

Economics and Obesity: Costing the Problem or Evaluating Solutions?

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Abstract

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There is no doubt that obesity is a major public health problem. However, what is the contribution of economics to solving it? In this report, we make the case that the role of economics is not in measuring the economic burden of obesity, through so-called cost-of-illness studies. Such studies merely confirm that obesity is a serious societal issue; adding a monetary figure to this does not add much. The economic foundations of such estimates can also be questioned, thus lessening their policy relevance. The real value of economics in the arena of obesity care is in evaluating, through formal economic evaluation, the use of our scarce health care resources in different strategies to prevent and treat obesity.

Key words: cost-of-illness, economic evaluation, priority setting

Introduction

Obesity is now well recognized as a public health crisis (1–5). Recent evidence suggests that more than half of the North American population is clinically overweight or obese (3,6–13), with rising rates in accompanying comorbidities (2,6,14–17). The total cost attributable to obesity and its negative health consequences has been estimated to represent 2% to 7% of national health expenditures worldwide (2).

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The magnitude of this modern epidemic has prompted a surge of research efforts attempting to capture obesity-associated economic costs (7,18–62). A great majority of these studies have, in some fashion, made use of, or made reference to, cost-of-illness (COI)¹ methodology. COI studies (i.e., a form of economic investigation) are commonly used in health care research (63,64). Their aim is to identify and measure all costs attributable to a disease, including direct health care costs and, often, indirect costs, such as losses in productivity. From such estimations, overall burden of disease is derived and presented in monetary terms. COI studies are designed to illustrate disease impact and to establish priorities for research and health service resource use of that illness relative to others (63,65,66).

Given the crucial stage of policy making with respect to obesity, in this report, we question whether the focus for the contribution of economics to priority setting in this area should move from costing the problem of obesity, as COI studies do, to conducting economic evaluations of potential solutions to this public health problem.

This report begins with a brief description of the COI approach, its claimed purpose, and a brief summary of academic initiatives making use of this approach in the arena of obesity. A concise overview of the economic principles behind priority setting and the practice of economic evaluation that stems from these principles provides the necessary background for detailed consideration of limitations of the COI method in the section that follows. Particular attention has been paid to how the COI approach falls short when applied to priority setting based on assessments of obesity-related policies.

Evaluating the Economic Burden of Obesity

The COI Approach

“Costing” of an illness is achieved through prevalence-based and incidence-based approaches (64,67). The more common, prevalence-based studies estimate the total cost of disease in a given year. Conversely, the more labor-inten-

¹ Nonstandard abbreviation: COI, cost-of-illness.

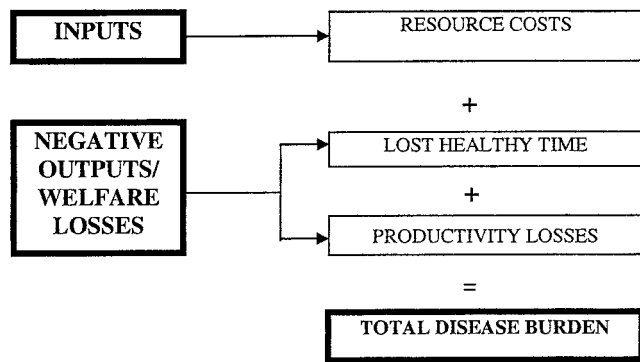


Figure 1: COI component inputs.

sive incidence-based studies, which estimate the lifetime costs of cases first diagnosed in a given year, provide a baseline against which new interventions can be assessed. In general, using either approach, COI studies focus primarily on estimating direct disease-specific, health care-related costs and, occasionally, will include secondary costs related to paid and unpaid lost productivity, or indirect costs (68). The latter form part of the welfare losses to society incurred by diseases. The remaining welfare losses are represented by the losses in healthy time resulting directly from pain and suffering caused by diseases, although these aspects are rarely, if ever, valued in monetary terms. This approach sums the resource costs and (negative) welfare impacts of disease, as depicted in Figure 1. Popularity of this technique

is evidenced by the growing number of original works published (7,20,21,25–27,42,44,45,69) that make use of the prevalence-based COI technique in evaluating the nationwide economic burden of obesity (see Table 1). Despite the difficulty in making cross-country comparisons, due to the variability of included comorbidities and BMI cutoff criteria across studies, recent world estimates do suggest that health care spending on obesity-related problems is highest in the U.S. and accounts for ~7% of its health care budget (21).

Proposed Uses of COI Studies

Proponents of the COI method (63,65,66) believe that its estimates should guide the deployment of resources to a particular illness and serve as an index of both the distribution of that illness within a population over time and the resultant health care needs that are not being met (70). They further argue that these measures will provide an indication of potential cost savings to society that can accrue from preventing the disease in question (with the implied assumptions that the disease can be completely eradicated by a particular intervention, that the intervention is without cost, and that there are no greater health returns to be gained by devoting the same quantity of resources, instead, to the treatment or prevention of several smaller diseases) (64,70). It is acknowledged that this method is of most use for informing resource-allocation decisions in the absence of other guiding information sources (63). Data resulting from COI studies (such as those cited above) have been widely used at federal and international levels, by such organiza-

Table 1. Prevalence-based nationwide COI estimates for obesity

Country	Reference	Cost type included	Number of included comorbidities	Data collection year	BMI cut-off criterion (kg/m ²)	Percentage of health care budget (%)
U.S.	Colditz (20)	Direct + Indirect	6	1986	≥29	5.5
U.S.	Wolf and Colditz (27)	Direct + Indirect	6	1990	≥29	6.8
Australia	Segal, Carter, and Zimmet (44)	Direct	6	1989	≥30	2.0
France	Levy et al. (45)	Direct	9	1992	>27	2.0
U.S.	Wolf and Colditz (25)	Direct + Indirect	4	1993	≥29	NS*
New Zealand	Swinburn et al. (42)	Direct	6	1991	≥30	2.5
U.S.	Wolf and Colditz (26)	Direct	8	1995	≥29	5.7
U.S.	Colditz (21)	Direct	7	1995	≥30	7.0
Canada	Birmingham et al. (7)	Direct	10	1997	≥27	2.4
Portugal	Pereira, Mateus, and Amaral (69)	Direct	10	1996	≥30	3.5

* NS, not specified.

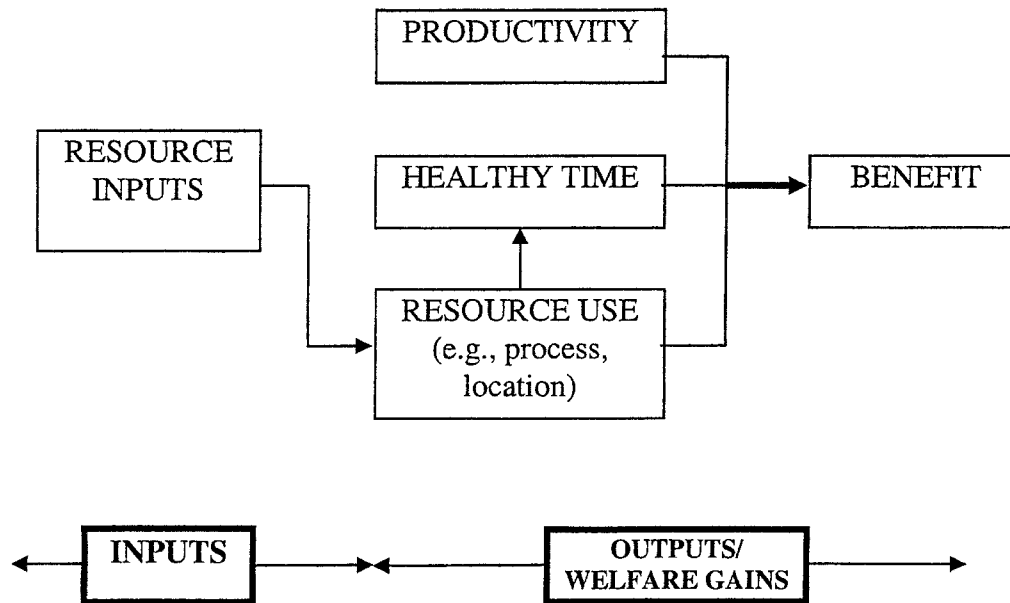


Figure 2: The input-output relationship of an economic evaluation.

tions as Health Canada and the World Health Organization, to capture disease-specific burdens (including that of obesity). Another common stated use of such data is for periodic evaluation of health care system performance (63,71,72), although the role of COI data in such evaluations is not clear.

The wide use of this method raises questions that need to be answered before conclusions can be drawn as to whether or not it is a useful basis for priority setting. Should COI data be emphasized as major metrics for such priority setting? What should policy-level decision makers make of all of these emerging cost data, and how should they use them to set priorities? For setting priorities, is the information gathered from such COI studies redundant and therefore, costly to gather, given that we already have a good indication of obesity's societal impact from epidemiological investigations?

Economic Principles of Priority Setting

Given real-world, practical constraints on resources, the allocation of resources to a particular activity necessitates the sacrifice of benefits that could have been obtained in the next-best alternative use of those resources; that is, there is an "opportunity cost" (70,73). The practical implication of this is that interventions (whether preventive or therapeutic) should be compared in terms of their costs and benefits. Only by doing this can one choose the combination of resources that maximizes societal benefits from the limited budgets available; this is the aim of prioritization.

As summarized in Figure 2, the resource inputs of an economic evaluation are the capital, labor, consumables,

and overhead costs used in providing interventions. Such inputs should also include the highest direct-cost category of personal expenditure on programs (in this case, weight loss programs), which may not be captured by the COI approach. These inputs produce benefit for patients and society through several routes, the first of which is related to the process and location of care (e.g., patients will have preferences over whether a therapy is provided through invasive or noninvasive means). Most importantly, therapies produce gains in health. These gains in health often add to productivity, whether in paid or unpaid labor.

With its roots more firmly grounded in economic principles, economic evaluation places its emphasis on the assessment of the relative impacts of competing "solutions" to disease through assessment of interventions, rather than costing the entire "problem". Thus, economic evaluations are specific in terms of establishing relationships between inputs and outputs (or costs and benefits), rather than simply mixing up these concepts and adding them up to one sum total, as is done by the COI method (Figure 1). An attempt to value productivity gains and to value relief of pain and suffering is still necessary with this form of evaluation, but, by relating costs to benefits, the entire framework for analysis is different from that of COI. Formal economic evaluation has gained momentum in the arena of health promotion, and its successful application to the evaluation of behavior change efforts has been observed in the areas of smoking cessation (74), diabetes treatment and prevention (75,76), and work-site wellness initiatives (77), to name a few.

In examining the impact of the worldwide obesity epidemic on society, the key considerations are determining the

value to be gained from interventions to prevent and treat obesity and evaluating the opportunity cost of weight-loss interventions, as represented by the benefits from alternative strategies that are competing for the same scarce health care dollars within fixed, finite budgets (28). To answer these policy-relevant questions, an appreciation for the efficacy, effectiveness, and cost of weight-loss interventions relative to competing treatment options must be gained and used to justify to providers, consumers, and purchasers of health care that a particular treatment is worth their investment.

Just as randomized trials are designed to assess differential impacts on effectiveness, the information included in economic evaluations should include differential impacts on costs and other benefits of the care evaluated. There is no guarantee that priorities based on costs and effectiveness of treatment options will bear any relationship to those implied by estimated costs of diseases. Reasons for this are explained in the following section.

Limitations to the COI Approach

Wrong Concept of "Cost"

A subtle, but vitally important, observation is that the opportunity costs referred to in the previous section do not arise from the illness itself, but, rather, from the allocation of resources to interventions aimed at managing and alleviating it (70). Thus, as alluded to above, priority setting is driven by a comparison of incremental costs and incremental benefits of interventions (i.e., the solution) aimed at controlling the illnesses and their consequences (71). On the other hand, COI studies remain focused on assessing the burden of the disease (i.e., the problem). COI methodology also claims to estimate relative need. However, not all needs are equally amenable to health service interventions, and identification of high needs alone does not sufficiently suggest that more resources should be allocated (70). More important than putting a dollar value on the burden alone is what can be done about the burden and what dollar values can be put on the costs and benefits associated with such treatment and prevention options. Without consideration of relative costs and benefits, or opportunity costs, COI studies are not believed, by their critics, to contribute to more efficient use of existing resources (64,70,71,78–80).

In addition to the concept of opportunity cost, another important contribution of economics to policy making is the identification of input-output relationships or, in other words, the relationship between costs and benefits. The crucial question then becomes the following: for the resources put into an intervention, what benefits does society gain? Using the COI approach, the information is not set out to capture responsiveness to change of outputs to different levels of resource inputs. For example, by focusing on the disease to capture "costs," and not on interventions to treat

the disease, loss in productivity is defined as a cost, using the COI method, and this cost is added to other direct costs, as well as to other sources of lost benefit. However, in Figure 2, changes in productivity brought about by an intervention are represented as a welfare gain to society and, hence, a benefit (68,70,78). It is only by separating out inputs and outputs and, thus, establishing the relationships between outputs gained for resources put in for different interventions that decision makers can allocate resources across these interventions in ways that maximize benefits to society from their limited budgets.

Flawed Assumptions

Certain methodological flaws of the COI approach have been recognized (64,70,71,78,79), including those associated with assumptions driving this method. Few chronic illnesses (for which the burden is generally greatest) can be completely eradicated, so that, even with accurate disease costing, the "cost savings" estimated by COI studies will likely be overestimated. For instance, a 10% weight loss might be achieved by some interventions to treat obesity; however, that weight loss will not instantly reverse all the adverse health consequences of excess adiposity.

Related to this point, another factor leading to reduced "cost savings" is the chronic and complex nature of this disease, precluding it from being entirely preventable or treatable by a single intervention. Certain fixed costs (e.g., cost of operating a clinic) will continue to be needed to treat those who acquire the disease, and the interventions aimed at reducing obesity are not without costs; therefore, again, the relative cost savings will be less than the average suggested by COI estimates.

Also, COI methodology has been criticized for being prone to the double-counting of total costs of diseases that are complicated by comorbidities. Clearly, many diseases are considerably intertwined, resulting in the inherent difficulty of attaching comparative meaning to findings using this form of analysis (70). However, it seems to be assumed that conditions such as heart disease, diabetes, and obesity are totally separable and, thus, that cost estimates associated with them can be compared as such. Double-counting is inevitably embedded in the total cost of each of these diseases, likely leading to an overestimate of the total cost for each (28).

On the other hand, if the costs of the other diseases (i.e., heart disease and diabetes) are independently assessed, the cost of obesity may well be undermined, even though it is undeniably a risk factor for these other illnesses. If this were true, then in terms of prevention, with prioritization based solely on global economic burden, obesity may not receive due attention relative to, for example, heart disease or diabetes. Yet of all of these illnesses, obesity is the only disease that is largely modifiable when compared with the

other two, and its treatment would likely help reduce the societal burden imposed by the others.

COI Interpretations of Labor Market Impacts

Further criticisms arise with respect to the choices of included and excluded data relating to labor markets. Firstly, COI techniques rely on earnings data to derive many of the component costs of a disease. This may inadvertently bias allocation of resources toward diseases affecting those who earn incomes, and thereby exclude those who do not (e.g., in extreme age groups). Secondly, an overestimation of the magnitude of indirect costs attributable to a disease may result from such calculations. By this method, short- and long-term absences from work are considered to contribute significantly to productivity losses to society and are counted as indirect costs (81). With respect to obesity, indirect costs constitute nearly half (48%) of the estimated total cost burden imposed by this condition (26,82). These may be greatly overestimated because no correction is made to account for the replacement of long-term absentees (i.e., premature retirees) or for those who intentionally work harder to counter short-term absences. Also, from the societal perspective, one might speculate that one person's loss in productivity could be viewed as another person's productivity gain, having minimal bearing on overall social costs.

Indirect costs, such as those that might be found outside the paid employment sector, have not been emphasized by COI evaluations, and yet these costs may be pivotal in achieving a more accurate depiction of costs of illness. For instance, the future quality of the labor force may be greatly affected by obesity as greater numbers of obese children, who have been noted to be less likely to reach their full academic potential, begin to enter the labor market (31). This potential reduction in labor quality, in turn, may be more disruptive in the future than a reduction in the quantity of productive labor associated with obesity because it will likely be less easily compensated for.

Conclusion: Tipping the Scales in Favor of a Solution-Based Approach

Essentially, for priorities to be set, the key question is not "which health problem results in a greater burden?" but, rather, "what intervention aimed to treat this health problem is the best buy?" (71). COI data may assist in mobilizing interest and resources to a particular problem (28), may be useful when attempting to extend beyond trial data to determine the magnitude of future health care cost savings of an intervention, as a source of "reference costs" (70), and, perhaps, to monitor the identification of new threats to health by relating population health to risk factors (79). However, COI evaluations are not likely to be useful for setting priorities for investments in research or treatment and prevention of disease. As obesity and its complications

continue to gain prominence as threats to health at a societal level, discussions regarding the choice of effective therapeutic and prevention modalities and the resources allocated to refine and implement these strategies become increasingly relevant and urgent. In a background of scarcity and fiscal constraint, rational use of resources to promote maximal benefits is widely emphasized. Such rationality will depend on sophisticated economic evaluations that account for costs of prevention and therapy, as well the relative value of interventions. Reviews of economic evaluations have recently emerged for pharmacological and surgical obesity therapies (83–85), but such economic investigations remain scarce for the majority of therapeutic options.

The time is right to meet the challenge of formulating rational approaches to obesity through formal economic evaluation. Although COI evaluations have been useful in some respects to conceptualize the magnitude of the obesity epidemic, the combination of data from well-designed randomized controlled trials and data emerging from techniques to model longer-term impacts on costs and benefits will likely provide the essential elements for conducting necessary evaluations for successful guidance of policy in obesity care.

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