sustainability b) Analysis of health care data provision to international organisations and in national reports c) Possibly a questionnaire to MS	List of data needed together with input from MDS Framework concept for data collection
MDS	a) Assessment of demand for SHA data and b) the MS' ability to supply these data	a) Review of justification for SHA in producers guidelines, b) Review of policy reports using health accounts information c) Literature review on indicators for efficiency, effectiveness, access and sustainability d) Analysis of health care data provision to international organisations and in national reports	Definition of a Minimum Data Set
SHA	Existing statistical data and meta information in the MS relating to Health Account data and health expenditure	a) Questionnaire to MS b) Review of health accounts data produced by MS	The procedures to implement SHA is also part of the EUROSTAT Grant GUIDE
HLA	All existing statistical data and meta information on Health Care Manpower in MS as described in the final report of the predecessor project (EVALUATION OF DATA SOURCES), including a potential update of the data sources.	a) Review data provided in the predecessor report	With respect to metadata and updating, co-ordination with SHA and EUCOMP is necessary
EUCOMP	Metadata on functional breakdown of health care systems in MS, with reference to international health care classifications, detailing health care functions performed, as well as the activities linked to these functions.	a) Questionnaire to MS based on modified software of EUCOMP I	EUCOMP I already finished, EUCOMP II with respect to metadata collection with SHA and HLA

9 CONCLUSIONS

A broad approach that takes into account the links between sustainable health care, employment and economic performance lies at the heart of the Lisbon Agenda. Employment, economic policy, social cohesion and innovation make up a coherent and comprehensive framework for policy-making. In the health sector, a high level of human health protection shall be ensured in the definition and implementation in the health sector of all Community policies and activities.

This paper provides core indicators within this framework based on the OECD/EUROSTAT concept of SHA.

Important SHA indicators from a macroeconomic perspective are:

- Total health financing rate;
- Public health financing rate;
- Public health financing rate by finance source;
- Productivity by type of health care provider;
- Expenditure by type of disease;
- Cost-sharing by type of diseases/services;
- Unit cost of services.

For effectiveness and equity in particular, variables outside SHA must be used.

The definition of the MDS and of additional information needed to analyse and evaluate these indicators must include:

- SHA data;
- Data on utilization of health services and prices;
- Manpower data;
- Metadata on health systems;
- Metadata on statistical resources;
- Metadata on the compilation of SHA;
- Metadata on regulations concerning the financing and provision of health services.

Currently, metadata and data on the compilation of SHA and the statistical sources used are missing. It is proposed to co-ordinate data collection with health systems information provided by EUCOMP or a similar system, and thereby to widen our knowledge and the potential for analysis.

10 REFERENCES

1. European Commission. *Consultation paper for the preparation of the European Union strategy on sustainable development*. Commission staff working paper SEC (2001). Brussels: Commission of the European Communities, 2001.
2. European Commission. Communication from the Commission "A concerted strategy for modernising social protection" (Com(99)347 Final) of 14 July 1999. 1999.
3. Social Protection Committee, Economic Protection Committee. *Council report in the field of health care and care for the elderly*. Brussels: Council of the European Union, 2002.
4. European Commission. Communication from the Commission "The future of health care and care for the elderly: guaranteeing accessibility, quality and financial viability" (COM(2001)723 final). 2001.
5. OECD. *A System of Health Accounts Version 1.0*. Paris: OECD, 2000.
6. European Commission. Communication from the Commission. "Adopting a programme of Community action in the field of public health (2003-2008)" Decision 1786/2002/EC of 23 September 2002. 2002.
7. BASYS. *SHA: Results of health account data in Europe*. (Final Report, Draft). Augsburg: BASYS, 2003.
8. Office of National Statistics (United Kingdom). *Support package for applying the manual of health accounts in the EU* (Eurostat grant: ?). London: Office of National Statistics, Work in progress.
9. Inspection Générale de la Sécurité Sociale, CEPS. *Age and gender-specific functional health accounts: A pilot study of the application of age and gender-specific functional health accounts in the European Union*. Luxembourg: IGSS/CEPS, 2003.
10. ECHI 2 Project Team. *Design for a set of community health indicators 22-02-04* Paper circulated to participants in ECHI 2 meeting of February 19-20, 2004. 2004.
11. European Council. Göteborg European Council *Presidency Conclusions*. 2001.
12. de la Porte C, Pochet P. *The OMC intertwined with the debates on governance, democracy and social Europe. Research on the open method of co-ordination and European integration* Research prepared for Minister Frank Vandenbrouke, Minister for Social Affairs and Pensions. 2003.
13. European Commission. Communication from the Commission "Supporting national strategies for safe and sustainable pensions through an integrated approach" COM (2001) 723 of 5 December 2001. 2001.
14. WHO. *The World Health Report 2000. Health Systems: Improving Performance*. Geneva: WHO, 2000.
15. Romanow RJ. *Building on Values: the Future of Health Care in Canada - Final Report*. Saskatoon: Commission on the Future of Health Care in Canada, 2002.
16. BASYS. *System of Health Accounts in the EU: Definition of a Minimum Data Set and of Additional Information Needed to Analyse and Evaluate SHA*. (Application for EUROSTAT grants

- for the Year 2002). Augsburg: BASYS, 2002.
17. Barr N. *The Economics of the Welfare State*. Oxford: Oxford University Press, 1998.
 18. Barr N. *The Welfare State as Piggy Bank. Information, Risk, Uncertainty, and the Role of the State*. Oxford: Oxford University Press, 2001.
 19. World Commission on Environment and Development. *From One Earth to One World: An Overview*. Oxford: Oxford University Press, 1987.
 20. Kornai J, Eggleston K. *Welfare, choice and solidarity in transition: Reforming the health sector in Eastern Europe*. Cambridge: Cambridge University Press, 2001.
 21. La Fond A. *Sustaining Primary Health Care*. London: The Save the Children Fund, 1995.
 22. Robertson J. *The economics of sustainable development: A briefing for policy makers*. London: 2002.
 23. Van Zon A., Muysken J. Health and Endogenous Growth. *Journal of Health Economics* 2001;**20**:169-85.
 24. Wanless D. *Securing our Future Health: Taking a Long-Term View. Final Report*. London: HM Treasury, 2002.
 25. Dargie C. *Policy Futures for UK Health: 2000 Report*. London: The Nuffield Trust, The Judge Institute of Management Studies, 2000.
 26. Ruggeri J. *Population Ageing, Health Care Spending and Sustainability*. Ontario: Caledon Institute of Social Policy, 2002.
 27. OECD. Ad Hoc Group on the OECD Health Project. *Spending on health and long-term care: Projections to 2050 revisited*. Paris: OECD, 2003.
 28. Bloor K, Maynard A. *Planning human resources in health care: Towards an economic approach. An international comparative review*. Ottawa: Canadian Health Services Research Foundation, 2003.
 29. OECD. *Purchasing Power Parities and Real Expenditures - 1999 Benchmark Year*. Paris: OECD, 2002.
 30. Dornbusch R. Purchasing Power Parity in Eatwell et al (Eds) *The New Palgrave: A Dictionary of Economics*. 87.
 31. Burns LR, De Graaff RA, Danzon PM, Kimberley JR, Kissick WL, Pauly M V. *The Health Care Value Chain: Producers, Purchasers and Providers*. San Francisco: Jossey-Bass, 2002.
 32. Eurostat. *Eurostat NewCronos Classification Plan. Population and social conditions. Demography*. www.eudatashop.gov.uk/data/downloads/demo.pdf Accessed 10 October 2003. 2002.
 33. OECD. *OECD Health Data 2002*. Paris: OECD, 2002.
 34. WHO. *European Health For All database 2003*. www.who.dk/hfadb Accessed October 1, 2003. WHO, 2003.
 35. Nolte, Ellen and McKee, Martin. *Measuring the health of nations: analysis of mortality amenable*

- to health care. *BMJ* 327(7424), 1129-0. 2003.
36. Hurst J, Jee-Hughes M. *Performance measurement and performance management in OECD health systems*. (Labour market and social policy occasional paper no. 47) . Paris: OECD, 2001.
 37. Smee CH. Improving value for money in the United Kingdom National Health Service . Performance measurement and improvement in a centralised system. In OECD, ed. *Measuring up: improving health system performance in OECD countries*, pp 57-86. Paris: OECD, 2002.
 38. Murray CJL, Salomon JA, Mathers CD, Lopez ADE. *Summary Measures of Population Health: Concepts, Ethics, Measurement and Applications*. Geneva: WHO, 2002.
 39. Palmer, Stephen and Torgerson, David J. Economics notes: Definitions of efficiency. *British Medical Journal* 318(7191), 1136. 99.
 40. Schneider M. Productivity, efficiency, effectiveness and quality of care. In Institut für Gesundheits-System-Forschung, ed. *Report on the workshop on the assessment of the productivity, efficiency, effectiveness and quality of the health care system, Kiel, 22-25 November 1994*, pp 145-53. Kiel: Schriftenreihe, 1995.
 41. Zweifel P, Breyer F. *Health Economics*. Oxford: Oxford University Press, 1997.
 42. Australian Bureau of Statistics. *Measuring outputs, inputs and productivity for Australian public acute care hospitals* OECD-UNECE-EUROSTAT meeting of national accounts experts Paris 3-6 June 1997. Paris: OECD.
 43. Talli K. *Measuring public sector productivity*. Case studies presented to the PUMA expert group meeting on measuring productivity growth in the government sector, OECD meeting of national accounts experts, Paris, 21-24 September 1999.
 44. *First national report on health sector performance indicators*. National Health Ministers' Benchmarking Working Group. Canberra: Commonwealth Department of Health and Aged Care, 1996.
 45. Canadian Institute of Health Information. *Health Indicators 2000*. 2000.
 46. Hurst J, Jee-Hughes M. *Performance measurement and performance management in OECD health systems*. (Labour market and social policy occasional paper no. 47) . Paris: OECD, 2001.
 47. Department of Health and Children Ireland. *Hospital Data Project- Final Report*. Luxembourg: Directorate General of Health and Consumer Protection, 2003.
 48. De Lathouwer, C and Pouiller, JP. How much ambulatory surgery in the world in 1996-7 and trends? *Ambulatory Surgery* 8, 191-210. 2000.
 49. Wagstaff A, van Doorslaer E. Equity in Health Care and Delivery. In Culyer A.J, Newhouse J.P, eds. *Handbook of Health Economics vol 1B*, pp 1803-57. Amsterdam: Elsevier, 2000.
 50. Williams A. Equity in health care : the role of ideology. In van Doorslaer E, Wagstaff A, Rutten F, eds. *Equity in the finance and delivery of health care: an international perspective*, pp 287-98. Oxford: Oxford University Press, 1993.
 51. Sen A. *Inequality re-examined*. Oxford: Oxford University Press, 1992.
 52. Murray CJ, Evans DB. *Health Systems Performance Assessment. Debates, Methods and Empiricism*. Geneva: WHO, 2003.

53. WHO. *Report of the Scientific Peer Review Group on Health Systems Performance Assessment*. Geneva: WHO, 2001.
54. Wagstaff A. Reflections on and Alternatives to WHO's Fairness of Financial Contribution Index. *Health Economics* 2002;**11**:103-16.
55. National Health Ministers' Benchmarking Working Group. *Second National Report on Health Sector Performance Indicators*. Canberra: Commonwealth Department of Health and Aged Care, 1998.
56. Schoen C, Davis K, DesRoches C, Donelan K, Blendon R. Health insurance markets and income inequality: findings from an international policy survey. *Health Policy* 2000;**51**:67-85.
57. van Doorslaer E, Wagstaff A, van de Burg H, Christansen T, De Graeve D, Duchesne I *et al*. Equity in the delivery of health care in Europe and the US. *Journal of Health Economics* 2000;**19**:553-83.
58. van Doorslaer E, Koolman X, Puffer F. Equity in the use of physician visits in OECD countries: has equal treatment for equal need been achieved? In OECD, ed. *Measuring up : improving health system performance in OECD countries*, Paris: OECD, 2002.
59. Le Grand J. Inequalities in health: Some international comparisons. *European Economic Review* 1987;**31**:182-91.
60. Murray CJL, Frenk J. A Framework for Assessing the Performance of Health Systems. *Bulletin of the World Health Organization*. 2000;**78**:717-31.
61. Mackenbach JP, Kunst AE. Measuring the magnitude of socio economic inequalities in health: an overview of available measures illustrated with two examples from Europe. *Social Science and Medicine* 1997;**44**:757-71.
62. Mackenbach JP, Bakker MJ, Kunst AE, Diderichsen F. Socioeconomic inequalities in health in Europe : an overview. In Mackenbach JP, Bakker MJ, eds. *Reducing inequalities in health : a European perspective*, pp 3-24. London: Routledge, 2002.
63. van Doorslaer E, Koolman X. *Explaining the differences in income-related health inequalities across European countries*. ECuity II Project Working Paper. 2002.
64. Smith P. Developing composite indicators for assessing health system efficiency. In Smith P, ed. *Measuring up: improving health systems performance in OECD countries*, Paris: OECD, 2002.
65. European Commission. *Social Protection in the Member States of the European Union (MISSOC)*. Brussels, Luxembourg: European Commission, General Directorate V Employment, Industrial Relations and Social Affairs, 2002.
66. BASYS. *Statistical analysis and reporting of data on health accounts* (Eurostat project: 2001/S144-0989/EN). Augsburg: BASYS, 2003.
67. Schneider M, Köse A, Biene-Dietrich P. *Gesundheitsökonomische Indikatoren für Rheinland Pfalz 1995-2000*. Mainz: Ministerium für Arbeit, Soziales, Familie und Gesundheit, 2003.
68. European Council. Lisbon European Council, *Presidency Conclusions*. 2000.
69. Atkinson T, Cantillon B, Marlier E, Nolan B. *Social Indicators: The EU and Social Inclusion*. Oxford: Oxford University Press, 2002.

70. Grossmann M. *The Demand for Health: A Theoretical and Empirical Investigation*. New York and London: Columbia University Press, 1972.
71. Rutstein, DD, Berenberg, W, Chalmers, TC, Child CG 3rd, Fishman, AP, and Perrin, EB. Measuring the quality of medical care: A clinical method. *N England Journal of Medicine* 294(11), 582-8. 76.
72. Eurostat. *Key figures on health pocketbook. Data 1985-2000*. Luxembourg: Office for Official Publications of the European Communities, 2002.
73. European Commission, IMF, OECD, UN, World Bank. *System of National Accounts 1993*. New York: United Nations Publications, 1993.
74. Robine J, Jagger C, Romieu I. Selection of a coherent set of health indicators: A first step towards a user's guide to health expectancies for the European Union. Phase II : final report. Montpellier : INSERM, Démographie et Santé, REVES, 2002.
75. World Bank, World Health Organisation, USAID. *Guide to producing national health accounts with special applications for low-income and middle-income countries*. Geneva: World Health Organisation, 2003.

76. EUROPEAN COMMISSION . CONSULTATION PAPER FOR THE PREPARATION OF THE EUROPEAN UNION STRATEGY ON SUSTAINABLE DEVELOPMENT COMMISSION STAFF WORKING PAPER SEC (2001) 517. BRUSSELS: 2001.

ANNEX A: RELATIONS AMONG FINANCIAL SUSTAINABILITY, EFFICIENCY, EFFECTIVENESS AND ACCESS

This appendix provides a formal presentation of the relationship between financial sustainability, efficiency, effectiveness and access.

Financial sustainability contains at least two elements:^{bb}

- a) Equilibrium between the different factors that contribute to overall financial stability.
- b) The current generation has an obligation to the next generation.

Independently of whether a system is built on contributions or taxes, the stability of the *total financing rate* (TFR) is that of the ratio of revenues and expenditure. We can define the financing rate which is necessary to finance the health care system when we know the *income base* (Y) for financing health services on one side and the *total expenditure for health services* (THE) on the other.

$$\text{TFR} = \frac{\text{THE}}{\text{Y}} \quad (1)$$

In a scheme based mainly on contributions, TFR is defined as the ratio of total expenditure of the scheme to the contribution base, which is more or less linked to the total income of an economy. By splitting expenditure into individual demands and revenues into individual contributions equation (1) can be reorganised. Expenditure equals the product of number of patients and the average cost per patient. The contribution base equals the number of contribution payers and the average contribution base. Now equation (1) can be written as equation (2).

$$\text{TFR} = \frac{\text{Patients}}{\text{Contribution payers}} * \frac{\text{Ø Cost per patient}}{\text{Ø Contribution base per payer}} \quad (2)$$

The first term on the right side is the *patient payer ratio* and the second the *relative cost treatment level*. The patients payer ratio^{cc} is usually difficult to determine in a health care system, where several sources contribute to health care financing including

^{bb} As defined by the *Commission of the European Union in a consultation paper of 2001*⁷⁶

^{cc} In pension systems this ratio defines the “dependency ratio”. In health care systems the patients’ payer ratio might be one in the case that each patient is involved in financing health care by cost-sharing regulations.

patients' out-of-pocket payments.^{dd} However, the financial sustainability of the whole system requires a comprehensive view of all subsystems of health care financing and the inclusion of the tax base in the calculation of the TFR.^{ee}

Also, the patient payer ratio depends on many factors. One is the *age structure* of the population, which can be measured in a way analogous to the pensioner ratio using an old-age dependency ratio (number of persons beyond the working age to the number of persons within the working age).^{ff} The same holds for children as dependents.

Tax-based systems and contribution-based systems vary by types of income included in the financing of health care. In countries with National Health Service systems consumption taxes are also used to finance health care. Under these conditions it is practically impossible to find any inhabitant of a country who does not contribute to health care financing. Therefore one possibility is to replace the number of "contribution payers" by the number of "inhabitants" in equation (2).^{gg}

$$\text{TFR} = \frac{\text{Patients}}{\text{Inhabitants}} * \frac{\text{Ø Cost per patient}}{\text{Ø Income/inhabitant}} \quad (3)$$

One should consider that the distribution of income as well as expenditure on health care are very unevenly distributed among inhabitants. This can be allowed for by replacing the average cost/income by the respective distributions. But to avoid complicating the discussion we focus here simply on averages.

Equation (3) gives a more general description of the TFR than equation (2), one which is independent of the type of health system. The first term in equation (3) describes the *patient ratio* of the population, the second term simply the *relative price to treat a patient*, which we will call the relative health price.

It should be noted that the TFR gives the *share of health expenditure devoted to GNI* where income is measured by GNI. The stability of the health expenditure ratio is therefore a good expression of financial stability. Transforming equation (3) in to growth rates gives equation (4):

^{dd} In case, there are transfer payments, for example from state budget to health insurance budget the "official" contribution rate is lower than the TFR (*ceteris paribus*) as contribution do not finance total expenditures. The same holds for cost-sharing payments of patients.

^{ee} An alternative is to fix the contribution rate at such a percentage that all the expenditure *not* covered by the "federal grant" – or any other transfer payments from other institutions – can be financed.

^{ff} This is often looked upon as a pure demographic indicator. However, for defining this ratio a decision is needed on when the working age starts and ends. In a comparative view, the same length of the working age is often used for defining the old-age dependency ratio. This can, however, be a misleading indicator for pension policy purposes, if in reality there is a substantial difference between countries in the start and end of working life.

^{gg} Another possibility is to use the labour force as the denominator.

$$W(\text{TFR}) = W(\text{patient ratio}) + W(\text{relative health price}) \quad (4)$$

Obviously, any increase in the patient ratio must be compensated by a decrease in the cost income ratio to reach financial stability, $W(\text{TFR})=0$.

Equation (4) provides a good argument for preventive action in the context of financial sustainability, as long as the patient ratio increases and/or relative prices for health soar.

Primary preventive actions aim to decrease both the patient ratio by the diminishing the incidence of diseases and the relative prices by decreasing the severity of diseases, and as consequence the need of treatment, which means, ceteris paribus, cost savings. Secondary preventive actions as screening increase the patient ratio at short run with the aim to discover diseases in an early stage of development and by this to rise the chance of treatment as well as to diminish future health care cost.

$$\text{TFR} = \frac{\text{Patients}}{\text{Inhabitants}} * \left[\frac{\text{Ø Cost per patient at constant prices}}{\text{Ø Income/ inhabitant at constant prices}} * \frac{\text{Ø Health output price}}{\text{Ø GDP Price}} \right] \quad (3a)$$

The second term on the right side might be reorganised when we are interested in the role of manpower in the health sector as $\text{Ø cost per patient at constant prices} = \text{Ø cost per health labour at constant prices} * \text{health labour per patient}$. Similarly $\text{Ø income/inhabitant at constant prices} = \text{Ø GDP at constant prices per total labour} * \text{total labour per inhabitants}$.

The modified equation for health labour is:

$$\text{TFR} = \frac{\text{Patients}}{\text{Inhabitants}} * \frac{\text{Health labour per patient}}{\text{Total labour per inhabitants}} * \frac{\text{Ø Cost (real) per health labour}}{\text{Ø Income (real) per total labour}} * \frac{\text{Ø Health output price}}{\text{Ø GDP Price}} \quad (3b)$$

$\text{Ø Cost per health labour at constant prices}$ is also an expression for productivity in the health sector. The two terms “Cost per health labour” and “ $\text{Ø Income per total labour}$ ” are not really comparable as $\text{Ø cost per health labour}$ includes also intermediate consumption. One might consider the share of intermediate consumption by adding the factor c .

$$\text{TFR} = \frac{\text{Patients}}{\text{Inhabitants}} * \frac{\text{Health labour per patient}}{\text{Total labour per}} * \frac{\text{Ø Income (real) per health labour}}{\text{Ø Income (real) per total labour}} * \frac{1}{c} * \frac{\text{Ø Health output price}}{\text{Ø GDP Price}} \quad (3c)$$

inhabitants

Equation (3c) contains helpful information regarding policy options for stabilizing the health sector. The five terms on the right side are:

- a) the patient ratio
- b) the relative health labour intensity
- c) the relative productivity (or income) of health personnel
- d) the intermediate consumption rate
- e) relative health prices.

From a health policy perspective one important difference is that between preventive and curative services. Preventive services aim to reduce the number of patient and diseases, while curative services aim to treat patients and reduce the consequences of diseases. Therefore preventive services can reduce the “output” of the health system measured in terms of health services. This would mean a reduction in productivity, if the volume of health labour remains constant.

Transforming equation (3c) into growth rates gives equation (4a):

$$W(\text{TFR}) = W(\text{P}) + W(\text{HLI}) + W(\text{II}) - W(\text{c}) + W(\text{RHI}) \quad (4a)$$

The following policies might help to stabilize the system:

- a) preventive policies to reduce the number of patients and severity of diseases (increase in effectiveness)
- b) improvement of the skill mix of health labour, improvement of service mix and restriction of health labour in urban conglomerations (increase in efficiency)
- c) equal distribution of health labour (increase in equity/access)
- d) regulations on extra billing and payments to providers
- e) development of markets for intermediate consumption
- f) cost containment of health prices.

ANNEX B: EXAMPLES OF INDICATORS OF EFFECTIVENESS USED IN DIFFERENT CONTEXTS

NHS Performance Framework : Effective Delivery of Appropriate Healthcare

- (i) Disease prevention and health promotion : % of target population vaccinated.
- (ii) Early detection of cancer, composite consisting of:
 - % of target population screened for breast cancer (ages 50-64);
 - % of target population screened for cervical cancer (ages 25-64).
- (iii) Inappropriately used surgery, composite consisting of age standardised:
 - rates of D&Cs performed in women under 40;
 - surgical intervention rates for glue ear (grommet surgery).
- (iv) Surgery rates, composite consisting of age standardised elective rates for:
 - CABG and PTCA;
 - hip replacement (ages 65 and over);
 - knee replacement (ages 65 and over);
 - cataract replacement.
- (v) Acute care management, composite consisting of age standardised admission rates for: a
 - severe ENT infection;
 - kidney/urinary tract infection;
 - heart failure.
- (vi) Chronic care management, composite consisting of age standardised admission rates for:
 - asthma;
 - diabetes;
 - epilepsy.
- (vii) Mental health in primary care : volume of benzodiazepines.
- (viii) Cost effective prescribing composite, consisting of:
 - NIC/PU of combination products;
 - NIC/PU of modified release products;
 - NIC/PU of drugs of limited clinical value;
 - NIC/DDD of inhaled corticosteroids.
- (ix) Discharge from hospital, composite consisting of:
 - rate of discharge to usual place of residence within 56 days of emergency admission from there with a stroke (ages 50 and over);
 - rate of discharge to usual place of residence within 28 days of emergency admission from these with a fractured neck of femur (ages 65 and over).

**HEDIS effectiveness indicators to measure effectiveness of care
(National Committee Quality Assurance, US)**

- Advising smokers to quit (in Member Satisfaction Survey)
- Beta blocker treatment after a heart attack
- The health of seniors
- Eye exams for people with diabetes
- Flu shots for older adults
- Cervical cancer screening
- Breast cancer screening
- Childhood immunisation status
- Adolescent immunisation status
- Treating children's ear infections
- Prenatal care in the first trimester
- Low birth-weight babies
- Check-ups after delivery
- Follow up after hospitalisation for mental illness

**Commonwealth Fund (US) : Indicators of effectiveness
Staying healthy**

- Childhood examination
- Trend in immunizations for older adults
- Colorectal cancer screening
- Trend in breast cancer screening and outcomes
- Smoking cessation counselling
- Getting Better when sick
- Antibiotics treatments for sore throat
- Antibiotic treatment for pneumonia
- Living with chronic illness
- Appropriateness of procedures as rated expert consensus
- Diabetes management
- Asthma management
- Stroke prevention for patients with atrial fibrillation
- Treatment and outcomes for HIV
- Medication to prevent recurrent heart attack
- Speed to treatment with clot-dissolving drugs following a heart attack

ANNEX C: ECHI-2 DRAFT HEALTH SYSTEM INDICATORS (16-02-2004)

Class 4. Health systems

This class should indicators covering activities in prevention and health promotion (4.1) as well as aspects of the health care system (4.2-4.5). It should also cover indicators of the quality of the health system and of 'health system performance'. In the sections on health care services, the categories currently listed by OECD and the System of Health Accounts are largely followed.

4.1 Prevention, health protection and health promotion.

It is proposed (January 2004) to change this hierarchy, by taking out the 'health promotion part as a separate block. The purpose is to discriminate between health interventions occurring within the health services, including health care and disease prevention (4.1.1, 4.2-4.5) and health interventions outside the health care system (4.1.2, 4.1.3). The latter would go as a separate chapter 5, Called: 'Health Promotion'. This has not yet been implemented in the present version.

4.1.1 Disease prevention; this group includes indicators on the implementation of prevention activities which are or are becoming widely applied, based on broad consensus of their positive effects on health

<ul style="list-style-type: none"> Vaccination coverage children; UW-0 	<ul style="list-style-type: none"> WHO-HFA: % of children immunised against: diphtheria, tetanus, pertussis, measles, poliomyelitis, tuberculosis, Hib, hepatitis B, mumps, rubella. % children 24-35 months with completed vaccination courses for: DKTP, Hib, BMR, hepatitis B, Men. C (CHILD) % children completing basic vaccination programme (OECD) All data by region, SES 	<ul style="list-style-type: none"> Registers 	<ul style="list-style-type: none"> Child project; OECD pilot quality indicators
<ul style="list-style-type: none"> % influenza vaccination coverage 	<ul style="list-style-type: none"> by gender, age, region, SES 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
<ul style="list-style-type: none"> Breast cancer screening; UW-0 	<ul style="list-style-type: none"> Coverage 	<ul style="list-style-type: none"> Survey 	<ul style="list-style-type: none"> Eurochip project: many screening variables to be defined OECD pilot quality indicators
<ul style="list-style-type: none"> Cervical cancer screening; UW-0 	<ul style="list-style-type: none"> Coverage cervical screening age 20-69, within past 3 years (OECD) 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> Eurochip project; OECD pilot quality indicators
<ul style="list-style-type: none"> Colorectal cancer screening 	<ul style="list-style-type: none"> Coverage 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> Eurochip project
<ul style="list-style-type: none"> Screening for blood pressure 	<ul style="list-style-type: none"> % of population with blood pressure measurement in past 5 years; by gender, ages 25-74 by 10y groups, SES 	<ul style="list-style-type: none"> HIS 	<ul style="list-style-type: none"> EHRM project:
<ul style="list-style-type: none"> Screening for serum cholesterol 	<ul style="list-style-type: none"> % of population with cholesterol measurement in past 5 years; by gender, ages 25-74 by 10y groups, SES 	<ul style="list-style-type: none"> HIS 	<ul style="list-style-type: none"> EHRM project
<ul style="list-style-type: none"> Antihypertensive drug 	<ul style="list-style-type: none"> prevalence of antihypertensive drug treatment 	<ul style="list-style-type: none"> HIS 	<ul style="list-style-type: none"> EHRM

<i>treatment</i>	<ul style="list-style-type: none"> among actual and potential hypertensives; prevalence of antihypertensive drug treatment in the population (cf. 4.3.4) EHRM project: gender, ages 25-74 by 10y groups, SES 		
<ul style="list-style-type: none"> lipid lowering drug treatment 	<ul style="list-style-type: none"> prevalence of lipid-lowering drug treatment in the population; EHRM project: gender, ages 25-74 by 10y groups, SES 	<ul style="list-style-type: none"> HIS 	<ul style="list-style-type: none"> EHRM
<ul style="list-style-type: none"> Osteoporosis prevention drug treatment; UW-6 	<ul style="list-style-type: none"> Defined daily doses (ATC M 05 B) 	<ul style="list-style-type: none"> Sale statistics, prescriptions 	<ul style="list-style-type: none"> MSC project
<ul style="list-style-type: none"> Testing for complication prevention in diabetics; UW-3 	<ul style="list-style-type: none"> % tested for HbA1c last 12 m % tested for lipid profile last 12 m % tested for micralbuminuria % with blood pressure tested last 12 m % with retina fundus inspection last 12 m % with serum creatinine test last 12 m 	<ul style="list-style-type: none"> Diabcare, sentinel networks, unique patient number 	<ul style="list-style-type: none"> Eudip project
<ul style="list-style-type: none"> Hormone replacement therapy (HRT); UW-11 	<ul style="list-style-type: none"> % of women aged 45-49 using peri- and post-menopausal hormone medication; 5-y age groups 	<ul style="list-style-type: none"> HIS 	<ul style="list-style-type: none"> Reprostat project: not in core set
<ul style="list-style-type: none"> Counselling on smoking 		<ul style="list-style-type: none"> HIS 	<ul style="list-style-type: none"> EHRM
<ul style="list-style-type: none"> General preventive examination 			<ul style="list-style-type: none"> Eurostat: 10 items, +6 in women
<ul style="list-style-type: none"> Prenatal screening 			<ul style="list-style-type: none"> By age of mother; not recommended by Peristat
<ul style="list-style-type: none"> Prenatal care attendance; UW-9 	<ul style="list-style-type: none"> Distribution of timing of first antenatal visit by trimester of pregnancy, for all women delivering live or stillbirth 		<ul style="list-style-type: none"> Peristat
<ul style="list-style-type: none"> HIV testing among pregnant women; UW-11 	<ul style="list-style-type: none"> % of pregnant women attending antenatal care who accept HIV screening 	<ul style="list-style-type: none"> laboratory records 	<ul style="list-style-type: none"> Reprostat
<ul style="list-style-type: none"> Neonatal screening 			<ul style="list-style-type: none"> By age of mother; PKU, other; not recommended by Peristat
<ul style="list-style-type: none"> Integrated children's health monitoring 			<ul style="list-style-type: none"> Not recommended in Peristat or Reprostat projects
<p>4.1.2 Health promotion; this group includes indicators on the implementation of health promotion interventions, largely aimed at improving health behaviours. Selected indicators should be clearly related with the effectivity of the interventions. This is clearly a development area. The EUHPID project will recommend indicators in this and related sections, based on a broad perspective of health promotion. See note under heading of 4.1 for proposal of rearrangement.</p>			
<ul style="list-style-type: none"> Nutritional policy; UW-0, UW-14 	<ul style="list-style-type: none"> Nutritional policy and statutory legislation 		<ul style="list-style-type: none"> PH Nutrition project
<ul style="list-style-type: none"> Nutritional fortification; UW-14 	<ul style="list-style-type: none"> Nutritional intervention: fortification; i.e., monitoring of fortification practices such as iodine in salt, iron in cereals 		<ul style="list-style-type: none"> PH nutrition project
<ul style="list-style-type: none"> Policies and campaigns on health behaviours 			

<i>(smoking, alcohol, diet, safe sex, drug use, sunlight exposure, physical activity, injury prevention etc); UW-0</i>			
• <i>EHRM: Awareness of elevated blood pressure, of elevated serum cholesterol</i>	•	• <i>Survey</i>	• <i>EHRM project: by gender, ages 25-74 by 10y groups, SES</i>
• <i>Integrated programmes in settings e.g. schools, workplaces, etc.; UW-0</i>	•	•	•
• <i>Mental health promotion</i>	•	•	• <i>Mental health project: decreasing suicide rate; supporting parental skills</i>
• <i>Physical punishment of children</i>	• <i>% children protected by law against physical punishment, as % in school or regular families</i>	• <i>Knowledge of statutes</i>	• <i>Child project (ECHI: useful and feasible indicator? Cultural bias?)</i>
• <i>Anti-bullying policies in schools</i>	• <i>% of children in schools with written anti-bullying policy/all schoolchildren</i>	• <i>mixed sources</i>	• <i>Child project</i>
4.1.3 Health protection; this group includes indicators on the implementation of legislation and regulation, aimed at prevention at the population level. Much of this regulation is being developed at the EU level. From a vast array of possibilities, a few issues have been selected that are associated with substantial health effects and that have been documented as (cost-) effective. This is also the area of 'health in other policies' and 'health impact assessment' (HIA). On the environmental health side, the ECEH project will give recommendations; See note under heading of 4.1 for proposal of rearrangement			
• <i>Regulations on public smoking</i>	• <i>Presence of smoking restriction in 9 types of buildings/situations</i> • <i>Existence and enforcement of laws/regulations to protect children from tobacco smoke exposure in public places (composite index?)</i>	• <i>Info on regulations/laws</i>	• <i>ECEH</i> • <i>Child project: include pregnancy, schools, day-care, public places, transport, hospitals, theatres, museums, restaurants, smoking advertisement (ECHI: the latter is a separate indicator; do not restrict all this to children)</i>
• <i>Smoking advertisement restrictions (also include alcohol)?</i>	• <i>Existence and enforcement of laws/regulation to inhibit tobacco advertisement</i>	• <i>Info on regulations/laws</i>	• <i>Child project: for children; ECEH</i>
• <i>Tobacco prices</i>			
• <i>Regulations on alcohol and driving</i>	• <i>Allowed limit of alcohol level in blood</i>		
• <i>Regulation on seat belts, cycle helmets</i>	• <i>Existence and enforcement of regulation for safe transport of children (proposal for composite index)</i>	• <i>Various sources</i>	• <i>Child project: include safety seats in cars, safety belts, (motor)cycl helmets, appropriate speed limits, safe walking/cycling plans</i>
• <i>Policies on healthy/safe nutrition, e.g. food/drink fortification</i>	•	•	•
• <i>Regulations on food safety and quality</i>			• <i>Implement by ECEH</i>

• Regulations on air/water quality			• Implement by ECEH
• Regulations on noise	<ul style="list-style-type: none"> • <i>Existence of policies for reducing noise exposure of babies and young children (proposal for composite index)</i> • <i>General regulations</i> 	• Environmental agencies	<ul style="list-style-type: none"> • <i>Child project: include intensive care units, day-care centres, schools, kindergartens</i> • Implement by ECEH
• Regulations on lead exposure	<ul style="list-style-type: none"> • <i>Existence of regulation limiting use of lead in building etc. materials and establishing biomonitoring (composite index proposed)</i> 	• Environmental agencies	<ul style="list-style-type: none"> • <i>Child project</i>
4.2 Health care resources; in this section, OECD and HFA listings have been largely followed;			
4.2.1 Facilities			
• Hospital beds total	<ul style="list-style-type: none"> • <i>WHO-HFA: Number, per 100,000</i> • <i>By region</i> 	• Registers	• <i>WHO-HFA: also % private inpatient hospital beds</i>
• Hospital beds acute care	<ul style="list-style-type: none"> • <i>WHO-HFA: Number, per 100,000</i> • <i>By region</i> 	• Registers	•
• Psychiatric care beds	<ul style="list-style-type: none"> • <i>WHO-HFA: Number, per 100,000</i> • <i>By region</i> 	• Registers	• <i>Mental health project: Eurostat definition (being revised)</i>
• Nursing/elderly home care beds	<ul style="list-style-type: none"> • <i>WHO-HFA: Number, per 100 000</i> • <i>by region</i> 	• Registers	•
• Stroke units	•		•
4.2.2 Manpower; indicators in this group recommended by the manpower project, with aid of the Eucomp project. Main goal of manpower indicators in ECHI frame: cost element and quality of care. Other aims: role in production/income/economic growth. Bottom group of indicators indicated by Manpower project as of lower priority. ECHI suggestion: some measure of personnel shortage may be more appropriate than unemployment from the point of view of quality of care or health system performance.			
• Health services employment	• <i>No. of persons; per 1,000 population; % of total employment</i>	• <i>National register, hospital statistics</i>	• <i>Manpower project: by head counts, fte, gender</i>
• Hospitals employment	• <i>Total employment in general hospitals, mental health and substance abuse hospitals, other specialty hospitals</i>	• <i>Same</i>	• <i>same; question ECHI: not indicated per 1,000 population, on purpose??</i>
• Nursing and residential care facilities employment	• <i>Total employment in facilities for nursing care, residential mental retardation, mental health & substance abuse, elderly community care, other residential care</i>	• <i>Same</i>	• <i>Same</i>
• Ambulatory care employment	• <i>Total employment in offices of: physicians, dentists, paramedical practitioners, out-patient care centres, medical/diagnostic laboratories, home health care, other ambulatory care</i>	• <i>Same</i>	• <i>Same</i>
• Employment in retail sale and other providers of medical goods	• <i>Total employment in dispensing chemists, retail sale and other suppliers of optical glasses, hearing aids, other medical</i>	• <i>Same</i>	• <i>Same</i>

	<i>appliances, other sale of pharmaceuticals and medical goods</i>		
• <i>Provision and administration of public health programmes</i>	• <i>Provision and administration of public health programmes</i>	• <i>Same</i>	• <i>Same</i>
• <i>General health administration</i>	• <i>Government administration of health, social security funds, other (social/private) insurance, other providers of health administration</i>	• <i>Same</i>	• <i>Not indicated; only head count or fte?</i>
• <i>Hospital staff ratio: acute care</i>	• <i>Hospital staff/number of beds</i>	• <i>Same</i>	• <i>Manpower project: staff from hospitals as indicated above only</i>
• <i>Nurses staff ratio: acute care</i>	• <i>Hospital nurses staff/number of beds</i>	• <i>Same</i>	• <i>Manpower project: staff from hospitals as indicated above only</i>
• <i>Physicians employed; UW-0</i>	• <i>WHO-HFA: Numbers and fte, per 100,000 population</i> • <i>By region</i>	• <i>Same</i>	• <i>Manpower project: no priority;</i> • <i>WHO: also proportion of physicians working in hospitals; and number of GP's per 100 000</i>
• <i>Nurses employed; UW-0</i>	• <i>WHO-HFA: Numbers and fte, per 100,000 population</i> • <i>By region</i>	• <i>Same</i>	• <i>Manpower project: no priority</i> • <i>WHO: also proportion of nurses working in hospitals</i>
• <i>Midwives employed</i>	• <i>WHO-HFA: Number and fte, per 100,000 population</i> • <i>By region</i>	• <i>Same</i>	• <i>Manpower project: no priority</i>
• <i>Dentists employed</i>	• <i>WHO-HFA: Numbers and fte, per 100,000 population</i> • <i>By region</i>	• <i>Same</i>	• <i>Manpower project: no priority</i>
• <i>Pharmacists</i>	• <i>WHO-HFA: Number, per 100,000 population</i> • <i>By region</i>	• <i>Same</i>	• <i>Manpower project: no priority</i>
• <i>Paramedical professions</i>	• <i>Number, per 100,000 population</i>	• <i>Same</i>	• <i>Manpower project: no priority</i>
• <i>Psychiatrists, child psychiatrists, clinical psychologists</i>	• <i>Number, per 100,000 population</i>	• <i>Same</i>	• <i>Mental health project</i>
• <i>Income of doctors etc.</i>	• <i>Yearly gross income</i>	• <i>Same</i>	• <i>Manpower project: no priority</i>
• <i>Unemployment rate of doctors etc.</i>	• <i>Unemployment/employment</i>	• <i>Labour market statistics</i>	• <i>Manpower project: no priority</i>
• <i>Shortage of medical personnel ??</i>	•	•	• <i>ECHI suggestion; bottlenecks in available medical personnel are an indicator of health care quality (4.5)</i>
4.2.3 Education			
• <i>No. physicians graduated</i>	• <i>WHO-HFA: Number, per 100,000 population, per year</i> • <i>By gender, age</i>		•
• <i>Number of nurses and midwives graduated</i>	• <i>Same</i>		• <i>Same</i>
• <i>No. pharmacists graduated</i>	• <i>Same</i>		• <i>Same</i>

• No. dentists graduated	• Same		• Same
4.2.4 <i>Technology; diffusion of new technology is also a measure of health system performance; indicators to be selected</i>			
• Radiation equipment	• No. of units		• Eurochip project; Eurostat/OECD
• CT scans; UW-0	• No. of units		• OECD
• MRI units; UW-0	• No. of units		• OECD
• PET units	• Positron emission tomography; No. of units		•
• linear accelerators	• Units with at least 2 linear accelerators		• OECD
• Lithotriptors	• No. of units		• OECD
• haemodialysis stations	• No. of units		• OECD
• Mammographs	• No. of units		• OECD
4.3 Health care utilisation; in this section, WHO/HFA has been followed (except admissions), with extensions from OECD: hospital discharges and medicine use. Discharges are taken as the best indicator for disease-specific hospital use, from the population health viewpoint. If discharges and medical procedures are further specified, we recommend to use ICD or –related codes, to comply with the health status indicators.			
4.3.1 In-patient care utilisation; all data by region			
• Beddays: in-patient care	• Beddays per 100,000 population	• Registers	•
• Beddays: acute care	• Beddays per 100,000 population; selected diagnoses		• Check Hospital Data Project (HDP); coordinate with diagnostic groups in 2.2. and 2.3, so preferably by ICD.
• Beddays acute care circulatory diseases	• aggregate beddays per year for AMI, acute coronary syndromes, stroke		• Eurociss project:
• Occupancy rate: in-patient care			•
• Occupancy rate: acute care			•
• Average length of stay: in-patient care	• Average length of stay in days		•
• Average length of stay acute care for selected diagnoses; UW-0	• Average length of stay in days		• Coordinate with diagnostic groups in 2.2. and 2.3, so preferably by ICD.
• Average length of stay acute care for circulatory diseases	• Average length of stay in days, for AMI, acute coronary syndromes, other forms of heart disease, stroke		• Eurociss project:
• Long-stay psychiatric patients	• Number of in-patients staying > 300 days in psychiatric services; • WHO-HFA: no of in-patients staying over 1 year in psychiatric services		• Mental health project
• Discharges; total	• Number of discharges, per 100,000; if by gender/age: standardise		
• Discharges; by disease	• Number of discharges, per 100,000; if by		• coordinate with diagnostic groups

group; UW-0	<ul style="list-style-type: none"> gender/age: standardise WHO-HFA: discharges per 100 000 for infectious/parasitic disease, cancers, mental/behavioural, circulatory system, respiratory system, digestive system, musculoskeletal system, injuries/poisoning 		<i>in 2.2. and 2.3, so preferably by ICD.</i>
<ul style="list-style-type: none"> Discharges for circulatory diseases 	<ul style="list-style-type: none"> For AMI, acute coronary syndromes, all ischaemic heart disease, heart failure, other forms of heart disease, stroke 		<ul style="list-style-type: none"> Eurociss project
<ul style="list-style-type: none"> Hospitalisations in psychiatric services 	<ul style="list-style-type: none"> full-time + part-time hospitalisations in psychiatric services; separate under age 18 		<ul style="list-style-type: none"> Mental health project
<ul style="list-style-type: none"> Maternity units: distribution of place of birth; UW-9 	<ul style="list-style-type: none"> Place of birth: at home, maternity units 		<ul style="list-style-type: none"> Peristat
<ul style="list-style-type: none"> Maternity units: % very preterm births in units without NICU; UW-9 	<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> Peristat
4.3.2 Out-patient care utilisation			
<ul style="list-style-type: none"> General practitioner contacts; UW-0 	<ul style="list-style-type: none"> Number, per 100,000/year 	<ul style="list-style-type: none"> Survey (register) 	<ul style="list-style-type: none"> HIS project
<ul style="list-style-type: none"> Dentist contacts 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> HIS project
<ul style="list-style-type: none"> Physiotherapist contacts 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> HIS project
<ul style="list-style-type: none"> Alternative practice contacts 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> HIS project
<ul style="list-style-type: none"> Maternal/child care 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> HIS project
<ul style="list-style-type: none"> Births attended by midwives 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> Peristat?
<ul style="list-style-type: none"> Mental health care 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> Mental health project: public and total (public private) psychiatric outpatient care; seeing health professional; sought other advice; admitted to psychiatric hospital; HIS project: also drug problem treatment
4.3.3 Surgical operations and procedures; selection below is limited subset from OECD; criteria? Indicators should be representative for technical progress, regional medical habits or performance of health care; make here new arrangement based on classification of procedures			
<ul style="list-style-type: none"> Total surgical in-patients 	<ul style="list-style-type: none"> Number per 100,000 population 		<ul style="list-style-type: none"> New in OECD 2001; invasive surgery public + private; excludes accident emergency surgery and endoscopies
<ul style="list-style-type: none"> Total surgical daycases 	<ul style="list-style-type: none"> Number per 100,000 population 		<ul style="list-style-type: none"> New in OECD 2001; invasive surgery public + private; excludes accident emergency surgery and endoscopies

<ul style="list-style-type: none"> CABG (Coronary Artery Bypass Grafting) 	<ul style="list-style-type: none"> rate per 100,000 population 	<ul style="list-style-type: none"> Hospital registries 	<ul style="list-style-type: none"> Eurociss project additionally recommended: rate per event, by hospital discharges, acute versus elective, stent PTCA, pacemakers by population, CT, MRI scans for stroke, per population
<ul style="list-style-type: none"> PTCA (Percutaneous Transluminal Coronary Angioplasty); UW-0 	<ul style="list-style-type: none"> rate per 100,000 population 	<ul style="list-style-type: none"> Hospital registries 	
<ul style="list-style-type: none"> Heart transplants 		<ul style="list-style-type: none"> Hospital registries 	
<ul style="list-style-type: none"> Other cardiovascular operations 	<ul style="list-style-type: none"> Valvular operations, aortic/other aneurysma operations, pacemaker operations 	<ul style="list-style-type: none"> Hospital registries 	
<ul style="list-style-type: none"> Hip replacement; UW-0, UW-6 		<ul style="list-style-type: none"> Hospital registries 	<ul style="list-style-type: none"> MSC project
<ul style="list-style-type: none"> Knee replacement; UW-6 		<ul style="list-style-type: none"> Hospital registries 	<ul style="list-style-type: none"> MSC project
<ul style="list-style-type: none"> Cataract operation; UW-0 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
<ul style="list-style-type: none"> Laser treatment in diabetics retinopathy; UW-3 	<ul style="list-style-type: none"> % patients receiving laser treatment < 3 months after diagnosis 	<ul style="list-style-type: none"> Patient number; reimbursement 	<ul style="list-style-type: none"> EUDIP project
<ul style="list-style-type: none"> Renal replacement in diabetics; UW-3 	<ul style="list-style-type: none"> Annual incidence and prevalence of dialysis and transplantation/1 million general population 	<ul style="list-style-type: none"> Registry, patient number, reimbursement 	<ul style="list-style-type: none"> EUDIP project
<ul style="list-style-type: none"> Cancer palliative radiotherapy 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> Eurochip
<ul style="list-style-type: none"> Hysterectomy; UW-11 	<ul style="list-style-type: none"> % of women with hysterectomy at age 50 	<ul style="list-style-type: none"> Population survey, hospital data 	<ul style="list-style-type: none"> Reprostat
<ul style="list-style-type: none"> Births by delivery mode; UW-9 	<ul style="list-style-type: none"> Distribution of births by mode of delivery: % spontaneous, assisted (ventouse, forceps), Caesarean before labour onset, Caesarean during labour; WHO-HFA: Caesarean sections per 1000 live births 	<ul style="list-style-type: none"> Birth registers, perinatal surveys 	<ul style="list-style-type: none"> Peristat project: by presentation of fetus, parity, previous Caesarean, plurality; indicator of medicalisation of childbirth (also 4.5.2, quality indicator?)
<ul style="list-style-type: none"> Onset of labour 	<ul style="list-style-type: none"> Distribution of births by mode of onset of labour 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> Peristat
<ul style="list-style-type: none"> Episiotomy 	<ul style="list-style-type: none"> % vaginal births with episiotomy 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
<ul style="list-style-type: none"> Fertility treatment; UW-9 	<ul style="list-style-type: none"> % pregnancies following fertility treatment 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> Peristat
<ul style="list-style-type: none"> Births without medical intervention; UW-9 Births attended by midwife; UW-9 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> Peristat
<ul style="list-style-type: none"> Others? 			<ul style="list-style-type: none"> Possibly: new mini-invasive surgeries/endoscopies; transplantations; also certain low-tech revalidation technologies; only effective procedures to select
<ul style="list-style-type: none"> Cancer treatment modes 	<ul style="list-style-type: none"> Patients treated by surgery, chemotherapy, 	<ul style="list-style-type: none"> Cancer registry 	<ul style="list-style-type: none"> Eurochip project

	<i>radiotherapy, endocrine therapy (ECHI: useful without ref. To cancer type?) , bone marrow transplants</i>		
4.3.4 Medicine use/medical aids?			
<ul style="list-style-type: none"> Medicine use total 	<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> Eurostat: average number of packages/prescriptions/person; His project: number of people using prescr/non-prescr drugs Euro-med-stat: see below; data by gender, age, region, SES
<ul style="list-style-type: none"> Use of specific groups of medicines; UW-0 	<ul style="list-style-type: none"> Peptic ulcer drugs Diabetes drugs Cholesterol/triglyceride reducers Cardiac glycosides Anti-arrhythmics Antihypertensives Diuretics Beta blocking agents Systemic antibacterials Analgesics Benzodiazepine derivatives Psychoanaleptics Antiasthmatics 		<ul style="list-style-type: none"> Selection from OECD Eurochip project: hormonal replacement therapy (surveys!) Euro-med-stat project (preliminary): for selected set of pharmaceuticals (not same as OECD list): <ul style="list-style-type: none"> tilisation in DDD tilisation in DDD/1000 population/day xpenditure per DDD ther expenditure indicators Eurociss project: <ul style="list-style-type: none"> hrombolytic drugs (per AMI event) CE-inhib, beta-blockers, diuretics, nitrates, aspirin, calcium antag., digitalis, spironolattone, statins, anticoagulants (rate/patient) Mental health project: DDD/1000/day for: <ul style="list-style-type: none"> ntidepressants ntipsychotics nxiolytics ypnotics MSC project: include RA drugs (ATC L 04A)
<ul style="list-style-type: none"> Use of medical aids 		<ul style="list-style-type: none"> HIS 	

4.4 Health expenditures/financing; in this section the core list of OECD is mostly used. Note: the mental health project proposes psychiatric share in disability pensions and sickness compensation; this raises the question where to accommodate this type of information. Create a section here under 4.4?			
4.4.1 Health care system			
• <i>Key indicators for the structure/financing of the national health care system</i>			• <i>Take items from Eucomp; Eurostat</i>
• <i>Insurance coverage; UW-0</i>			
• <i>Distribution of household expenditures on health</i>			• <i>Take from WHO/HQ? Included in HIS project</i>
4.4.2 National expenditure on health; mainly from OECD 2001 core list according to SHA			
• Total/public/private expenditure on health; UW-0	• <i>Total; PPP\$ per capita; % of GNP/GDP</i>		
• Total/public/private expenditure on personal health	• <i>Total; PPP\$ per capita; % of GNP/GDP</i>		
• Total/public/private expenditure on collective health	• <i>Total; PPP\$ per capita; % of GNP/GDP</i>		
4.4.3 Expenditure on medical services			
• <u>Expenditure on in-patient care (total/public/private)</u>	• <i>% of total expenditure</i>		• <i>Mental health project: expenditures of in-patient + outpatient psychiatric services</i>
• <u>Expenditure on out-patient care (total/public/private)</u>	• <i>% of total expenditure</i>		
• <u>Expenditure on ancillary services (total/public/private)</u>	• <i>% of total expenditure</i> • <i>Public expenditure for cancer prevention on tobacco</i> • <i>Public/private expenditure for cancer registration</i> • <i>Public/private expenditure for cancer screening</i> • <i>Public/private expenditure for cancer research</i> • <i>Public/private expenditure on cancer drugs</i>		• <i>Eurochip project (cancer)</i>
• <u>Expenditure on home care services (total/public/private)</u>	• <i>% of total expenditure</i>		
4.4.4 Medical goods dispensed to out—patients			
• Expenditure on pharmaceutical goods and other medical non-durables	• <i>% of total expenditure; PPP\$ per capita</i>		
• Expenditure on medical appliances/other durables	• <i>% of total expenditure; PPP\$ per capita</i>		

4.4.5 Total health expenditure by age group (expenditure by disease not yet proposed for technical reasons); may be problem in some countries; dropped from OECD 2001 list			
• <i>Expenditure by age group</i>	• <i>Expenditure (%) 0-64 (m/f)</i> • <i>Expenditure (%) 65-74 (m/f)</i> • <i>Expenditure (%) 75+ (m/f)</i>	• <i>Calculated from several sources</i>	
• <i>Expenditures for cancer prevention, registries, drugs, research</i>			<i>Eurochip</i>
• <i>cost of a cancer patient</i>			<i>Eurochip</i>
4.4.6 Health expenditure by fund source; follow SHA			
• <i>By government/social security/own pocket etc.</i> • <i>Financial equity/accessibility of care</i>			• <i>Indicator of health system performance; place here or in 4.4.1?</i>
<p>4.5 Health care quality/performance; this is a special section. Whereas sections 4.2-4.4 rather contain 'neutral' statistical indicators on capacities, uses and cost of the system, quality and performance deal with whether the system does what we want it do. The yardstick is thus whether it is patient-oriented, safe, and last but not least effective in promoting health (see below in 4.5.1-4.5.3). In fact selected indicators from earlier sections like on medical manpower (4.2.2), on up-to-date technology (4.2.4), on specific medical procedures (4.3.3), or on financial equity of access (4.4) could find a place in this section as well. Together with this section, many of the indicators under 4.1 would make up a range of indicators of the quality/performance of health systems, including health care, prevention and health promotion. Items are included from the OECD pilot on quality indicators of the health system (A list).</p>			
4.5.1 Subjective indicators; the group includes indicators on patient-orientedness			
• <i>Satisfaction with the health system</i>	• <i>% of population satisfied with health system</i>		•
• <i>Responsiveness; UW-0??</i>			• <i>WHO instrument?</i>
• <i>Satisfaction of mothers with perinatal care; UW-9</i>			• <i>Peristat: for development</i>
4.5.2 Health care process indicators; this group includes indicators of medical safety as well as effectiveness, in terms of process measures. Selected items should be clearly associated with adverse or improved health outcomes from research information.			
• <i>Autopsy rate</i>	• <i>% of deaths</i>		
• <i>Waiting lists/times; UW-0</i>	• <i>In-hospital waiting time for femur fracture surgery;</i> • <i>Waiting time for elective surgeries e.g. cataract, hip replacements, PTCA</i>		• <i>OECD pilot indicators; OECD study on waiting times</i>
• <i>Compliance with oncology practice</i>	• <i>Deviance to best oncology practice (definition: % of treatments given with specific bad practice)</i>	• <i>Cancer registry</i>	• <i>Eurochip</i>
• <i>Inappropriate diabetes monitoring; UW-3</i>	• <i>Proportion of diabetics with HbA1c < 6.5%</i>		• <i>OECD pilot indicators; see also 4.1.1</i>

• 28-day emergency readmission rate			• In UK for specific diseases
• Quality of blood products; amount of blood transfused			• Health care quality indicator?
• Accessibility of care facilities	• Does health policy give access to immunisation and other care for children who are asylum seekers, illegal, homeless, itinerant	• Policy assessment	• Child project (ECHI why not assess actual situation?)
• Parental accompaniment in hospitals	• % of children inpatient beds (under 16) where parents can stay day and night	• Hospital discharge data (feasible??)	• Child project (ECHI: relevant indicator?)
• Delay of cancer treatment	• Defined by specific sites	• Cancer registry	• Eurochip project
• Support to women in perinatal period; UW-9	•	•	• Peristat: for development
4.5.3 Health outcomes; this group includes indicators of medical safety as well as effectiveness, in terms of measures health outcomes. Selected items should be clearly related to the use of up-to-date medical procedures.			
• Avoidable Deaths	• Asthma mortality rate age 5-40		• OECD Pilot indicators • Earlier studies: perinatal & maternal deaths
• Iatrogenic disease/death			• Define criteria
• 30-day mortality rate following acute AMI			• OECD pilot indicators
• 30-day mortality rate following stroke			• OECD pilot indicators
• 30-day mortality after CABG			• OECD pilot indicators
• Surgical wound infection; UW-0	• Incidence		• Helics project?
• Incidence of end-stage renal failure per 1000 diabetics; UW-0, UW-3	• Blindness and nephropathy from diabetes: see 2.3.3		• Eudip project • OECD pilot indicators
• Antibiotic Resistance	• Number per population		• Based on laboratory tests; EARSS project; focus on Streptococcus pneumoniae and Staphylococcus aureus
• Cancer survival rates; UW-0	• 5y survival rate acute lymphatic leukemia in children • 5y survival rate breast, cervical, colorectal cancer	• Cancer registries	• Child project: 5y age groups up to 19 (at diagnosis) • OECD pilot indicators: observed and relative survival • Recommendations from IARC follow
• Stage at cancer diagnosis; UW-0	•	•	• Eurochip
• Coverage of cancer registration	•	•	• Eurochip project (ECHI: indicator on quality of information)

ANNEX D: INDICATORS DISCUSSED IN THE POLISH HEALTH ACCOUNTS

By proposing a consistent and comprehensive list of health accounts indicators, the Polish SHA manual on the core management objectives of the Polish health system: to contribute to sustainable, effective, efficient and equitable health system development. Polish Health Accounts Indicators (PHAI) are linking accounting data to each other, to other structural information of the health system, and to the economic and social environment of the health system. They contribute to the monitoring of trends throughout Poland, to the evaluation of Polish health policies, and they enable international comparisons. For doing this health accounts find their place in the wider framework of monitoring social and economic developments in PHAI may serve different stakeholders for various purposes as to:

- Measure the financial status of the health system, its determinants and the trends at federal and regional level;
- Facilitate the planning, monitoring and evaluation of Financial Programmes and actions, and
- Provide stakeholders of the health system with appropriate health accounts information to make comparisons and support their national health policies.

In the design of the indicator set, a set of explicit criteria was applied. These included:

- Be *comprehensive and coherent*, i.e. cover all domains of the public health field;
- Take *account of earlier work*, especially that by WHO-Europe, OECD and Eurostat;
- Cover the priority areas which Member States and Community Health Policies currently pursue.

The selection of indicators at the detailed level are guided by the following principles:

- Indicators (and underlying data) should meet the methodological and quality criteria concerning *quality, validity, sensitivity and comparability*;
- Selection of indicators should be based, to start with, on existing and comparable data sets for which regular monitoring is feasible, but should also indicate *data needs and development areas*.

The proposed PHAI constitute a balanced collection, covering the following six areas within the field of health sector development which are summarized in the box below:

- *Demand of health services*;
- *Production of health services*;
- *Financing of health services*;
- *Prices of health services*;
- *Health services manpower*;
- *Health systems innovation*.

Within this first version of the Polish health accounts manual only the first three dimensions were developed. Therefore the discussion of indicators focuses only on the demand side, the supply side and the financing of the Polish health system.

Examples of indicators derived from Polish SHA

- 1 Demand of health services**
 - 1.1 Health expenditures by functions
 - 1.2 Health expenditures by providers
 - 1.3 Health expenditures by age and gender
 - 1.4 Health expenditures by type of illness
 - 1.5 Health expenditures by episode of illness
 - 1.6 Health services by income
- 2 Production of health service**
 - 2.1 Value added by providers
 - 2.2 Intermediate consumption by providers
 - 2.3 Productivity by providers
 - 2.4 Type of services by providers (functional breakdown)
 - 2.5 Value added of intermediate health services industries
 - 2.6 Health services export ratio
- 3 Health financing**
 - 3.1 Health expenditures by financing agencies
 - 3.2 Current debt ratio
 - 3.3 Assets and debts
- 4 Prices of health services and goods**
 - 4.1 Price indices of health services and goods
 - 4.2 Relative health services prices
 - 4.3 Unit costs of selected services
- 5 Health sector employment**
 - 5.1 Health sector employment by providers
 - 5.2 Health sector employment by occupations
 - 5.3 Health sector employment by education
 - 5.4 Unemployment of health professions
- 6 Health systems innovations**
 - 6.1 Expenditures on education and research
 - 6.2 Health investments

The above list gives the *generic* descriptions of the indicators. Their *operational* specification depends on both the context in which they are used and the availability of data. Examples of the operational indicators are given below.

Demand side indicators

The analysis of the health system from the demand side perspective on the consumption of health services and goods by the population living within a given area. This population perspective is quite different to the supply side perspective discussed below. The SHA manual distinguishes between personal expenditures and public services, basic purposes of care (curative, rehabilitative and long-term care), and modes of production (in-patient, out-patient, etc.). This functional breakdown of health expenditures allows comparisons between countries independently of the organisation of the health care system.

There are several ways in which to present the population consumption in practice. Usually the demand side is presented as:

- Total expenditures by type in national currency;

- Total expenditures by type in national currency per capita;
- Total expenditures by type as percentage of Gross National Income;
- Share of expenditures by type as percentage of total expenditures;
- Share of current expenditures as % of total consumption;
- Growth rates of total expenditures and expenditures by type;

For international comparisons Gross Domestic Product might replace Gross National Income. However, it should be noted that these values may differ, particularly at the regional level.

Supply side indicators

The supply side perspective on the production of health services and goods within a given area. Health care services delivered are presented at consumers' prices. That means that current government transfers and subsidies designed to reduce the prices paid by final consumers or insurance funds for certain goods or services are included. Transfers to market producers are identical to the category of "subsidies" in national accounting, in so much as subsidies can only occur in market production.

The breakdown of expenditure by production units is related to use of the products of these production units. The structure reflects the particular characteristics of the country's medical institutions. Great care is therefore needed when interpreting the indicators in the international context. In addition, it would be helpful to distinguish between volume and prices. Further dimensions are the employment, cost structure and productivity of these production units.

Financing indicators

Health Financing indicators based on the ICHA-HF classification give an overview on the public/private mix of health care funding. The indicators reflect the level and the organisation of the government involvement in health care financing. As the share of government involvement varies by the coverage of benefits under public programmes it is helpful to analyse the structure of financial flows against the background of benefit regulation. More detailed indicators which link financial flows to the demand and the supply side can be derived from the tables of Part III.

A major cause of different growth rates between public and private spending for health services has been the inflation of costs and prices in both sectors. Medical innovations and price regulation directly influence the trends and structures of expenditure for medical services and goods.

ANNEX E: ELEVEN INDICATORS FOR RHINE-PALATINATE (1995-2000)

This appendix presents 11 macroeconomic health care indicators based on the German SHA framework for the State “Rhine-Palatinate”.

Indicator	Jahr							
	1995		1998		1999		2000	
1. THE/GDP								
Rhine-Palatinate	11,0%		11,8%		11,7%		11,8%	
Germany	10,6%		10,7%		10,7%		10,8%	
2. Health Expenditures per capita								
Rhine-Palatinate	2.237 €		2.500 €		2.551 €		2.631 €	
Germany	2.327 €		2.530 €		2.587 €		2.662 €	
3. Health Funding as % of THE								
	RHP	D	RHp	D	RHP	D	RHP	D
SHI	60,0%	59,1%	57,6	56,9	58,5%	57,2%	58,3%	56,9%
Other Social Insurance	6,7%	6,6%	9,9	10,4	10,0%	10,5%	10,1%	10,6%
Government	13,1%	14,8%	10,1	11,1	9,8%	11,0%	9,6%	10,8%
PHI	8,7%	8,1%	8,9	8,4	8,6%	8,5%	8,7%	8,6%
Out-of-pocket, NPOs	11,5%	11,4%	13,5	13,3	13,0%	12,8%	13,3%	13,2%
4. GKV-Beitragssatz								
Rhine-Palatinate	13,20%		13,35%		13,40%		13,38%	
Germany-west	13,22%		13,53%		13,51%		13,51%	
5. Cost-sharing as % of gross expenditures in Statutory Health Insurance								
Rhine-Palatinate	6,3%		7,8%		7,2%		7,5%	
Germany	6,3%		7,8%		7,1%		7,4%	
6. Value Added, bn €								
Rhine-Palatinate	11,98 Mrd. €		13,64 Mrd. €		14,05 Mrd. €		14,52 Mrd. €	
Germany	-		-		-		-	
7. Value Added as % of GDP								
Rhine-Palatinate	8,9%		9,5%		9,5%		9,5%	
Germany	-		-		-		-	
8. Health Trade balance, bn €								
	Mrd. €		Mrd. €		Mrd. €		Mrd. €	
Rhine-Palatinate	0,09		0,40		0,60		0,64	
9. Health Labour (1000, including health industries)								
	Kopf- zahl	Voll- kräfte	Kopf- zahl	Voll- kräfte	Kopf- zahl	Voll- kräfte	Kopf- zahl	Voll- kräfte
Rhine-Palatinate	-	-	198,2	143,8	197,6	143,1	196,1	141,8
Germany	-	-	4125,0	3132,2	4100,8	3105,1	4099,0	3104,9
10. Health Labour Rate (including health industries)								
Rhine-Palatinate	-		11,7%		11,5%		11,2%	
Germany	-		11,0%		10,8%		10,6%	
11. Productivity (Value added in € per HL (FTE)) at constant prices (1995)								
Rhine-Palatinate	-		48.000 €		49.000 €		50.000 €	
Germany	-		-		-		-	

SOURCE: SCHNEIDER ET AL, 2003 ⁶⁷

ANNEX F: INTERNATIONAL CLASSIFICATION OF HEALTH ACCOUNTS

ICHA-HC Classification of Health Care And Health-Related Functions

- HC.1 Services of curative care
 - HC.1.1 In-patient curative care
 - HC.1.2 Day cases of curative care
 - HC.1.3 Out-patient curative care
 - HC.1.3.1 Basic medical and diagnostic services
 - HC.1.3.2 Out-patient dental care
 - HC.1.3.3 All other specialised health care
 - HC.1.3.9 All other out-patient curative care
 - HC.1.4 Services of curative home care

- HC.2 Services of rehabilitative care
 - HC.2.1 In-patient rehabilitative care
 - HC.2.2 Day cases of rehabilitative care
 - HC.2.3 Out-patient rehabilitative care
 - HC.2.4 Services of rehabilitative home care

- HC.3 Services of long-term nursing care
 - HC.3.1 In-patient long-term nursing care
 - HC.3.2 Day cases of long-term nursing care
 - HC.3.3 Long-term nursing care: home care

- HC.4 Ancillary services to health care
 - HC.4.1 Clinical laboratory
 - HC.4.2 Diagnostic imaging
 - HC.4.3 Patient transport and emergency rescue
 - HC.4.9 All other miscellaneous ancillary services

- HC.5 Medical goods dispensed to out-patients
 - HC.5.1 Pharmaceuticals and other medical non-durables
 - HC.5.1.1 Prescribed medicines
 - HC.5.1.2 Over-the-counter medicines
 - HC.5.1.3 Other medical non-durables
 - HC.5.2 Therapeutic appliances and other medical durables
 - HC.5.2.1 Glasses and other vision products
 - HC.5.2.2 Orthopaedic appliances and other prosthetics
 - HC.5.2.3 Hearing aids
 - HC.5.2.4 Medico-technical devices, including wheelchairs
 - HC.5.2.9 All other miscellaneous medical durables

- HC.6 Prevention and public health services
 - HC.6.1 Maternal and child health; family planning and counselling
 - HC.6.2 School health services
 - HC.6.3 Prevention of communicable diseases
 - HC.6.4 Prevention of non-communicable diseases
 - HC.6.5 Occupational health care

- HC.6.9 All other miscellaneous public health services
- HC.7 Health administration and health insurance
 - HC.7.1 General government administration of health
 - HC.7.1.1 General government administration of health (except social security)
 - HC.7.1.2 Administration, operation and support activities of social security funds
 - HC.7.2 Health administration and health insurance: private
 - HC.7.2.1 Health administration and health insurance: social insurance
 - HC.7.2.2 Health administration and health insurance: other private
- HC.R.1 Capital formation of health care provider institutions
- HC.R.2 Education and training of health personnel
- HC.R.3 Research and development in health
- HC.R.4 Food, hygiene and drinking water control
- HC.R.5 Environmental health
- HC.R.6 Administration and provision of social services in kind to assist living with disease and impairment
- HC.R.7 Administration and provision of health-related cash-benefits

ICHA-HP Classification of Health Care Providers

- HP.1 Hospitals
 - HP.1.1 General hospitals
 - HP.1.2 Mental health and substance abuse hospitals
 - HP.1.3 Speciality (other than mental health and substance abuse) hospitals
- HP.2 Nursing and residential care facilities
 - HP.2.1 Nursing care facilities
 - HP.2.2 Residential mental retardation, mental health and substance abuse facilities
 - HP.2.3 Community care facilities for the elderly
 - HP.2.9 All other residential care facilities
- HP.3 Providers of ambulatory health care
 - HP.3.1 Offices of physicians
 - HP.3.2 Offices of dentists
 - HP.3.3 Offices of other health practitioners
 - HP.3.4 Out-patient care centres
 - HP.3.4.1 Family planning centres
 - HP.3.4.2 Out-patient mental health and substance abuse centres
 - HP.3.4.3 Free-standing ambulatory surgery centres
 - HP.3.4.4 Dialysis care centres
 - HP.3.4.5 All other out-patient multi-speciality and co-operative service centres
 - HP.3.4.9 All other out-patient community and other integrated care centres
 - HP.3.5 Medical and diagnostic laboratories
 - HP.3.6 Providers of home health care services
 - HP.3.9 Other providers of ambulatory health care
 - HP.3.9.1 Ambulance services
 - HP.3.9.2 Blood and organ banks
 - HP.3.9.9 Providers of all other ambulatory health care services

- HP.4 Retail sale and other providers of medical goods
 - HP.4.1 Dispensing chemists
 - HP.4.2 Retail sale and other suppliers of optical glasses and other vision products
 - HP.4.3 Retail sale and other suppliers of hearing aids
 - HP.4.4 Retail sale and other suppliers of medical appliances (other than optical glasses and hearing aids)
 - HP.4.9 All other miscellaneous sale and other suppliers of pharmaceuticals and medical goods
- HP.5 Provision and administration of public health programmes
- HP.6 General health administration and insurance
 - HP.6.1 Government administration of health
 - HP.6.2 Social security funds
 - HP.6.3 Other social insurance
 - HP.6.4 Other (private) insurance
 - HP.6.9 All other providers of health administration
- HP.7 Other industries (rest of the economy)
 - HP.7.1 Establishments as providers of occupational health care services
 - HP.7.2 Private households as providers of home care
 - HP.7.9 All other industries as secondary producers of health care
- HP.9 Rest of the world

ICHA-HF Classification of Health Care Sources of Funding

- HF.1 General government
 - HF.1.1 General government excluding social security funds
 - HF.1.1.1 Central government
 - HF.1.1.2 State/provincial government
 - HF.1.1.3 Local/municipal government
 - HF.1.2 Social security funds
- HF.2 Private sector
 - HF.2.1 Private social insurance
 - HF.2.2 Private insurance enterprises (other than social insurance)
 - HF.2.3 Private household out-of-pocket expenditure
 - HF.2.3.1 Out-of-pocket excluding cost-sharing
 - HF.2.3.2 Cost-sharing: central government
 - HF.2.3.3 Cost-sharing: state/provincial government
 - HF.2.3.4 Cost-sharing: local/municipal government
 - HF.2.3.5 Cost-sharing: social security funds
 - HF.2.3.6 Cost-sharing: private social insurance
 - HF.2.3.7 Cost-sharing: other private insurance
 - HF.2.3.9 All other cost-sharing
 - HF.2.4 Non-profit institutions serving households (other than social insurance)
 - HF.2.5 Corporations (other than health insurance)

- HF.3 Rest of the world

Source: OECD, 2000⁵

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