

# The cost-effectiveness of prevention: is an ounce of prevention worth a pound of cure?

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## COST-EFFECTIVENESS

When focusing on the burden of diseases attributable to specific risk factors, the literature argues that a substantial part of the economic and clinical burden of such diseases can be averted by means of prevention [2]. It is then implicitly assumed that prevention is cost-effective. A recent study measured the global burden of disease and assessed the cost-effectiveness of preventive interventions [3]. The authors observed that the majority of preventive interventions are cost-effective, but that these preventive interventions do not always target the diseases with the highest burden. When comparing the proportion of economic evaluations focusing on a specific disease and the share of the global burden made up by that disease, the authors concluded that interventions that prevent infectious diseases and cancers are over-represented and that interventions that prevent mental and behavioral diseases and diseases of the respiratory system are under-represented.

Prevention is not by definition cost-effective. Another study carried out an aggregate analysis of 231 economic evaluations reporting data about 608 incremental cost-effectiveness ratios of pharmaceutical interventions published between 2000 and 2007 [4]. Of these economic evaluations, 7% related to preventive interventions and 93% to curative interventions. The authors found that prevention was more cost-effective than a curative approach: preventive interventions had a significantly lower median ratio of 6,255 € per quality-adjusted life year than curative interventions (12,917 € per quality-adjusted life year;  $p = 0.002$ ). Nevertheless, the cost-effectiveness of preventive interventions varied substantially and there were many cases where a particular curative intervention was more cost-effective than a specific preventive intervention.

This is confirmed by another study which demonstrated that the distribution of preventive interventions spanned the full range of cost-effectiveness results and that the majority of preventive interventions improved outcomes, but also increased costs [5]. Therefore, although prevention is more cost-effective than a curative approach at aggregate level, this may not necessarily be the case when comparing specific preventive and curative interventions.

## METHODOLOGY

When assessing the cost-effectiveness of prevention, current techniques of economic evaluation may not be fully adapted to compute the economic and health impact of preventive interventions [2,6,7]. Particular methodological limitations arise, for example, from:

- the definition of the preventive intervention and the comparator (i.e., the recipients of the intervention, the setting in which the intervention is delivered, the various activities that make up the intervention, etc.);
- the need to estimate long-term costs and outcomes;
- the use and validity of decision-analytic modeling approaches;
- the use of disease-specific rather than generic outcome measures;
- the inclusion of benefits beyond those measured by traditional clinical outcome measures such as quality-adjusted life years;
- the economic and health impact of the intervention on individuals other than the user of the intervention;
- the inclusion of unrelated health care costs in life years gained through prevention.

As a result, economic evaluations may underestimate or over-estimate the cost-effectiveness of preventive interventions [6].

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## DECISION MAKING

The question of the cost-effectiveness of prevention is complicated by the decision making process. On the one hand, decision makers sometimes argue that cost-effectiveness should not play a role in the choice to implement public health interventions such as screening for newborns [7]. On the other hand, decision makers sometimes promote prevention as a means to save health care costs, thereby holding prevention to a higher standard than other health care interventions [6]. For instance, the aggregate analysis of economic evaluations (cfr. *supra*) showed that 41% of preventive interventions saved money (and were more effective) than the comparator, but that 59% of preventive interventions increased costs (and improved outcomes) [4]. Finally, a similar analysis of the cost-effectiveness of preventive interventions identified some preventive interventions that increased costs and reduced outcomes as compared to the alternative [3].

Budget silo mentality in the decision making process also does not aid funding decisions about preventive interventions. In Belgium, for example, regions are responsible for the vaccination budget, whereas national authorities manage the health care budget. This means that the costs of implementing a vaccination policy are incurred by the regions, but the possible health care savings arising from the prevention of disease accrue to the national budget.

## SOCIETAL CONSIDERATIONS

Economic evaluation serves as an instrument to maximize population health subject to the constraint of limited resources. However, cost-effectiveness is only one of the criteria in the decision making process, and is probably not the most important criterion when focusing on preventive interventions. In addition to cost-effectiveness, decision making by policy makers may be guided by equity concerns or the need to achieve certain targets by means of for example public health interventions. This is exemplified by the observation that decision makers have sometimes funded preventive interventions with high cost-effectiveness ratios or refused funding for interventions with low cost-effectiveness ratios [7].

One approach to incorporate these societal considerations in the decision making process is by adapting the threshold value against which the incremental cost-effectiveness ratio of an intervention is assessed. This reflects the idea that the societal willingness to pay for health gain may depend on the type of intervention, the type of disease, the perception of risk, the policy area, etc. For instance, the current consultation paper for value-based pricing in England and Wales proposes to set the threshold value in relation to the innovative character, the disease burden and wider societal benefits (e.g. impact on careers) of a medicine [8]. Future research needs to elicit social values ascribed to preventive interventions with a view to determining the threshold value that applies to prevention.

## REFERENCES

1. Probst-Hensch N, Tanner M, Kessler C, et al. Prevention – a cost-effective way to fight the non-communicable disease epidemic: an academic perspective of the United Nations High-level NCD Meeting. *Swiss Med Wkly* 2011; 141: 13266
2. König HH, Riedel-Heller S. Economic aspects of prevention. *Internist (Berl)* 2008; 49: 146-53
3. van Gils PF, Tariq L, Verschuuren M, et al. Cost-effectiveness research on preventive interventions: a survey of the publications in 2008. *Eur J Public Health* 2011; 21: 260-4
4. Simoons S. Public health and prevention in Europe: is it cost-effective? *J Pharm Health Serv Res* 2011; 2: 151-5
5. Cohen JT, Neumann PJ, Weinstein MC. Does preventive care save money? Health economics and the presidential candidates. *N Engl J Med* 2008; 358: 661-3
6. Phillips KA, Hotlgrave DR. Using cost-effectiveness/cost-benefit analysis to allocate health resources: a level playing field for prevention? *Am J Prev Med* 1997; 13: 18-25
7. Grosse SD, Teutsch SM, Haddix AC. Lessons from cost-effectiveness research for United States public health policy. *Ann Rev Public Health* 2007; 28: 365-91
8. Department of Health. A new value-based approach to the pricing of branded medicines. London: Department of Health, 2010. Available at: [http://www.dh.gov.uk/prod\\_consum\\_dh/groups/dh\\_digitalassets/@dh/@en/documents/digitalasset/dh\\_122793.pdf](http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/documents/digitalasset/dh_122793.pdf) [last accessed February 2012]