VALUE IN HEALTH 14 (2011) 387–389

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Policy Analysis

Short Note

Health Dynamics: Implications for Efficiency and Equity in Priority Setting

Katharina Hauck, PhD[a,*], *Aki Tsuchiya, PhD*[b]

[a] *Katharina Hauck, Healthcare Management Group, Imperial College Business School, UK*

[b] *Department of Economics, and School of Health and Related Research, University of Sheffield, UK*

Keywords:
Cost-effectiveness analysis
Equity
Health mobility
Health dynamics
Panel data
Resource allocation

ABSTRACT

Health dynamics are intertemporal fluctuations in health status of an individual or a group of individuals. It has been found in empirical studies of health inequalities that health dynamics can differ systematically across subgroups, even if prevalence measured at one point in time is the same. We explore the relevance of the concept of health dynamics in the context of cost-effectiveness analysis. Although economic evaluation takes health dynamics into account where they matter in terms of efficiency, we find that it fails to take into account the equity dimensions of health dynamics. In addition, the political implications of health dynamics may influence resource allocation decisions, possibly in opposing directions.

Introduction

Health dynamics is a concept developed in the literature on health inequalities [for a review see 1]. It measures fluctuations in health status of an individual or a group of individuals over several time periods. There is evidence that the extent of health dynamics can differ significantly across individuals or subgroups, even if prevalence measured at one point in time is the same. Analyzing health dynamics requires longitudinal data that track individuals over time, and the increased availability of observational panel data has led to a number of studies that analyze and compare health dynamics for different subgroups [see for example 2,3–5]. However, there is a lack of discussion about the implications of health dynamics for resource allocation decisions. In this short article, we show how cost-effectiveness analysis (CEA) incorporates the efficiency aspect of health dynamics. We then discuss the equity aspect of health dynamics and whether and how it should be reflected in CEA. We also discuss some of the political implications of health dynamics, and how they may influence resource allocation decisions.

Health dynamics is best explained with an example: A study about the mental health of young Australians finds that 27% of 18 to 24-year-olds have a mental health disorder [6]. This might be due to each individual having a 27% chance of experiencing ill health in any given year, or 27% experiencing ill health all the time (and 73% never) or—most realistically—something in between, so that of the 27%, say 10% will experience ill health in repeated time periods, and the rest (17%) are ill for one time

Funding: KH was supported by the Australian Research Council Post-doc Fellowship Program while this paper was written.

* *Address correspondence to:* Katharina Hauck, Healthcare Management Group, Imperial College Business School, Tanaka Building, South Kensington Campus, London, SW7 2AZ, UK.

E-mail address: k.hauck@imperial.ac.uk.

1098-3015/$36.00 – see front matter

doi:10.1016/j.jval.2010.09.003

period only. The first scenario is characterized by high, the second by none, and the third by some intermediate level of health dynamics. As with incidence and prevalence, health dynamics is a population concept, based on the aggregate health experiences of a number of individuals over several time periods. As with incidence and prevalence, health dynamics is determined by the proportion of healthy individuals becoming ill. As with prevalence, but unlike incidence, health dynamics is determined also by the proportion of ill individuals who become healthy. In addition, unlike incidence or prevalence, health dynamics reflects the number of consecutive periods individuals remain in one health state or the other. And finally, unlike incidence or prevalence, which are fundamentally based on dichotomous measures of health (i.e., ill nor not ill), health dynamics can incorporate degrees of ill health, or health-related quality of life.

Because trials in effect produce panel data that track individuals over time, conventional CEA reflects the efficiency aspect of health dynamics. For instance, imagine a CEA of a program that cures all who are ill at $t = 0$. We assume that two groups H and L experience high and low health dynamics, but the same level of prevalence at any point in time. We also assume that costs of treating these groups are equal regardless of how long patients have had the condition for or how long patients would have the condition for without treatment, and marginal utility for surviving in a given health state is constant. While the number of patients at $t = 0$ is the same across the two groups, the average patient from H would have recovered sooner without treatment than the average patients from L. Thus, treating H has a lower net benefit and will be less cost-effective.

Alternatively, imagine a CEA of a prevention program implemented at $t = 0$, which reduces the incidence over the next n time periods to zero. H has a higher level of incidence per period; at the same time, each averted case would have lasted for a shorter duration. Equal prevalence at any point in time means that at the end of the n time periods, benefits for the two groups will be the same. Thus, results will depend on the cost side. If the prevention program is a complete public good so that the costs cannot be attributed to individual beneficiaries (e.g., air quality control to prevent respiratory conditions), then the overall CEA results are the same for L and H, and differences in health dynamics do not affect cost-effectiveness. Conversely, if the prevention program is entirely a private good (e.g., a drug to prevent hypertension), then the costs are a function of the number of people treated. Because H has an overall higher incidence over the target period, a larger number of people need to receive the intervention to eliminate incidence over this period. Therefore, in this case, H will be associated with a higher cost of achieving the same health benefit as L, and will be less cost-effective.

Our interest is in exploring whether or not there are equity concerns associated with variations in the level of health dynamics, and if so, what its relevance would be to CEA and to resource allocation more widely. Let's assume that the question whether there is any equity aspect to the concept of health dynamics that needs to be considered is a matter of social value judgement that should be left to the general public to settle. If the public is only interested in the level of total ill health and not how it is distributed, health dynamics should have no bearing on resource allocation beyond what is reflected in the efficiency aspect of CEA.

On the other hand, if the public is not only interested in the level of total ill health, but also in how it is distributed over time and across subgroups, then there is scope for health dynamics to influence resource allocation beyond what is already reflected in CEA. We assume a situation where people can be either healthy or ill, and there are no births or deaths. Lower health dynamics imply a lower probability of recovery to full health in the next time period. The public may feel that subgroup L with low health dynamics should receive greater compensation for their lower probability of leaving the ill state in the next time period. There is some qualitative evidence to support this presumption (for further details see Dolan et al. [7]): Depending on the context, at least some members of the public think that patient groups who have had the condition for longer durations should be given priority even if this meant that some efficiency was sacrificed. Furthermore, this may depend on the nature of the condition, on whether patients had learned to live with the condition, on the actual lengths involved, and on the magnitude of the efficiency sacrifice. The results also suggest that improving the health of L should receive higher weight relative to improving the health of H. Thus, there is evidence to suggest that the efficiency implication of health dynamics on CEA (where they do exist) and the equity implication of health dynamics on CEA (if they are to exist) both go in the same direction.

Health dynamics may also have political implications, which in turn may affect resource allocation decisions. Over several time periods a comparably larger proportion of people (and voters) in subgroup H are affected by a particular illness than people in L. A policy maker (possibly concerned about re-election) may want to allocate larger amounts of resources to subgroup H, even if cost-effectiveness ratios are the same as for L. On the other hand, an illness that is characterized by low health dynamics may be more conducive to the formation of patient organizations that require time and a stable member base to become politically influential. It has been shown that such organizations can have a considerable influence on resource allocation decisions [8]. This implies that L would manage to attract a larger amount of resources even if cost-effectiveness ratios are the same as for H. In summary, there may well be political implications of health dynamics that influence resource allocation decisions, possibly in opposing directions. They may make it difficult to implement the recommendations generated by CEA, especially if differences in health dynamics between subgroups are large.

CEA reflects health dynamics in terms of efficiency. Depending on the type of intervention, CEA either favors groups with lower health dynamics or gives equal priority to groups with different levels of dynamics. However, CEA does not take into account the equity dimension of health dynamics. The public may be concerned with health dynamics and give greater priority to those with lower health dynamics. If this is the case, health dynamics need to be incorporated into CEA to reflect the public's value judgments. On the other hand, the direction of influence of health dynamics in the political context is ambiguous. Further research is required to investigate the extent to which health dynamics are a concern for the public, the conditions for which health dynamics matter most, and to find ways of how the equity dimensions of health dynamics can be incorporated into CEA.

Acknowledgment

The authors thank the participants of the 7th European Conference on Health Economics in Rome, July 2008, where an earlier version of this work was presented, for their comments, particularly those from Richard Edlin, Giovanni Forchini, Bruce Hollingsworth, and Andrew Jones, and for comments on the chapter in KH's doctoral thesis on which this article is based, from Anthony Culyer, Peter C. Smith, and Nigel Rice.

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