DISSENT

Cost of illness studies: what is good about them?

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The article by Currie *et al* is highly critical of cost of injury studies, stating that " . . . such studies are not helpful in the context of setting priorities for resource allocation and research activities".[1] The authors postulate that cost of injury studies add little to what is already known, such as deaths from motor vehicle crashes, hospital admissions, and emergency department visits. These routinely collected data, they say, provide direct and meaningful information about the size of the problem, if that is what is needed by decision makers for setting priorities for resource allocation and research activities. So, why spend additional resources and research time to describe the burden of motor vehicle crash injuries when the problem is adequately quantified? They conclude that research funds would be better spent by estimation of the effectiveness, costs, and benefits associated with different injury prevention strategies.

Cost of illness studies abound in the US. Are they all useless, as suggested by the authors? What do they measure? How are they used?

What do cost of illness studies measure?

When choices are made about the allocation of resources, who is affected? On whose behalf are decisions made? The answers to these questions define the perspective of cost studies. For example, costs or losses to industry or business due to a disease focus on the impact of absenteeism and lost productivity[2 3]; costs to public programs are accountable for their beneficiaries[4]; and costs to society take a comprehensive approach to estimating direct and indirect health and other related costs associated with an illness, disease, or injury.[5 6]

Cost of illness studies are typically divided into two major categories: (1) core costs are those resulting directly from the illness and (2) other related costs include non-health costs of the illness. Within each category, there are direct and indirect costs. Direct costs are those for which payments are made, and indirect costs are those for which resources are lost. Indirect costs consist of (1) morbidity costs, the value of lost productivity by persons unable to perform their usual activities or to perform them at a level of full effectiveness due to the illness and (2) mortality costs, the value of lost productivity due to premature death resulting from the illness, calculated as the present discounted value of future market earnings plus an imputed value for housekeeping services.

An example of a comprehensive approach is our study, *Cost of Injury in the United States: A Report to Congress, 1989*.[6] This study reported aggregate and per capita lifetime costs of injuries incurred in 1985 by type of cost (direct medical and non-medical, morbidity, mortality), by six age groups, and by cause of injury (motor vehicles, falls, firearms, poisonings, fires and burns, drownings, and other). Direct medical costs were disaggregated by source of payment and type of expenditures (hospital services, physician visits, prescriptions, physical therapy, nursing home care, ambulance and helicopter, attendant care, and other expenses). Direct non-medical costs included expenditures for home modifications, vocational rehabilitation, auto and health insurance. Disaggregating the costs in such detail provides considerable information that is used for a variety of purposes described below.

Is the human capital approach an overestimate of costs?

The authors state that the human capital approach may overestimate indirect costs because lost production due to premature loss of life can be replaced by existing unemployed persons. What is the human capital approach? This is an approach to valuing life in which productivity is based on market earnings and an imputed value for housekeeping services. In the human capital approach, a person is seen as producing a stream of output that is valued at market earnings and the value of life is the discounted future earnings stream. Morbidity and mortality destroy labor, a valuable economic resource, by causing persons to lose time and effectiveness from work and other productive activities, forcing them out of the labor force completely, or bringing about premature death. This method has been criticized because it tends to underestimate (not overestimate) costs because it values life using market earnings, thereby yielding very low values for children and the retired elderly. It also undervalues life if labor market imperfections exist and wages do not reflect true abilities. In addition, psychosocial costs, such as pain and suffering, are components of the burden of illness omitted from the human capital computation of indirect costs.[7] The argument that it overestimates costs because the person who

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died can be replaced is specious and contrary to public health principles, which value human health and life as society's goals.

How are cost of illness studies used?

Cost of illness studies translate the adverse effects of diseases or injuries into dollar terms, the universal language of decision makers and the policy arena. These estimates are used to: (1) define the magnitude of the disease or injury in dollar terms; (2) justify intervention programs; (3) assist in the allocation of research dollars on specific diseases; (4) provide a basis for policy and planning relative to prevention and control initiatives; and (5) provide an economic framework for program evaluation.

The cost of injury study cited above has been used widely. The study as been cited in the Centers for Disease Control and Prevention request for proposals for injury centers and in many journal articles relating to various aspects of injury prevention and control, for example cost effectiveness of airbags,[8] fall injuries[9] injuries to children,[10] injuries to women,[11] injury cost scale,[12] reducing the burden of injury,[13] and many others.

Over the years, the costs of various diseases have been cited in Congressional testimony, official reports, publications, or speeches as partial justification for the expansion of research in specific diseases. In recent years, Congress has expressed considerable interest in estimates of cost of diseases as one measure of allocating research dollars among the National Institutes of Health (NIH). For example, in 1995, in response to a request by the Senate Committee on Appropriations, NIH prepared a report showing estimates of the societal cost impact of the diseases on which NIH institutes, centers, and divisions conduct and support research. The first report was submitted to Congress in 1995, and subsequent reports were issued in 1997 and in February 2000.[14] The latest report contains cost estimates for 60 diseases. The report states, "COI [cost of illness] estimates do not provide a simple formula for the allocation of research resources. They cannot substitute for the well-informed judgment required to synthesize information about the broader dimensions of disease burden with knowledge of scientific opportunities in developing strategies and budgets for research and development programs. However, COI estimates can provide order of magnitude indicators of the economic burden of particular diseases. While they should be interpreted with caution, COI estimates can help decision-makers in Congress and in the Administration anticipate and respond to public interests" (page 4).

Another example of uses of cost of illness estimates is the recent report of the Institute of Medicine which recommended that in setting priorities, NIH should strengthen its analysis and use of health data, such as burdens and costs of diseases.[15] It is clear that NIH, the Institute of Medicine, and the Congress of the United States recognize the importance of cost of illness estimates in setting research priorities.

How reliable are the results?

Currie *et al* question the usefulness of cost of illness studies and implicitly question the reliability of the cost estimates. The reliability of the study results depend on a variety of factors: the scope and recency of the study, the methodology used, and the sources of the data. While relatively good information on the use of services for estimating direct costs is available from national surveys, charge and cost data are less readily available and probably less reliable. Indirect costs depend on the discount rate used; the higher the discount rate, the lower the final costs. If the results of different cost of illness studies are compared, special attention should be given to the methodologies used, the discount rate, the reference years, and the scope and recency of the data. Cost of illness studies are used by policy makers to justify budgets, to prioritize funding in biomedical research, and to develop intervention programs to ameliorate or prevent a disease. As researchers on cost of illness studies, we have an obligation to present the methodology in considerable detail so that the users will be better able to assess their accuracy and evaluate whether the results are facts or fiction.

Conclusions

This dissenting opinion has focused on the usefulness of cost of illness studies, the issue raised by Currie *et al* in this issue. I do not question the importance and usefulness of cost effectiveness and cost benefit studies of intervention strategies in the injury or any other disease prevention area. These studies have made significant contributions to documenting and quantifying the values of health outcomes and are most frequently used in prevention effectiveness. Cost effectiveness and cost benefit analyses provide a structure to guide analysts as they evaluate public health programs and inform decision making. Today, the possibilities for improving health are greater than ever. With public spending of all kinds under intense scrutiny, it is more important than ever to ensure that the funds available are serving the nation's highest priority health needs efficiently. Because of the increasing complexities of public health problems and activities, we need to bring to bear a wide array of quantitative approaches and solutions to these problems. Cost of illness studies provide an important guide and resource for policy development, priority setting, and management of public health.

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From the Journals

If we are to take seriously the inclusion of violence prevention, there can be no more formidable challenge than the prevention of wars and conflicts. An editorial in the *Lancet* argues that at the very least civilian safety is a legitimate public health concern and that the absence of rehabilitative medical services is a clinical issue. It argues that health professionals are obliged to serve as advocates to prevent wars and to ensure that those affected are properly treated. One example is the WHO Regional Office for Europe's Peace Through Health programme that "aims to use medicine as a direct means to reconciliation..... For WHO, to view contributions to peace-building as extraneous to our technical role is at best myopic, at worst negligent" (*Lancet* 2000;**355**:587).

Considering the enormous importance of hip fractures among the elderly, a report in the *Lancet* from a team in Southampton is disquieting. Based on a case-control study of men and women 50 and older the report concludes that there is an increased risk of hip fracture among those who ingest fluoride in drinking water at concentrations below 1 ppm (*Lancet* 2000;**355**:265).

As we move increasingly to include violence related topics in the journal, suicide prevention is pertinent. A team of investigators found that divorce has a strong net effect on mortality from suicide, but only among men. The results derive from the National Longitudinal Mortality Study in the US—a large ongoing survey involving a complex sample of over 50 000 households (*J Epidemiol Community Health* 2000;**54**:254–61).

In addition to level of skill, the use of plastic boots and releasable bindings all had protective effects against injury in a large survey of telemark skiers in Western US and Canada (*Am J Sports Med* 2000;**28**:83–90).

Among the 10 great public health achievements in the US since 1900, motor vehicle and workplace safety are listed second and third (*MMWR* 1999;**48**:1141–7).

Matser and colleagues call attention to neuropsycholgical impairment among amateur soccer players. Some have attributed this to heading the ball; others suggest it is due to player impacts, high kicks, or falls. Two studies show an apparently low incidence of concussions in soccer players from contact with objects other than the ball and conclude that the more likely culprit is repeated head-ball contact. They add, "Those of us who love and play soccer are reluctant to face the possibilities that heading is dangerous and should be limited or even banned . . ..". The letter concludes, "Better understanding of the physics of heading can help to guide prudent changes in rules and training routines to improve brain safety in soccer". Another letter suggests that alcohol may be a factor—noting that soccer players have a median consumption that is approximately three times the average for US college students (*JAMA* 1999;**282**:971–3).