Statistics Netherlands

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Deflating health expenditures*

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1. Introduction.

In 1994 the Netherlands spent 8.9% of the Gross Domestic Product on health care. Since the end of the sixtieth this figure has more then doubled, due to price, quantity and quality changes in medical services. It is expected that there will be a further upward pressure on this percentage due to the aging of the population and further developments in health technology.
Since Dutch health care for a considerable part of the population is financed by compulsory health insurance funds which are a burden on labor costs and the purchasing power of households, politicians are anxious to know the development of the expenditures, prices, quantities and qualities of health services. This interest appears from several, recently, published documents[1] by the Ministry of Health, Welfare and Sport, which state that the aim is a maximal yearly growth of the volume of health consumption of 1.3 %.

This paper describes the ways Statistics Netherlands compiles and presents statistical information about real developments in health care. The problems that arise, stem from the difficulties in establishing the correct prices of health services that are necessary for a reliable deflation of health care expenditures. These problems are closely linked with the regulated market for health services in the Netherlands, were prices do not represent costs. The way the problems are dealt with is derived from the information that is needed. So Statistics Netherlands is working on improvements.

Section 2 of this paper provides some information about Dutch health care that explains the problems with the establishment of correct price figures. Section 3 presents and comments on the way health expenditure and price figures are used in the consumer price indices, the National Accounts and the statistics Cost and Financing of Health Care. In section 4 plans are presented to improve the quality of volume figures about health care.

2. Prices in Dutch health care.

In health care the most correct way to control supply and demand is to establish the improvements in health by the measures taken. This is, however, impossible to realize, since it would require knowledge about all causes of health changes. The second best way to support decision-making in health care is to collect information about the relations between individual health services and their effects on health. Here to, there is insufficient knowledge to construct an overall picture of all the relations involved. So the level of ambition is reduced to the health services themselves, of which the numbers and the total expenditure can be established rather easily.
According to the National Accounts, expenditures on health can be seen as a value measure that expresses the aggregate of all the health services at their market prices in the period under consideration. Changes in the expenditures can be caused by changes in the numbers as well as by changes in the prices of the health services. Price changes, in their turn, could be caused by changes in input prices as well as by changes in the quality of the services. A first step to separate these factors is to construct volume indices that express the development of health care expenditure in constant prices. This means that these volume indices indicate both changes in the numbers and the quality of

1) See for instance: Gezond en wel (Healthy and well), policy document of the Ministry of Health, Welfare and Sport, the final report of the official Task Force Volumebeheersing en kostenbeperking (Volume control and cost reduction) and the annual ministerial report Financieel Overzicht Zorg (Financial Care Survey) 1995.

the health services. Separating these last two factors as well would give very interesting information about developments in health care, but it would require an intensification of data collection that is beyond present day statistical means.
In order to find reliable volume indices, the price indices that are used to deflate the expenditures must express only the effects of changes in prices (input and/or output). This means that corrections should be made for the price effects of changes in the quality of health services.

The Dutch system of costs control in health care is based on a parlaimentary agreement on the growth of the expenditure for health care. This macro budget is under the supervision of the semi governmental organization COTG (Central Organ for Tariffs in Health Care). First, it is subdivided into categories of health care, such as hospitals, nursing homes, and consulting physicians, and, second, into individual institutions and practitioners. All these institutions and practitoners should finance their budgets by the proceeds from the tariffs (prices) they charge for their services. For the institutions, the tariffs of the specialized services such as operations or X-ray photography, are established by the COTG on the basis of the average cost, which results in uniform tariffs throughout the country.
Part of the individual institutional budgets will be covered with these uniform tariffs, and the expected number of specialist services rendered per institution. The rest of the individual budgets should come from the proceeds of the nursing-days. So the tariffs of the nursing days are used as closing entries and can be different for different institutions. These tariffs only have an indirect relation with the costs since also the services that are not covered by tariffs, such as some visites to out-patient departments, should be covered from the proceeds.
For consulting physicians, the tariffs are derived from politically agreed norms for the development of personal incomes and work loads. So the tariffs of the consulting physicians also express political ideas about income distribution.
The conclusion must be that the observable prices in Dutch health care do not have a direct relation with production costs or product quality. So corrections are necessary in order to find correct deflators for reliable volume indices.

The health care tariffs that are fixed by the COTG, are defined for individual medical services. But in health care it is not so much the medical services that matter, it is above all the treatment of the illness, which consists most of the time out of a combination of services, such as nursing days, specialist treatments and medicins. The chosen combination of services depends on the state of the art of medical knowledge and the quality of the services, which are changing in the course of time. For example, a reduction in the number of nursing days, through substitution by an increased number of home visits by a nurse, could mean an improvement in health care despite the reduction in volume and cost. So in order to find a reliable set of price figures to deflate the value development of health care, one should not only take care of the changes in the quality of the services themselves, but also of the developments in the combination of services that make a medical treatment.

These findings raise the question how Dutch statisticians establish the information about price changes that is necessary to deflate health expenditures in a reliable way. In the next section it is analyzed how the Consumer Price Indices, the National Accounts and the statistics Costs and Financing of Health Care come to volume figures for health care.

3. Deflating in practice.

3.1 Consumer Price Indices.

Since 1990 Statistics Netherlands has published a new consumer price index for household consumption. This so called central consumer price index is restricted to the actual acquisitions by the households themselves. In this way the figure represents the development of the purchasing power as experienced by households, and therefore it could be seen as a dedicated (partial) cost-of-living index [Balk, 1990]. This in contrast to the traditional consumer price indices based on the SNA definition of consumption. Here the indices represent also price changes of goods and services that are financed in an indirect way, as is the case with medical services which, for many households, fall under a compulsory health insurance fund forwhich the premium is directly taken out of their salary.
As a consequence of the restriction of the new index to the actual acquisitions by the households themselves, the health expenditures included are limited. They include only some popular medicines, spectacles and hearing-aids, which results in a weight for medical care of 0.6 % and a corresponding price index with only 14 medical products.

The traditional price index of household consumption, that is still published for international comparison of consumer price changes, is based on the SNA definition of household consumption. The expenditures on medical services, that are based on the results of the budget surveys of Statistics Netherlands, consist of the expenditure on insurance premiums, paid own risk and some non-insured commodities. So medical consumption gets a share in total consumption of 12.2% in the index for the whole population. Five subcategories of medical care are distinguished, each with their own composed price indices (see table 1). The weights within the price indices for the distinguished subcategories are based on the expenditure figures of health organizations and insurance companies.

Table 1 Composition of consumer price indices for medical care.

	Weighting	Number of prices used
Medical care	12 200	197
Medical and pharmaceutical products	1 700	106
Therapeutic appliances and equipment	600	14
Physicians and others	3 900	56
Hospital care	5 700	19
Health insurance services	300	2

Information about the prices of medical services is obtained from the standard prices list by the COTG, and from the publications of medical organizations. For the prices of nursing days, which differ per institution, an average is calculated on the basis of information of all Dutch institutions. Since no detailed information is available about the services themselves, no corrections are made for changes in the quality of the services. So the conclusion must be that health expenditure in the consumer price indices are

deflated in a limited way. This, however, does not imply that price changes are always over-estimated, because some analysts doubt whether all new technologies are better than the old ones (Hoven).

3.2 National Accounts.

Figures about health care are given explicitly on two places in the Dutch National Accounts. In the production accounts, health services are part of the non-commercial services n.e.c. and amount to between 3 and 4 percent of total output. In the accounts for private final consumption expenditure, the expenditure for medical care has its own heading with five sub-headings. This prominent position corresponds with the share (13%) of medical expenditures in total private consumption expenditure.
The two figures about health care in the National Accounts (41,100 mln dfl for private final consumption, and 36,604 mln dfl for the output of medical services in 1991) are not completely linked up. The difference is caused by medical services delivering also to government, enterprises, and abroad, and households consuming medical products that come from other producers than medical services only. The most important of these are medicines (5 590 mln dfl in 1991) that come via wholesale and retail trade from chemical industries.
This way of presenting financial information about health care stems from the principles of the National Accounts, in which activities are classified according to their main physical character and not according to the use of their products. The concentration on main character for classification also excludes smaller activities, such as occupational health care, from the figures representing health services or consumption. So the National Accounts can give only a limited picture of the extent and consequences of health care, such as the effects on the labor market.
Most important in the National Accounts are the volume figures. They express the real developments of variables such as output or income without being veiled by changes in the price level. To arrive at volume figures for medical services or consumption, several deflation methods are used in the Dutch National Accounts [Drost a.o.]. To establish the volume developments of output the health services are subdivided. For the sub-categories Hospitals, Psychiatric institutions, Institutions for the mentally disabled, and Nursing homes the volume figures are found with the help of a proximate volume indicator that consist of the development of the wage rate and of the labor inputs. This way of deflating excludes any correction for changes in the quality of the services. For the other sub-categories (General practioners, Medical specialists, Dentists, Paramedical services, Home nursing services and maternity services and Other medical services) a consumer price index is used to find the volume of output. These price index figures are based on the price information that is used for the Consumer Prices Index where, as was describe in section 3.2, only marginal corrections are made for quality changes. So also the volume figures for these last subcategories do not fully represent the real volume changes. The same is true for the figures about the expenditure for medical care as part of private final consumption. Here the same price information is used to deflate the health expenditures as is used for the traditional consumer price indices for household consumption.

3.3 Cost and financing of health care.

Since 1953 Statistics Netherlands has produced the statistics Cost and Financing of Health Care (C&F), in which the complicated financial structure of health care is presented. Since 1972 these statistics are published on a

yearly basis. The structure of the statistics was modeled on the system of National Accounts. The National Accounts is an institutional system of statistics. This means that the economic actors are classified according to their main economic activity. The secondary activities conducted by the actors are not distinguished from their main activity.
C&F are part of the system of health statistics, a system which aims to provide insight in the physical and mental health and their determinants, the demand for and supply of services rendered by health care institutions and practices, and the required inputs. As part of this system, C&F are functional statistics, unlike the National Accounts. Functional means that data of all actors in the economy are taken into account insofar as these activities are linked to the field of health care. All other activities are excluded.
In C&F, health care can be described as the activities that aim at achieving, maintaining or improving health. Not all activities covered by this description are, however, included. Examples of activities that are not included are activities related to preserving the environment, medical research and health care education.
The costs of health care are defined as the expenditure of households, companies and government for this field. For practical reasons, the costs are not measured at the household level but via the producers of these costs and services. The data published in C&F originates from direct surveys, the analyses of the annual reports of health care institutions, and calculations which make use of other statistics and information from financing institutions such as insurance companies.

The most results of C&F are presented in prices of the year represented. Only the main results are also given in prices of a base year. Table 2 shows the volume indices that are based on the deflated expenditures. Fourteen categories of institutions and practices in the field of health care are distinguished.

Table 2 Cost in constant prices of categories of institutions and practices in the field of health care

	1985	1989	1990	1991	1992	1993*
	volume-indices (1985=100)					
1. Intramural health care						
1.1 Hospitals	100	101	104	106	108	107
1.2 Mental hospitals	100	104	107	109	111	116
1.3 Institutions for the mentally weak	100	104	106	108	112	112
1.4 Nursing homes	100	108	110	111	114	115
1.5 Other institutions for intramural health care	100	104	105	100	101	101
Total intramural health care	100	103	106	107	109	110
2. Extramural health care						
2.1 Specialists practices	100	116	121	130	137	146
2.2 General practitioners practices	100	113	117	118	120	121
2.3 Institutions and practices for dental health care	100	105	107	111	116	120
2.4 Practices of midwives and paramedics	100	121	131	132	133	133
2.5 Suppliers of medicines, wound dressings, etc.	100	128	144	156	172	187
2.6 Institutions for public health care	100	113	118	120	120	122
2.7 Other institutions for extramural health care	100	107	109	116	121	126
Total extramural health care	100	117	125	131	138	145
3. Other health care						
3.1 Food and water inspection	100	107	105	107	110	110
3.2 Policy, administration and management	100	116	115	118	120	119
Total other health care	100	116	115	117	119	118
Totaal generaal	100	109	113	117	121	124

Several calculation methods and a multitude of indices are used to arrive at this table with volume indices. Initially, deflation takes place for all of the thirty categories of institutions and practices whose expenditures are presented in C&F. Since the quality of the data of some of these categories is below the required standard, volume indices are publiced for fourteen categories only. Annex 1 is a synopsis of the methods and indices used for the institution and practices distinguished.

As can be seen in annex 1 three calculation methods are employed:

- for institutions for intramural-health-care the expenditures at constant prices are calculated with the help of volume indices that are based on a number of characteristic services. Besides, the extent of the actual labor force and the development of labor productivity is also taken into consideration.
- for the institutions for extramural-health-care the volume figures are arrived at by deflating the expenditures with the consumer price indices for medical services which is, as was decribed in section 3.1, based on a combination of COTG tariffs for medical consultations.
- for the institutions for other-health-care the deflation of the expenditures takes place with the help of indices for wages in the health services.

This way of calculating the volume indices is the result of a historical development of C&F, in searching adequate and efficient deflators on the basis of limited information. As was demonstrated in secton 2, it is difficult to find price information that represents the development of the costs in health care institutions. Especially the practice to establish the tariffs for the nursing days as a closing piece in the financing of the institutional budgets forced the statisticians to construct direct indices for the volume in the intramural health care. For the services of the institutions for extramural health care, it has been difficult to find reliable price information, since services are difficult to define. As a proxy we use CPI-indices. So improvements of the deflators are particularly neccesary in this are. The same is true for the institutions for other health care where wage indices are used to find a volume index.

4. Improvements.

The discussion in the last section on the way expenditures on health care are deflated by Statistics Netherlands, reveiled that it is very difficult to obtain adequate information about the prices of health services. Improvements will be difficult, however, since the problems are connected with the way the prices in Dutch health care are established. Besides, there are the (normal) difficulties in price indices on services namely how to define health services adequately and establish quality changes correctly. These problems cannot be solved in the short run. So the only way health statisticians can improve their volume indices at the moment is by specifying their present methods further in order to get a better link with reality. In the next two paragraphs, two projects aimed at improving volume figures about health care are described

4.1 Cost and financing of health care.

In 1995 Statistics Netherlands started with research on better deflators for

the categories of extramural health care in C&F as part of large quality improvement project. For these categories of health care, the present volume figures are based on consumer price indices wich are a composition of COTG tariffs for medical consultations. This compositions are not always adequate. In order to improve these indices for these categories, an analysis will be made of the qualitative and quantative aspects and developments of the services rendered. With the results of this analysis, adequate prices will be sought from the list of tariffs of the COTG. So a right combination of services and prices on a detailed level will be available to compose adequate weighted price indices for every category.
The first category of practioners that has actualy been analyzed in this way, was the general practitioners practices (2.2). The activities of these practitioners were classified with the help of a report (National Study about Diseases and actions in family doctors practices) by NIVEL (Dutch Institute for research of first line health care). The resulting picture has been completed with information from several statistical surveys about the consumption of medical services by households (Health Survey of Statistics Netherlands and the report Influenza Vacination by the research institute TNO Prevention and Health). Next, the list of services that was made in this way has been confronted with the COTG list of standard prices. For most of the services, prices were available so that calculations could be made. Further analyses of the COTG list learned that most prices of the distinguished services in the period 1990-1994 changed more or less in the same way. So it was found that the advantages of a detailed price indices above the use of the price of a single service were small for this categorie of practices in this period.
At the moment analyses are made of the services of dental practices (2.3), practices of physiotherapists and midwives (2.4).

4.2 A Production index for health care.

Health expenditures are deflated in order to find information about volume developments. As was demonstrated in section 2 and 3, the construction of reliable volume indices for health care is hindered by the difficulties to construct the right price indices. The main reason for this is the absence of information about real market prices and quality changes in health care. Besides there is the problem of selecting services for the indices whose prices changes must be representative for the prices changes of the whole group of services.

An alternative way of describing volume developments in health care that should be investigated, is the construction of a production indices for all health services. In fact this is an extension of the way volume figures are found for intramural health care in C&F.
A production index is based on a number of selected health services that are weighted together by the prices in the base year. In this way, the problem of the absence of market prices is eliminated, and the volume index becomes independent of political choices about the financing structure in health care. Like the price indices, a production index will also be dependent on the developments in the services chosen for the volume indices. This selection could, however, be superior to that for the price indices since it will be based on knowledge about the kind of the medical services and not on the expected development of the prices. When the services for the index are chosen in such a way that they represent the treatment of certain diseases, as is done with the construction of diagnosis related groups [Health Policy], the substitution of medical services within a treatment could also be dealt with.

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Annex 1.

Calculation methods for volume indices in Cost and financing of health care

Categories of institutions and practices	Calculation base	Composition indices
1. Intramural health care		
1.1 Hospitals	volume indices	Admissions, in-patient-days, day nursing days and visits to out-patient departments. The development of full-time equivalents and labor productivety in hospitals is taken into account
1.2 Mental hospitals	volume indices	The same as for hospitals; psychatric part-time treatment days instead of day nursing days.
1.3 Institutions for the mentally weak	volume indices	The same as for hospitals; part-time treatment days instead of day treatment days and visits to out-patient departments.
1.4 Nursing homes	volume indices	The same as for hospitals; part-time treatment days instead of day treatment days and visits to out-patient departments.
1.5 Other intramural institutions	volume indices	Number of pupils/tots and nursingdays The development of full-time equivalents and labor productivety in hospitals is taken into account
2. Extramural health care		
2.1 Specialists practices	output price indices	Consumer price indices for specialists practices, a combination of various consultation fees.
2.2 General practitioners practices	output price indices	Consumer price indices for general practitioners practices, a combination of various consultation fees.
2.3 Institutions and practices for dental health care	output price indices	Consumer price indices for institutions and practices for dental health care, a combination of various consultation fees.
2.4 Practices of midwives and paramedics	output price indices	Consumer price indices for practices of midwives and paramedics, a combination of various consultation.
2.5 Suppliers of medicines, wound dressings, etc.	output price indices	Consumer price indices for medicines.
2.6 Institutions for public health care	output price indices	Consumer price indices for institutions for public health care.
2.7 Other extramural institutions	output price indices	Combination of significant consumer price indices and wage indices for health services.
3. Other health care		
3.1 Food and water inspection	input price indices	Wage indices for health services.
3.2 Policy, administration and management	input price indices	Wage indices for health services.