

OECD AGEING RELATED DISEASE STUDY

TECHNICAL REPORT

**THE INTERPLAY OF HEALTH POLICY, INCENTIVES AND REGULATIONS IN THE
TREATMENT OF AGEING-RELATED DISEASES**

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SUMMARY

7. This paper provides a general introduction to the OECD Ageing-Related Diseases project.
8. The recent focus, both in health and ageing policy, has been to pay increased attention to health outcomes. Therefore, it is very important to investigate whether additional expenditure may have generated improved outcomes in health care systems. In doing this it is important to distinguish between marginal and average gains in health outcomes.
9. The paper reviews available studies which offer detailed insights into health care systems, including clinical studies, studies on utilisation rates and some epidemiological studies. It also discusses some of the early attempts to develop disease-oriented approaches at the micro level. Gaps in these studies, together with the increased availability of detailed data, now offer new opportunities for a fruitful study building on the existing information infrastructures.
10. Most of the differences in aggregate expenditures observed at the macroeconomic level result from the interplay of health policy, incentives and regulations in the treatment of ageing-related diseases. The Annexes provide an overview of the available macroeconomic literature on the topic.

TABLE OF CONTENTS

Note by the Secretariat	1
SUMMARY	2
THE INTERPLAY OF HEALTH POLICY, INCENTIVES AND REGULATIONS IN THE TREATMENT OF AGEING-RELATED DISEASES	4
INTRODUCTION	4
TOWARDS A DISEASE-ORIENTED APPROACH TO ANSWERING HEALTH AND AGEING POLICY NEEDS	5
AVAILABLE STUDIES	6
Disease-specific clinical studies	6
Studies on utilisation rates	6
Epidemiological studies	6
Disease-oriented studies	7
CONCLUSION: THE VALUE OF A COMPREHENSIVE DISEASE-ORIENTED APPROACH AT THE MICRO LEVEL	8
ANNEX 1. International macroeconomic approaches for comparing health care systems and health expenditure	9
1.1 Macroeconomic descriptive comparisons	9
1.2 Analytical macroeconomic studies using cross sectional data	10
1.3 Analytical macroeconomic studies using pooled cross-sectional data over OECD countries	11
.....	12
ANNEX 2. What has increased medical spending bought?	13
2.1 International descriptions of health outcomes	13
2.2 Analytical studies of aggregated public health outcomes using cross sectional data	14
2.3 Analytical studies of aggregated public health outcomes using pooled cross sectional data over OECD countries	15
2.4 Analytical studies of trends in health outcomes over time both national and international	16
2.5 Trade-offs in health care: is medical care worth it?	17
2.5.1 Average value of medical spending versus marginal value	17
2.5.2 The value of medical spending: how to obtain positive outcomes with limited resources	18
REFERENCES	21

THE INTERPLAY OF HEALTH POLICY, INCENTIVES AND REGULATIONS IN THE TREATMENT OF AGEING-RELATED DISEASES

INTRODUCTION

1. This paper outlines the general policy and economic questions to be explored in the project, i.e. "how regulations and incentives built into the health-care system might impact on treatment rates, costs and outcomes across different OECD countries". The goal of this paper is to link macroeconomic analysis of the health care system with economic incentives at the micro level, looking at treatment choices by patients and physicians. These choices may be either explicit, or may result from the general structure of health care systems. In order to analyse behaviours and incentives at the microeconomic level, the project may involve processing original micro-datasets. Up to now, fairly crude indicators have been used to judge the global performance of health care systems. To obtain a fuller understanding, it is necessary to have more detailed quality related and performance indicators. In particular, disease-specific indicators of utilisation rates, treatments and outcomes are required.

2. Health care systems face demands from more empowered and better-informed patients. However the issues faced by modern health care systems are complex. It is no longer adequate to have them summarised in aggregate indicators. The production of health involves several "product lines" and several types of interventions. This study is aimed at offering more precise comparisons of activity and outcomes across countries with particular regard to the increasing needs of ageing populations. Ageing related diseases pose new challenges, as they have different characteristics than communicable diseases or violent injuries, which formed many of the cases addressed by health care systems in the past.

3. All international macroeconomic investigations have revealed striking differences in levels of health care expenditure.¹ An institutional description also reveals a high heterogeneity in reimbursement, financing and organisation. If one considers trends over time from 25 to 30 years ago, medical spending has dramatically increased. Countries spend on average twice more than they did on medical care at the beginning of the 1970s. The US spends 40 % more than Canada and twice as much as the United Kingdom. Even within countries, health care systems reveal striking differences. Many OECD structural reviews of health care systems have revealed high inequalities of health care spending over regions within countries. When considering interventions at a micro level, the "local variation" literature², the chances of receiving a tonsillectomy or an appendectomy seem to depend much on supply conditions in a given area. Annex I provides a general overview of the discussion of macroeconomic approaches for comparing health care systems and health expenditure. However, the question of the value of this increased expenditure may be asked. Annex II provides a general overview of international issues in measuring and explaining health outcomes at the international level, and the links between health care spending and improved health outcomes.

1 All this discussion owes much to a seminar held by D. Cutler at the OECD in December 1998. see Cutler McClellan Newhouse (1998).

2 See Wennberg for the US, or Swiss examples for differences in interventions across cantons.

4. The Ageing-Related-Diseases project is intended to break new ground empirically. It builds upon the OECD's ability to act as a data clearing-house and on past efforts to assemble macroeconomic data for health care systems. The project will aim at offering better and more precise answers to the questions asked at a general level from the experience with macroeconomic indicators. It will attempt to collect more microeconomic data within a disease-specific framework. In addition, it will explore the effects of various combinations of incentives in health care systems, both for health care providers and patients.

5. This introductory paper is organised as follows. First, it will provide some background to the OECD's extension of its work in the field of health and ageing. Second, it will provide an overview of the existing related studies, and will highlight the remaining gaps to be filled. This should lead to the consideration of the relevance of disease-oriented international comparisons involving micro data to further our understanding of the ability of health care systems to face the growing needs generated by ageing populations.

TOWARDS A DISEASE-ORIENTED APPROACH TO ANSWERING HEALTH AND AGEING POLICY NEEDS

6. Policy makers in the field of health and social policy are increasingly asked questions about the value and quality of care obtained from health care expenditure (Anderson 1997). The conclusions from the last OECD Ministerial meeting of ministers of health and social affairs expressed the need for further work in the fields of health and other social outcomes as a priority area for the OECD: this project can be considered as a way to develop work on health outcomes from a disease specific and economically consistent framework.

7. The needs for the analysis are twofold. First, policy makers need clear answers in terms of cost, access and outcomes for health care systems. Second, these answers are needed to address some of the unresolved questions of some of the macroeconomic analysis so far. For example, many macroeconomic analyses of trends in health costs, and of differences across countries have come to the conclusion that differences in the diffusion of modern technologies could explain some of the unresolved variance across countries. However, it remains difficult to clearly disentangle the role of relative prices and costs of other inputs differences in volume and type of care provided to distinguish countries.

8. A review of relevant macroeconomic studies is included in the annex to this paper. The annex covers two types of study:

- examinations of the determinants of variations in health expenditure;
- explorations of the determinants of variations in health status and health outcome.

9. The ageing field seems to be an appropriate area to pursue microeconomic investigations. In fact, health care needs of elderly populations are increasing, as they already represent a significant portion of health care consumption, from 30 to 50 %. This adds to the social pressures generated by ageing on social systems, with additional demands for pensions and long-term care needs. Following the OECD (1998) report "Maintaining Prosperity in an Ageing Society", it has been expressed that "there should be greater focus on cost effectiveness, on medical expenditure and research that are focused on reducing dependence" as to increase the incentives to foster the use of the most cost-effective treatments.

AVAILABLE STUDIES

Disease-specific clinical studies

10. Disease specific studies at a micro level present us with some difficulties with drawing general conclusions for health care systems. They have mainly been clinical trials and come from the medical research. First, they usually rely upon very small samples and may not offer enough representativeness. Second, even when larger samples are used, such as for the GUSTO trial or other major trials in the cardiac field, their main aim is very focussed: it is to investigate medical practices at the margin in a research perspective and not to investigate current average practices. Policy-makers needs for monitoring health care systems are to understand which factors account for the main trends in expenditure and outcomes.

11. Clinical studies can help us to find appropriate guidelines and are generally useful for implementing evidence-based medicine. However, they usually may not provide information of general relevance to policy.

Studies on utilisation rates

12. Analysts generally consider that there is a huge level of variation in utilisation rates and medical patterns of treatment within health care system. Therefore, an important literature has developed to investigate such differences. These results can be available within countries, but some of them also exist at the international level, following the early and convincing results by Wennberg, McPherson and others.

13. Such studies might provide interesting, but partial answers for the questions being asked here. Often, these data have been gathered in a cross-sectional way. At the same time, attention has been turned towards trends over time. This has been shown as being one of the only ways to resolve some of the problems associated with disentangling confusing factors. Many of these studies have remained purely descriptive. Often they do not make the link with the incentives embodied in the health care systems or with expenditure. Therefore, they cannot offer a complete story about the effect of incentives, epidemiology and health interventions in shaping health outcomes and costs. Nevertheless, they may constitute an interesting first step. For example, Van den Brand (1993) provides an extensive analysis over time of utilisation of coronary angioplasty and the cost of angioplasty services in 14 European countries over the period 1985-1991.

Epidemiological studies

14. Epidemiological studies often represent a first stage in developing a disease micro data oriented strategy. These studies are presented at length in Moise (2001). Sometimes, the epidemiologists have been able to investigate health outcomes. For example, the EURO CARE project³ has obtained consistent information over time about relative survival in different countries, of patients with breast cancer. In the field of osteoporosis, the European Foundation for Osteoporosis has investigated the factors influencing availability and reimbursement of bone mineral density measurement (Fraser 1997). This represents an interesting first step as it presents: aggregated data on availability of dual-energy X-ray absorptiometry systems; the link with medical incentives and regulations; and cost and reimbursement.

³ see Berrino (1993), cf Jacobzone Jee Hughes Moise 1999

15. It might be envisaged that this project on ageing-related-diseases could offer a further step forward. For example, expenditure and treatment patterns data could be added to the EURO CARE data, and the EURO CARE data could be extended beyond European countries to include other OECD countries.

Disease-oriented studies

16. More specific studies exist comparing treatments across countries. Most of the available cross-country studies involve the United States and Canada, and many of them focus on AMI (for a review see Cutler 1998). Some of these studies are presented as background for this meeting⁴. Apart from these, Katz and Hofer (1994) have investigated breast cancer exams and mammography. Other examples include cataract surgery, with investigations of waiting lists, in Manitoba and the USA. Roos et al. (1996) investigate poorer Manitoba outcomes in the case of hip fracture. Further, Ho, Hamilton and Roos (1998) show that waiting times for surgery are longer in two Canadian provinces than in US states. However, the longer waiting time does not seem to explain the difference in post-surgery outcomes across countries, once the influence of exogenous factors has been properly controlled. The discussion of existing work during the meeting should provide a good introduction to such studies.

17. Two other studies are worth a special mention. The first is the "McKinsey Study". Although it has significant empirical weaknesses, it represents an interesting attempt to address the type of questions being addressed in this study. Its main drawback was to rely on expert's guesses to compute average country performances without proper micro data findings. The main objectives of this study were to assess differences in productivity at a disease level for three countries (United States, United Kingdom, Germany), and to examine the major causes of these differences by focusing on variations in diagnosis and treatment, and by relating such variations to incentives and supply constraints. The goals of the study were quite similar to the goals of the ageing-related disease study. This study did not address allocative efficiency but overall productivity. It focused on four diseases (diabetes, gallstones, breast cancer and lung cancer). The main drawbacks to this approach are that most figures for outputs and inputs are national averages and that the data were drawn from the mid to the late 1980s. Outcome measures were derived from literature reviews and secondary data. In addition, the study made extensive use of coefficients for measuring quality of life, which can be debated at length. Nevertheless, it seems to have obtained a few interesting insights. The differences in diabetes⁵ treatment between the United Kingdom and the United States have been referred to in section 2. In terms of outcomes, the US and the United Kingdom did not exhibit huge differences. The UK performance appeared to be good for its cost, although it could have been improved further at reasonable cost. The studies were able to investigate types of treatment (radiation vs chemotherapy) and also the intensity of those treatments. The study is also interesting as it made the link between patterns of treatment and differences in provider incentives, constraints and regulations. Finally, it also attempted to bridge the gap between the micro and the aggregate level. The major shortcoming remains the absence of sound and proper micro data.

18. Finally, a recent study on heart attacks and coronary care be seen as a pilot study for this OECD project. It has demonstrated the feasibility of conducting such a project, at least for heart attacks, in a range of developed countries, mainly in the OECD⁶. This study adopted a framework for linking patterns of treatments with the overall characteristics of the health care system. The framework includes an attempt to

⁴ See Tu et al.1997a,b in the case of AMI, stroke. Some of these papers will be distributed as room documents

⁵ This refers however to type 1 diabetes.

⁶ Outside the US, this included mainly Australia, , Belgium , several canadian provinces, Denmark, Finland, France, Israel, Japan, Korea, , Singapore, Sweden, Taiwan.

generalise the sort of findings of trends in survival obtained from US data (McClellan, Kessler 1999). It also includes some attempts at formalising costs of specific health care interventions. However, this study has adopted a US centred perspective, which needs to be adapted to match the priorities of other OECD countries as well. For example it has a focus on technology and looks mainly at inpatient treatment. In addition, there is a need to test its validity for other diseases and in further countries.

CONCLUSION: THE VALUE OF A COMPREHENSIVE DISEASE-ORIENTED APPROACH AT THE MICRO LEVEL

19. There is clearly a significant potential for disease focussed studies in international comparisons of the effectiveness of health expenditure. Pure clinical studies may not necessarily fit with policy-makers' needs. US/Canada comparisons have shown the way but remain of limited scope at the international level. The relative advantage of implementing such disease studies through the OECD is to give them a strong economic and health policy component.

20. Disease-oriented, micro-data studies come at a certain cost. However, they are better situated to offer answers to questions, which have remained unresolved up to now at the international level. While it is hypothesised that technical progress may explain most of the unexplained residual in the growth in medical spending, most of the available work has been using US based evidence. Cutler et al. (1998) show that this diffusion seems to have been worth its costs on average, when taking into account the value of improved health outcomes and survival. McClellan and Noguchi (1998) show that while this diffusion has been worthwhile on average, many medical technologies may be used excessively, inadequately or inappropriately. Therefore, understanding which types of medical technologies diffuse efficiently and what policies influence diffusion is crucial for answering policy makers needs. In addition, the question of health care price indices remains subject to many questions in OECD countries, particularly since health care is a sector replete with regulated prices. In the US, recent studies have shown that various quality-adjusted price indices would have to be adjusted downwards by comparison with usual available indices. On the other hand, evidence from other countries suggests that there are implicit inflationary pressures in health care systems, whereby health care providers tend to preserve their income, while modifying slightly their production functions to obtain implicit price increases. There is a need to explore whether there are links between the diffusion of technology, prices and the incentives faced both by providers and patients. Microdata studies such as the OECD Ageing-Related Diseases Study are the ideally suited for this challenge.

21.

ANNEX 1. INTERNATIONAL MACROECONOMIC APPROACHES FOR COMPARING HEALTH CARE SYSTEMS AND HEALTH EXPENDITURE

22. The purpose of this annex is to present what has been learned from available international analytical studies in terms of health policy. Much has been achieved by past work but it has also raised some unresolved questions and has spurred interest for further international comparisons. This should prove useful as the Ageing-Related-Diseases project aims at investigating how health policy, incentives and regulations may shape health care systems outcomes. This project takes a microeconomic approach, but must take into account the macroeconomic knowledge of the links between health policy, incentives and regulations in health care systems at the international level.

1.1 Macroeconomic descriptive comparisons

23. Most available international economic studies have used a macroeconomic framework for the purpose of comparing the impact of health care systems on medical spending. The OECD Secretariat has been actively involved in this area and has developed comparable statistics and studies to provide a comparative overview of health care systems. OECD (1990) presented a first general overview with detailed comparative statistics on general level of resources, number of physicians, nurses and beds. Hurst in OECD (1992) offered a synthetic overview of a comparative structure of health care systems for 7 OECD countries, with a core typology of health care systems (Reimbursement, Contract and Integrated System). This has been extended to 17 OECD countries (OECD 1994).

24. Most studies have focused on explaining differences in health care spending. The development of OECD Health Data has facilitated comparisons of various macroeconomic and public finance aggregates as a percentage of GDP. (Schieber, Poullier, Greenwald, in Health Affairs 1994a,b). These studies show important variations in health care spending across countries, along a certain mean, linking GDP per capita and the share of health care spending in GDP⁷. These descriptive studies have often tried to transpose at the international level factors identified in national studies to contribute to growth in medical spending. Among national analytical work, Newhouse (1992) provides a reference for accounting for growth in health care expenditure. Potential growth factors include increased coverage, ageing populations and variations in prices. However, such a framework only accounts for 50 % of the growth in medical spending. The remaining 50 % “residual” in expenditure growth must somehow be accounted for. Following the macroeconomic growth accounting framework, this residual can be attributed in some way to technical progress. The discussion conducted by Abel Smith (1996) follows the framework provided by Newhouse to understand the escalation of health care costs at the international level.

⁷ This was described as the "Poullier line", with the pioneering work of Jean Pierre Poullier.

1.2 Analytical macroeconomic studies using cross sectional data

25. Analytical macroeconomic studies have focused on the contribution of institutional differences to explain international variations in health care spending. Following the method developed by Kleinman (Kleinman 1974), these studies have used a demand function approach: real per capita health care expenditure is hypothesised to be a function of real per capita income and a selection of non-income variables. Newhouse (1977) presents a seminal work analysing determinants of the volume in health services in 13 countries using data from 1971: national income per capita explains 92 per cent of overall cross sectional variance and the income elasticity of health care spending is above unity. These results have been reproduced in broad terms by most studies using similar methods with more recent cross sectional data (Leu 1986, Parkin 1987).

26. Following such results, analysts were then tempted to conclude that the inexorable nature of the relationship between health care expenditure and national income was beyond the reach of policy (Culyer 1990). Because most macroeconomic estimates of the income elasticity of health care spending up until the mid-1980s have exceeded unity, analysts have conjectured health care to be a luxury good, at least for developed countries. Nevertheless this has led some commentators to conclude that additional spending at the margin in developed countries produces more "caring" than "curing" components of health (Newhouse (1977)). Another important conclusion was that other factors such as prices paid by patients and reimbursement methods for physicians would play a marginal role. However, this high income-elasticity was not supported by the results of microeconomic studies using survey data, and is also against wider international evidence, including less developed countries. Health care spending may represent a higher burden for less wealthy households when paid out of their own pocket. Further evidence against a high income elasticity for health care has been found in microeconomic studies that show income elasticity of medical consumption as being low or not very significant (Muurinen 1982, Wagstaff 1986).

27. These studies using cross-sectional data have been criticised for the small sample sizes of many of the data sets employed and the assumption that health care is homogeneous across countries (Parkin et al. (1987)). This controversy has given rise to several issues for the analysis of health care systems at the international level.

28. The first puzzling issue was the high income-elasticity of health care spending. Most conjectures have been along the following lines:

- Would the high elasticity be due to the effect of socialised spending at the national level, as spending would increase more than proportionately when national income rises? (Newhouse (1977))
- Would this not reflect the omitted impact of supply driven factors? (Parkin et al. 1987)
- Could this be due to a problem in measuring prices and quantities? Various adjustments including PPPs with both health care specific price indices and general macroeconomic price indices have been introduced (Gerdtham Jönsson 1991).

29. This question has received a partial answer from more recent work. More advanced statistical techniques, such as panel data and unit roots have offered a more in-depth discussion of the partial relevance of this estimate. Analytical work on price indices in the field of health, involving both hedonic approaches and cost of living approaches have shed some light on problems linked with health related price adjustments. These will be included in the discussion in part II.

30. The second issue was the absence of influence of other factors, like institutional, demographic factors linked with objective pressures faced by health care systems. Leu (1986) included additional relevant variables, exogenous variables (proportion of persons aged less than 15 and more than 65, urbanisation), share of the public sector and the impact of a major global integrated health care system such as the UK NHS using a dummy. In such systems, collective choices would involve stricter control over health care spending. He found a few variables to be significant, such as the NHS variable and also the share of public beds. This research was however very preliminary. Since then econometric methods have allowed for more sophisticated investigations, with panel data techniques helping to overcome the insufficient size of datasets by pooling data over time and offering the possibility of more robust estimates.

1.3 Analytical macroeconomic studies using pooled cross-sectional data over OECD countries

31. Gerdtham, Jönsson et al. (1994) (see also OECD 1995) offer the most complete results for analysing the impact of health policy on medical expenditure using panel data techniques and pooled cross-national data. The main purpose of this study was to investigate the following questions:

- Would the global organisation of health care systems have an influence on global health expenditure? Variables were coded following the Hurst (1992) typology.
- Would budget ceilings have an impact?
- Would the public/private share play a role in global health expenditure?
- Would health care insurance coverage influence health care spending at the macroeconomic level?
- Would reimbursement systems for physicians influence health care spending?
- Do gate-keeping arrangements play a role in limiting health care expenditure?
- Do an increased number of physicians increase global spending?
- Would the global balance of care between hospital inpatient care and outpatient care play a role in spending?
- Would the rate of some expensive interventions influence medical care spending? (Such as renal dialysis).

32. This type of macroeconomic study is dependent upon the quality of the variables coded. For example, very few specific expensive medical interventions could be identified. Results as presented in OECD (1995) involve both an analysis of global expenditure and a separate analysis of ambulatory care, inpatient care and pharmaceutical expenditure.

33. First, the study showed that the income elasticity was very much reduced when other factors had been controlled for. As a result, it could be hypothesised that the link between income and health care expenditure previously found resulted from omitted exogenous variables. Second, gate-keeping arrangements were found to play a very important role. Third, reimbursement systems for physicians played an important role, as capitated systems lead to lower expenditures. Fourth, there was some evidence that a higher share of inpatient care could lead to higher expenditure. Fifth, some indicators showed that an important share of the public sector was associated somehow with lower expenditure. Finally, the number

of physicians needs to be interacted with the way they are paid to be able to reach a conclusion about the impact on health expenditure. On the other hand, the main features of health care systems⁸ were not able to contribute as much to the explanation when other factors had been controlled for (e.g. gate-keeping). In addition, their size and magnitude were different from what had been intuitively thought.

34. These are important results and may offer some justification for many of the attempts to find more efficient arrangements in health care systems. Many of these features, for example, are to be found in managed care in the United States. These results also offer insights about the impact of the balance of care across institutions (inpatient/outpatient). One of the limitations of these studies for health policy is the sole focus on expenditure, as health outcomes have not been addressed. A review of health outcomes is provided in Annex II.

8. Public reimbursement, public contract, public integration

ANNEX 2. WHAT HAS INCREASED MEDICAL SPENDING BOUGHT?

35. International comparisons have shown almost no effects of variations in health care spending on available health indicators. These indicators include infant mortality, standardised mortality statistics, life expectancy indicators and potential years of life lost (PYLLs). As stated by Anderson (1997), the United States appears to spend the most on health care with poor results in terms of life expectancy and infant mortality. All these facts may make one suspicious about what additional health care expenditure may have bought. Even within a country, such as the United States, higher spending in Miami does not translate into better outcomes than in Minnesota where managed care has driven costs down.

36. However, when asked, people clearly prefer spending more on medical care over time. Few would be happy to return to the state of the art of medical practice from the beginning of the 1970s, even at lower costs. The progress in medicine is praised by the media and it is difficult to deny major innovations to the public if they produce any significant health gains. The introduction of new drugs provides a good example although the UK's explicit rationing of Viagra indicates that there are limits to the therapies that some countries will fund through their public systems.

37. This intuitive presentation shows that increased medical spending over time is popular and that health status is improving through time, yet differences in spending across countries do not seem to yield health gains. Can these two views be reconciled? Is it that all the technical advances, which improve health status through time can be afforded by even the lowest spending OECD countries?

38. To answer this question, there is a need for closer investigation in order to compare health outcomes, both across countries and over time. First, this requires a brief overview of international descriptions of "public health" outcomes. Second, this requires more analytical considerations to explain these variations and relate them to health care systems interventions at the macro level. However, there is a need to go beyond these "public health" outcomes and explore preliminary results both at the national and international level involving other dimensions of health outcomes such as morbidity, functional health. Finally, this will introduce a formal discussion of health outcomes in terms of marginal versus average gains in health, and whether these gains are worth their cost.

2.1 International descriptions of health outcomes

39. Jee and Or (1998) offer a general overview of health outcome indicators. These include:

- Mortality
- Life expectancies, standardised causes of mortality rates, PYLLs;
- Morbidity
 - general morbidity (health status, measures of disability, health utility indices),
 - disease specific morbidity (prevalence and incidence);
- Composite health measures (Health expectancies), Disability Adjusted Life Years (DALYs);
- Performance indicators for the quality of medical care

- avoidable mortality
- survival rate
- adverse events following treatment
- satisfaction with health care systems.

40. Most available economic and epidemiological studies to date have focused on mortality indicators. Many studies give them a strong focus due to their easy availability. However, these are crude indicators of health status. The major part of modern health services may not be to reduce mortality but speed cures, reduce disabled side effects of illnesses or provide succour to the sick (Aaron 1991). Apart from these indicators, more precise indicators of health status have been developed, mainly for the purpose of clinical studies and partly for epidemiology. However, countries are still reluctant to fully implement them in health surveys as they involve many subjective questions. It would be difficult to perform international comparisons using them, except maybe for some dimensions of severe functional disability.

41. Disease specific morbidity is often available, but usually on a limited basis. It has often been gathered through WHO monitoring projects and collected for a wide number of countries. However, it is rarely associated with economic analyses of health care interventions and actual results of treatments. Some of the available data for composite health measures will be discussed below (see II.4). As far as performance indicators are concerned, early work included Aaron and Schwartz (1984) (see results in Aaron 1991). They offer a picture of huge variations in interventions across countries, mostly with the United States performing more than other countries. A more complete view gathering more recent information is offered by Jee and Or (1998). However, the overall picture so far remains very patchy. For example, at the aggregate level there was no general link across OECD countries between mortality rates for ischemic heart disease and rates of angioplasties for the year 1993. The accompanying paper (Jacobzone Jee-Hughes Moise 1999) offers the medical and epidemiological background for the study and presents the available evidence in terms of both morbidity and survival rates for the diseases considered in the project.

42. Finally, it is interesting to note that while generally the Americans do not seem to be overly satisfied with their health care system, some correlation between public satisfaction and per capita expenditure on health seems to appear from European data. The data are not presented as a share of GDP but in PPP adjusted levels. Countries with higher spending such as Finland, Denmark, France the Netherlands or Germany seem to have more satisfaction than Portugal, Greece, Italy or Spain (Mossialos 1997). This subjective view may not be totally relevant from a pure medical point of view but is consistent with an economic approach valuing individual utility. Also, the picture would change if expressed in terms of the share of health expenditure in GDP, as for example, Denmark appears among countries spending less than France or Germany, but with a much higher satisfaction.

2.2 Analytical studies of aggregated public health outcomes using cross sectional data

43. From available descriptive materials, analysts have tried to obtain some explanations for differences in health outcomes. The path for developing studies has been parallel to that observed for studies of macroeconomic health care expenditure. However, fewer studies are available. Cochrane (1978) was the first to exhibit some results using cross sectional data for 18 countries: national income and behavioural factors such as alcohol, tobacco and sugar consumption were the main determinants of various infant mortality and age-standardised mortality rates, with weak links to health resources in terms of physician numbers. Further results by Leu (1986) confirm the role of national income and also stress

education and public financing in reducing mortality. Babazano and Hillman extend the analysis to 21 countries and for the year 1988, with a combined negative effect of national income, hospital beds and public medical spending reducing various life expectancy indicators.

44. However, such studies suffer all the shortcomings of cross sectional ordinary least squares regressions previously mentioned, upon which doubt has been cast by more modern econometric results. This is even more particularly true for health outcomes, expressed in mortality rates, than for health care expenditure. If health care expenditure is clearly an economic aggregate, which in true "behavioural" terms can be linked to an economic framework, health outcomes require a broader framework. This holds even for crude health indicators such as mortality rates. As "health" can be produced by numerous environmental factors, it is almost certain that most of the results will be driven by unobserved heterogeneity. In addition, in such studies, as health care expenditure and national income are closely associated, it is impossible to disentangle any effects. There is a need to consider these earlier results with extreme caution in the perspective of health policy making.

2.3 Analytical studies of aggregated public health outcomes using pooled cross sectional data over OECD countries

45. In their investigation of medical spending using pooled cross sectional data over time, two studies have added some investigation into health outcomes. Using pooled cross sectional data for 21 countries over the period 1960 to 1987, Hitiris and Posnett (1992) found that national income would increase global mortality rates⁹, as would also the share of the population aged 65 and over. Medical spending contributed to reduce global mortality rates. Grubaugh and Santerre (1994) analysed infant mortality and found that increased number of physicians and national income would reduce it while alcohol and tobacco consumption would contribute to increase it. Education or women participation in the workforce, would have no influence.

46. Further work by Or (1997) extends such analysis to "avoidable" mortality. These results have shown a positive impact of health expenditure on health outcomes measured in terms of PYLLs for women but not for men. For men, lifestyle factors contributing to premature mortality play a more important role. Contrary to earlier results (Cochrane 1978), higher numbers of doctors and health personnel do reduce mortality. Hospital admissions also have an impact in contributing to reduce premature mortality. Pharmaceutical expenditure, which may act as a proxy for other outpatient interventions as well, also has an effect in reducing mortality. The way health expenditure is financed influences premature mortality, with a larger share of public financing allowing for better outcomes. This study also underlines the role of environmental factors, with a proxy for education and work conditions playing an important role in explaining outcomes. As expected, alcohol, tobacco consumption, consumption of sugar and butter, all have a negative impact on premature mortality.

47. In spite of the paucity of such studies, they have offered interesting results, more robust, and much more valid in a health policy framework. However, the scope of such work remains limited by the small number of health outcome indicators widely available over time at the international level. To develop more studies requires investment in developing additional health outcome measures.

⁹ Maybe this strange result is due to the fact that the share of the population aged 65 and over is a limited indicator for ageing, and that richer countries have a far older population on average.

2.4 Analytical studies of trends in health outcomes over time both national and international

48. This difficulty has been partly overcome at the national level. For example, Cutler and Richardson (1997) investigate health outcomes for the United States in recent decades. After examining various mortality rates, they look at the effect of most medical conditions on self-rated health status of the US population over time from 1970, up to 1980 and 1990. They measure both prevalence of disease and the impact of diseases on estimated quality of life. The study shows that prevalence of diseases has increased, but so has quality of life based on disease. The second part of the study translates these results into an economic framework, linking health status and "health capital". The main results would tend to show that the relative improvements in quality adjusted life years for the diseases would be parallel and even higher than the relative increases in medical spending over the same period. People tend to be healthier in a way, even if they are partly "sicker". Such a study could in theory be extended to other countries, as it requires mostly national health surveys over time. Parallel work by Sermet Grandjean (1998) using French data tends to show similar trends in a descriptive way for the French population.

49. Measures of changes in health outcomes over time also involve measuring the quality of changing medical interventions. Health care systems experience a fast introduction of new and costly technologies. In order to understand this in a relevant economic way, one has to refer to theories of diffusion of new technologies. Part of the difference involved with new treatments reflects faster release from hospitals, use of more precise, often with less heavily invasive interventions. Therefore, the alternative approach to a "population health status" approach is to examine more carefully specific treatments. These could be defined by their structural characteristics, using a "hedonic" framework, or these could be benchmarked against the additional quality or length of life that they bring. This second strategy would lead to estimate "cost of living" indices for health care (Cutler, McClellan, Newhouse 1998). This requires valuing the enhanced capabilities of medicine in the same way that it is done for computers. The major shortcoming is that the information structure that would be required to build up such measurements might prove to be very costly and difficult to directly generalise at the international level.

50. Finally, in one field recent work has shown consistent results at the international level. This concerns trends in disability among older populations. A couple of national studies has shown empirical results close in spirit to those presented above. The rise in morbidity due to increased survival and better management of acute diseases may have produced slight increases in mild disability. In terms of functional health, or severe disability however, the majority of studies found clear reductions (Manton 1997 for the U.S., Sermet 1998 for France). Recent OECD work (Jacobzone 1998) has shown that these trends were generally consistent at the international level, although they were not equally shared among countries, gender and age groups. Most reductions were found in the younger elderly, (65-75 years) and men and were more important in countries like the United States than in Australia where even some increase had been noticed. Such studies remain however descriptive. If they allow analysing the implications of such trends for public and long-term care policy, they do not allow analysing their causes and their interrelations to the health care system.

51. The materials presented up to now give partial answers to the question asked. Medical care spending seems to buy some reductions in mortality, although in many cases socio-economic status and income may play an even greater role. Some analysts also conjecture the distribution of income to be important in addition to its level. At middle ages however, and once the burden of communicable disease has been mostly reduced, most deaths observed in developed countries would be attributable to lifestyles, car accidents, and also AIDS and socio-economic factors. At older ages, most of the gains obtained by health care systems are gains in either increasing quality of life or reducing adverse consequences of acute diseases. This would therefore require a longitudinal approach in order to be able to analyse and disentangle underlying causes. It was once thought that OECD health care systems were buying longer

lives: they may in fact be mainly buying quality of life, and this would particularly hold for older populations.

2.5 Trade-offs in health care: is medical care worth it?

52. This section includes first an analytical section to discuss some of the issues at stake and second a discussion of the implications for health policy.

2.5.1 Average value of medical spending versus marginal value

53. This formal discussion will present some analytical background to formalise the question. A health production function is presented in figure 1 (situation 1). Most analysts would hypothesise decreasing marginal returns, with very high returns for low inputs at the beginning and decreasing returns later on. The shape CD may represent the possibilities of medical care at a certain time t , for example at the beginning of the 1970s. A country C would be a country choosing to have high average returns for its inputs, but refusing to allow for health interventions with too low marginal returns (i.e. a low cost-effectiveness). A country D, on the other hand may represent a country with a much higher propensity to pay for health care, ready to devote much more inputs for lower marginal gains. As an illustration for the simplicity of presentation, the point C may illustrate a country with a National Health Service like the United Kingdom, and point D may illustrate a country with an open-ended system for reimbursement, such as the US system in the past. The move from the curve CD to the curve AB may represent technical progress, expanding the possibilities of medicine over time.

(See Figure 1: The trade-offs in health care)

54. With an optimistic view, it should then be possible to have better health outcomes for similar inputs. This would not however change the relative position of the countries A and B, which would choose to operate on the efficient point of the production curve, taking into account each of their respective budget constraints. Therefore the difference between points C and D, or between points A and B may represent cross national differences at a certain point in time, while the overall difference between CD and AB may represent changes in medical possibilities over time¹⁰. This could help to understand why some people may accept to choose the Canadian health care system versus the US, because of rather similar general outcomes with fewer inputs, while everybody would choose today's health care systems by comparison with past medical standards.

55. This scenario may not always be as simple, for example if countries rely on different types of organisation of medical care, and in fact have different production functions. One example was given in the McKinsey study (see below, Baily Garber 1997). The United Kingdom was screening diabetic people carefully and providing close and expensive care management to those eligible for treatments. However, this system could not be extended very much because of exponential costs for populations for which the rates of return of treatment would have been very low. At the other end, the United States were treating patients more intensively on average, but with less screening and prioritisation. In situation 2, the curve AI would illustrate health interventions with a very high rate of return for the first medical inputs spent, for which the population could be adequately screened. However, to achieve a higher level of health outcomes would require going to point I, with much more inputs for marginal additional gains. The curve BF would correspond to a case where more intensive treatments would be given but without any screening. Rates of returns would be lower if lower inputs were to be spent. However, with the curve BF it would be possible

¹⁰ this owes much to a discussion from D. Cutler, OECD, 1998.

to achieve higher levels of health outcomes at a lower cost than with the production curve AI. In this case, there is no clear pareto improvement of one situation versus the other.

56. Therefore, for the level of inputs I_1 , the curve AI would clearly dominate the curve BF. However, the curve BF would clearly dominate the curve AI if a higher level of outcomes, HO_1 would be desired. As health care is always partly financed out of public funds, the general public finance implications should also be mentioned. Particularly, if one hypothesises that public funds cannot be increased beyond a certain limit, any higher level of input would require more private inputs, therefore more out of pocket payments or supplemental insurance coverage. All applied international evidence on equity (Van Doorslaer, Wagstaff 1993) shows that this can only be achieved with a lower level of equity within the health care system. The chart below illustrates this intuitive trade-off between equity and the level of inputs. In this chart, the points AB, with inputs I_1 would clearly allow for a higher level of equity, in any system. However, the higher level of health outcomes in the case FI, would entail relatively less losses in equity in the point F than in the point I. The point I would then be out of reach for the health care system of country AI, while the country BF may accept to go up to point F, if it is ready to accept a lower level of equity against a higher level of overall outcomes. Again and with caution, this may be taken as an intuitive illustration of trade-offs faced in two very opposite situations among OECD health care systems, between the United States and the United Kingdom.

57. These schematic diagrams provide an illustration of implicit choices faced by policymakers in organising their health care system. Any situation requires in fact a choice of prices and quantities, and certain implicit choices about redistribution. This shows also that it is by no means certain that efficiency and redistribution should be directly opposed. In addition, in a social policy framework, redistribution can be in itself considered as being welfare enhancing, and thus efficient.

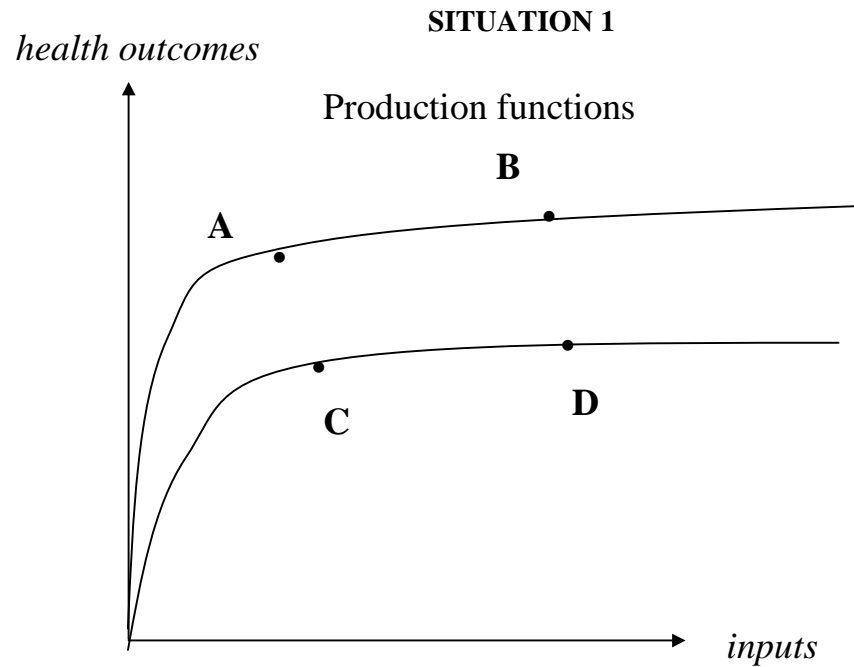
2.5.2 The value of medical spending: how to obtain positive outcomes with limited resources

58. The above discussion has highlighted the difference between average and marginal gains in health care. However, this would need to be supplemented by more thorough empirical relevant investigations to provide convincing materials in the health policy arena. Some US studies would support the view that the increases in medical spending on average and over time have been worth it (Cutler, Richardson 1997). These estimates integrate the value of additional quality adjusted life expectancy gained over time with a certain number of assumptions. However, these results remain specific and cannot be easily transposed to the international level. In addition, considering the current health care system in the United States, it is doubtful that all health interventions are worth it. A study by Cutler, McClellan and Newhouse (1998) shows that managed care organisation tends to achieve similar outcomes in the case of coronary disease at a lower cost. Thus the difference with other types of health care arrangements can be purely explained by price differences. From an economic standpoint, welfare could be enhanced if all "real quality adjusted prices" could be lowered as to provide the same average efficiency as the most efficient current settings.

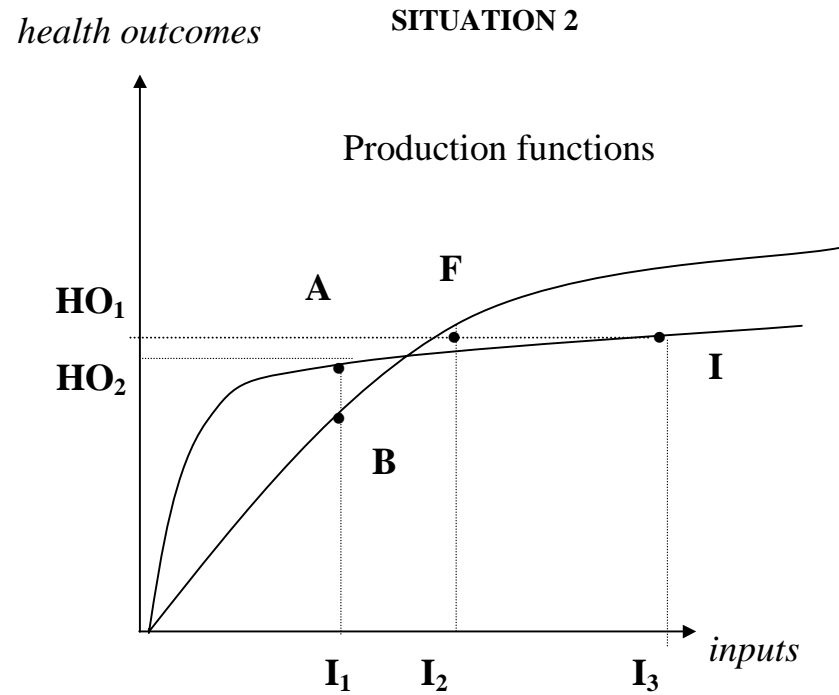
59. In fact, the variance observed in the United States is certainly greater than in many other OECD countries. However, the international observation of differences could provide enough variance to compare "average" and "marginal" productivity in health care systems. Many of the "managed care" techniques had been introduced early on in some public systems, such as the NHS. Today, many health care systems aim to improve health outcomes with resources that cannot be further expanded. Therefore, it would be of highest importance to investigate at the international level whether some countries are able to obtain more from their medical systems than other countries at the same cost. Is it possible to find institutional arrangements to reduce the unnecessary parts of medical care or to better control provider's rents in the health care systems?

60. A precise answer to such questions could then provide some insights, whether medical care would be worth the resources devoted to the health care system. This requires a strategy paying an important attention to relevant health outcomes and indicators of performance of health care systems. The macroeconomic approaches mentioned above, both in terms of analysing spending and general outcomes, have offered many relevant insights. However, due to the peculiar nature of indicators and methods being used, there is a certain limit to their findings. A micro-economic approach, keeping the main macroeconomic framework in mind, could help resolve some of these difficulties while offering a path towards more in depth analysis. However, to compare health care systems in a way that would be relevant from the real medical output point of view in terms of health outcomes, requires going one step down, to the disease level. There, empirical evidence would be needed, which would be both medically relevant, economically consistent, and could bring convincing results for policy-makers.

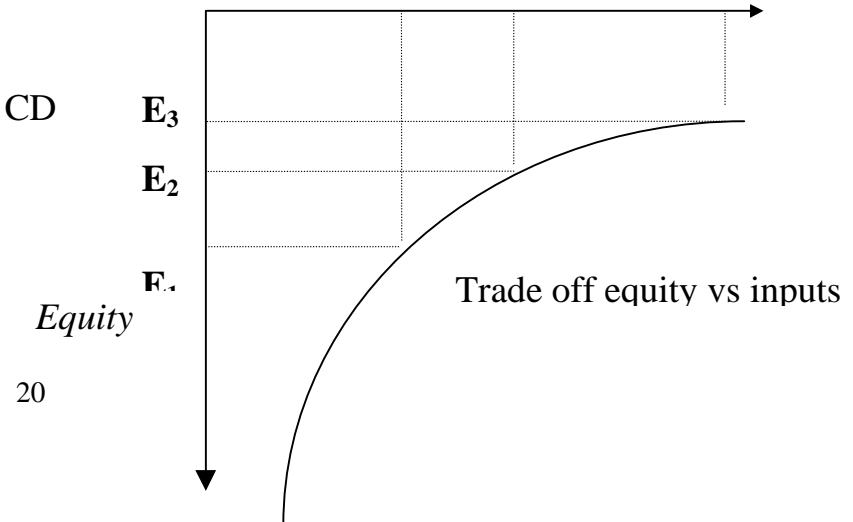
Figure 1: THE TRADE-OFFS IN HEALTH CARE



Situation 1 : AB more efficient production function than CD



Situation 2 : no clear improvement



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