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# Predicting the Future Health Care Expenses of Cancer

## K. Kesteloot

IN RECENT years, the scarcity of health care resources has become more obvious in the industrialised world. On the one hand, health care needs are increasing at a fast pace, due to changes such as technological advances in medical equipment and the development of new drugs. On the other hand, the amount of resources a society can afford to spend on health care is not unlimited. A growing reluctance among government officials to increase public health care spending can be observed, for example, due to huge government deficits.

This growing scarcity increases the need for thorough economic evaluations in order to achieve an efficient allocation of health care resources: the total available amount of resources should be used in such a way as to improve the health status of the population as much as possible, or put differently, a nation should try to achieve a target health status for its population with as few resources as possible.

A prerequisite for the efficient allocation of health care resources, now and in the future, is the availability of reliable data on the costs and effects of different health care interventions. Future health care provisions can only be planned, and future health care policies designed, in an accurate way if reliable information on the expected future expenses for different population groups, pathologies, etc. is available. The article by Koopmanschap and his colleagues contributes to this need by proposing a methodology to predict the future health care expenses on cancer in the Netherlands.

Its main contribution lies in the methodology it proposes to predict future costs. The authors calculated an average cost of cancer per patient, for different 'types' of patients, depending on the tumour site, sex, age and disease stage (i.e. first year after incidence, intermediate, or last year of life) for the year 1988. By calculating how many patients of each type there will be in 2005 and 2020, under different scenarios concerning the future age structure of the population, the incidence of cancer and the survival rate, the future costs of cancer in the Netherlands can be calculated.

This research clearly illustrates the need for multidisciplinary research in the field of health economics, or health services research: medical input is necessary to provide data on effects, such as survival rates; the economist is responsible for correct calculation of the costs and their allocation across patient groups, pathologies, years; epidemiologists can propose reasonable future scenarios on demography, incidence, etc. Each of these and other disciplines are clearly complementary, compared with independent efforts, for good research.

## GENERALISATION OF THE RESULTS

The methodology proposed by the authors can obviously be applied to other diseases, or to cancer expenses in other countries. As the paper stands, however, the direct applicability of the cost predictions to other countries is limited, since the authors do not provide enough information on (i) which cost items they included and (ii) how each cost component was calculated. With some methodological, or even presentational

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improvements, the application of their framework to other countries could have been facilitated. The suggestions, which are well known from the standard textbook on economic evaluations in health care [1], are not only useful for this particular paper, but apply to all articles attempting to estimate current or future costs.

In presenting cost data, it is first of all necessary to define which types of health care costs are included. The authors seem to have only direct health care expenditures in mind; they do not incorporate 'indirect costs' resulting, for example, from lost production, although the latter may be quite important for diseases like cancer.

Moreover, even with direct health care expenses, it is useful to identify the types of health care costs included. Is for example, the OECD definition [2] used, or is the definition in this article narrower or wider in scope? In presenting the cost data on which their predictions are based, the authors specify only very broad cost categories, being in- and out-patient hospital care, and non-hospital care. A further breakdown of these categories would provide interesting insights in the relative costs of certain aspects/modalities of cancer treatment, i.e. a distinction between the costs of radiotherapy and chemotherapy, costs of drugs and especially of cytostatics and anti-emetics, may give the readers a better feeling for the importance of each of these items in the total costs of cancer care.

This problem of the definition of health care costs could partly be resolved by explicitly identifying the viewpoint of the analysis (e.g. patients, providers, health care financing institutions, society), another prerequisite for a methodologically sound cost calculation. Furthermore, the authors do not indicate whether their cost data are based on real resource use, or on charge data.

The authors could also have tested the robustness of their results, in terms of some of their assumptions, through sensitivity analysis. An interesting exercise includes, for example, the impact of the assumption used to allocate the costs of in-hospital cytostatics across different types of tumours. The hypothesis taken may be debatable since the length of stay for chemotherapy patients may not be proportional to the costs of the administered cytostatics, since, for example, some types of tumours may require more expensive cytostatics than others, but not necessarily longer hospital stays. Whether a more precise allocation rule is worthwhile could be judged by means of sensitivity analysis: to what extent would the obtained cost estimates change, if other, reasonable, allocation rules had been used?

## LIMITATIONS

The authors propose an interesting and promising methodology to predict the future costs of diseases, but their results, i.e. the absolute future cost levels, should be treated with caution, to avoid erroneous conclusions. The obtained absolute cost levels should be regarded as a useful thought experiment, since in reality, besides the factors considered, there are many other determinants of the future cancer expenses, which the authors do not incorporate, or in other words, which they implicitly assumed to remain unchanged, but which are quite likely to change in the (near) future.

Of course, not all possible determinants of the future costs of cancer can be accounted for in the context of a single article, but it is important to highlight some of the other factors, to put the authors' future cost estimates into the right perspective.

The development of palliative care outside a hospital setting (e.g. at home, in hospices, etc.) may drastically reduce the length of hospital stay in the last year of life phase. Also, the length of hospital stay during the first year following incidence and the intermediate phase may be reduced further through, for example, the availability of efficacious anti-emetics (more ambulatory chemotherapy) and endoscopic techniques (shorter length of stay after surgical treatment). These factors could substantially affect the future costs of cancer, all the more since hospital care amounts, according to the authors, to as much as 60% of cancer expenditure. More information is required to judge whether these evolutions will decrease (due to less hospital care) or increase (due to higher expenses on such items as anti-emetics, endoscopic equipment etc.) the total costs of cancer.

Also, changes in the treatment modalities for certain types of cancer may seriously alter the cost picture. A switch from surgical to radiotherapy treatment for certain tumours would, on the one hand, involve much higher equipment costs but, on the other hand, would reduce the amount of hospital care. It is not clear whether such a move (or a reverse move towards more surgery) would augment or decrease total costs. As already indicated, the cost data presented in the paper do not provide enough details to trace the impact of such changes on the expected future costs of cancer.

Finally, changes in health care policy may also have a major impact on the future costs of cancer. Two straightforward examples are the extent of cancer screening programmes and health insurance. More extensive cancer screening programmes may, in the short term, increase the amount of health care expenses devoted to cancer, because of the screening activities. In the long run, however, the costs of cancer treatment may be reduced, due to the possibility of treatment at an earlier disease stage. Major changes in the health insurance coverage and benefits may also affect the health care expenses on cancer treatment, through their impact on the number of patients receiving treatment and the nature of the treatment. This would surely affect the estimated cost levels, if the authors' cost calculations are based on charge data.

The proposed methodology may enable us to predict the absolute levels of health care resources likely to be spent on cancer in the future, keeping some limitations in mind. However, in the present format, statements about the relative expenses are not possible, i.e. about the future share of cancer in total health care spending, since the framework only incorporates the impact of changes in the incidence of and mortality due to cancer on cancer costs! It does not take variations in mortality, incidence etc., for other disease categories into account, although some of these factors will also change by the year 2005 or 2020. The authors' statement that, by 2020, cancer costs will have increased much more rapidly than total health care costs, should thus be taken with even more caution than the authors' assertions about the expected absolute levels of cancer care expenditures.

## CONCLUSIONS

A promising methodology to predict the future costs of certain diseases is being developed. This framework should be used to analyse the impact of many more determinants of the future costs of cancer and other diseases on total health care expenses, because this will provide very interesting, and necessary, information for future health care planning. We are looking forward to the results of future research!

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