

# The economic impact of musculoskeletal disorders

Björn LINDGREN

Department of Community Medicine and Department of Economics, Lund University, Sweden

Economics is the science of choice. Resources are scarce in comparison with people's wants and desires. This is the fundamental fact on which all economic analysis and research is based. Furthermore, there are many alternative ways of satisfying people's wants and desires. Therefore, choices have to be made. When making these decisions, people have to give up something else—the road not taken. Thus, there is always an opportunity cost involved in decision-making. For benefits to be greater than the opportunity cost it is essential that the decisions taken are wise and well-informed.

## *The opportunity cost of illness*

The opportunity cost is the economist's favourite cost concept. There is an opportunity cost to society due to the existence of diseases and injuries, the *opportunity cost of illness* (Rice 1966, Lindgren 1981). Conceptually, this opportunity cost can be considered as consisting of two separate parts, which are slightly different in character—direct costs and indirect costs.

*Direct costs* are all the costs of prevention, detection, treatment, rehabilitation, and long-term care due to the presence of diseases. Direct costs reflect the value of the resources shifted from other sectors of the economy (education, communication and transport, defense, housing, food, entertainment, etc) into the health care sector due to the presence of illness. Thus, they represent the sacrifice of other goods and services required in order to obtain health care.

In addition, if there were no diseases or injuries, more could be produced of every good or service. The *indirect costs* of ill-health reflect the value of those goods and services that could have been produced, if people had not fallen ill. Thus, indirect costs represent the loss of potential productivity, an opportunity forgone for ever.

The sum of direct and indirect costs represents the opportunity cost of illness, *i.e.*, the value of all resources which might have been realised in other uses than health care, had illness not existed.

The opportunity cost of illness may change over time, *inter alia*, because of improvements in medical technology, prevalence of disease, and changes in overall productivity.

It should be observed that there may, of course, be welfare losses, besides the loss of desirable goods and services. That is the psychological effects of pain, suffering, insecurity, and grief associated with illness. Such negative effects which go beyond the loss of goods and services are sometimes called *intangible costs*. Since there is not yet any generally accepted measure, nor any realistic possibilities of estimating the size of the total intangible costs, so far there has been no attempt to actually do it. They may, nevertheless, be substantial.

## *Cost of illness in Sweden 1980 and 1991*

In this paper, some results of a recent study on the opportunity cost of illness in Sweden 1980 and 1991 are presented (Jacobson and Lindgren, 1996). Secondary data were used, data which are fairly easily available in official Swedish documents or registers. The collection of primary data tailored to the measurement of the opportunity costs of illness would have been too resource-consuming, without necessarily producing more precise estimates. Data was provided by a large number of sources, among them the Swedish National Social Insurance Board, the Swedish National Bureau of Statistics, the National Corporation of Swedish Pharmacies, and the Swedish Federation of County Councils.

For mortality, permanent disability, and in-patient care, annual diagnosis-related data is available for the total population. For prescribed drugs and out-patient care, data is routinely collected twice a year from a sample of one sixteenth of all physicians - members of the sample change over time.

For temporary morbidity, *i.e.* short-term absence from work, however, there is no routinely collected diagnosis-specific data at all. Our estimates are based on two special studies made by the Swedish National

**Table 1. Cost of illness in Sweden by type of cost 1980 and 1991. Lost future earnings discounted at 5%. Billion SEK, 1991 prices.**

Type of cost	1980	1991
Pharmaceuticals	6.7	10.8
Outpatient care	20.7	28.1
Inpatient care	60.0	65.6
Morbidity	60.1	72.8
Disability	47.9	63.2
Mortality	29.6	29.3
Total	225.0	269.8

Source: Jacobson and Lindgren (1996)

**Table 2. Cost of illness in Sweden by disease category 1980 and 1991. Lost future earnings discounted at 5%. Billion SEK, 1991 prices.**

Disease category	1980	1991
Infective and parasitic diseases	4.0	5.2
Neoplasms	15.5	16.0
Endocrine and metabolic diseases	5.3	6.4
Diseases of the blood	0.7	0.8
Mental disorders	38.7	41.0
Diseases of the nervous system	10.0	13.1
Diseases of the circulatory system	32.6	32.5
Diseases of the respiratory system	20.1	22.1
Diseases of the digestive system	9.7	9.5
Diseases of the genito urinary system	5.6	5.6
Complications of pregnancy and childbirth	2.8	3.9
Diseases of the skin and subcutaneous tissue	3.3	3.8
Diseases of the musculoskeletal system and connective tissue	36.8	60.9
Congenital anomalies	1.5	2.5
Certain causes of perinatal morbidity and mortality	0.6	1.1
Symptoms and ill-defined conditions	10.8	11.1
Accidents, poisonings, and violence	21.3	21.7
All other and unallocated	5.7	12.6
Total	225.0	269.8

Source: Jacobson and Lindgren (1996).

**Table 3. Diseases of the musculo-skeletal system and all diseases in Sweden 1991 by type of cost. Percentages.**

Type of cost	Musculo-skeletal system	All diseases
Pharmaceuticals	1	4
Outpatient care	4	10
Inpatient care	4	25
Morbidity	43	27
Disability	48	23
Mortality	0	11
Total	100	100

Source: Jacobson and Lindgren (1996)

Social Insurance Board. These studies report on diagnosis-related absence from work due to illness in 1983 and 1990. It should be observed that these two studies used extremely small samples—roughly 2% of all reported spells of absence in the first study and even less in the second (0.5). So, diagnosis-specific estimates on the opportunity cost of illness due to temporary morbidity is by far the weakest point in all studies of this kind.

On the other hand, data on costs per bed-day, physician visits, and for pharmaceuticals, as well as data on personal earnings seem to be quite reliable.

Estimates of productivity losses were all based on earnings data, distributed by age and sex.

Since permanent disability and mortality mean productivity losses in future years, the expected loss of future earnings were discounted—in this case by a factor of 5 percent, which is a rather generally accepted discount rate to be used in cost-of-illness studies.

#### *The economic impact of musculo-skeletal disorders*

The estimates clearly show a significant and increasing economic impact of musculo-skeletal disorders, both in absolute terms and in relative terms.

Table 1 provides an overview of the development of the opportunity cost of illness by type of cost from 1980 to 1991 in 1991 prices, *i.e.*, in fixed prices. For all diseases taken together, the total cost of illness increased by 20%. Pharmaceuticals, though, increased by 61%, outpatient care slightly less by 36%, and inpatient care by 9%. Among the indirect costs, temporary morbidity costs increased by 21%, and permanent disability costs by 32%. Mortality costs *decreased* by 1%.

According to Table 2, musculo-skeletal disorders was the most expensive disease category in 1991, accounting for 23% of the total cost of illness. The costs of musculo-skeletal disorders in Sweden increased by 65% between 1980 and 1991, *i.e.*, substantially more than any other disease category. In 1980, musculo-skeletal disorders ranked second after mental disorders, accounting then for 16% of the total cost of illness.

Table 3 shows that musculo-skeletal disorders are quite different to the average disease category regarding the distribution of the cost of illness by type of cost. Indirect costs, *i.e.*, those costs that are normally not seen by health-care providers or by health-care financiers, dominate. *N.B.* the costs of premature mortality are (almost) zero.

## Discussion and conclusion

Cost-of-illness studies typically present ex post information on the economic impact of diseases for some years in the past. The estimated figures can be seen as the result of a number of interdependent factors. The result is dependent on the prevalence of disease, the medical technology used, the incentives (and disincentives) to patients and doctors created by the way health care and insurance against health care costs and income losses are organised, and several other factors. Thus, the estimate of the opportunity cost of illness is dependent on time and place. Differences in the regulation of health care or health insurance may, *inter alia*, explain differences in estimated costs among countries, and the opportunity cost of illness may change over time in a specific country, because of, *inter alia*, improvements in medical technology, changes in the prevalence of disease, and changes in overall productivity. Some studies do exist from other countries and from other periods of time. Unfortunately, differences in methodology and type of data used make interpretations of differences in estimates almost impossible and, hence, comparisons rather meaningless.

The fact that the indirect costs dominate as they do among the musculo-skeletal disorders might be interpreted as if there were gaps in therapy (Lindgren, 1989). Certainly, political decision-makers, health-care insurers and the general public may be worried about the costs of treatment in general and about the size of the health-care sector as compared to the economy as a whole. But there is also a cost associated with the non-treatment of a disorder, *viz.* due to the absence of adequate therapy—or due to the inadequate use of available medical technology. A new therapy may well increase some part of the health-care bill but at the same time potentially decrease the costs of institutionalised care; reduce the number of sick-days and disability pensions; and increase life expectancy and quality.

The adequate use of existing medical technology is a major challenge for health-care providers and insurers. The development of new medical technology for musculo-skeletal disorders is a major challenge for medical research at universities and at research institutes and for R&D within the pharmaceutical companies. The use of existing technologies and the innovation and diffusion of new technologies should be carefully evaluated. The benefits—in terms of increased welfare and health—arising from using scarce resources with the existing or new technology must be shown to be larger than the opportunity costs of its best alternative use. Since the main part of the economic impact of musculo-skeletal disorders falls outside the health-care sector, the economic evaluation method to be used should be the cost-benefit analysis (CBA). CBA involves the monetary measurement of both all relevant costs and all relevant final outcomes, including health improvements (Drummond et al. 1997). This technique has the advantage in comparison with less complex but more limited techniques, such as the cost-effectiveness analysis and the cost-utility analysis, that it could be used in order to compare therapies for musculo-skeletal disorders with any other resource use either within or outside the health-care sector.

## References

- Drummond M F, O'Brien B, Stoddard G S, Torrance G W. Methods for economic evaluation of health. Care programmes. 2nd ed. Oxford University Press, Oxford 1997.
- Jacobson L, Lindgren B. Vad kostar sjukdomarna? (What are the costs of illness?) Stockholm: Socialstyrelsen (National Board of Health and Welfare), 1996.
- Lindgren B. Costs of illness in Sweden 1964–1975. Diss. Liber, Lund 1981.
- Lindgren B. The cost of 'non-treatment'. In: Measuring the Benefits of Medicines; The Future Agenda (Ed. Teeling Smith G). London: Office of Health Economics, 1989.
- Rice D P. Estimating the cost of illness. Health Economics Series no. 6. Public Health Services, Washington D C, USA. Government Printing Office 1966.