International Journal of Technology Assessment in Health Care, **16:4** (2000), 1193–1200.

SOCIOECONOMIC COSTS OF RHEUMATIC DISEASES

Implications for Technology Assessment

Dick Jonsson
Magnus Husberg
Linköping University

Abstract

Objectives: To study the socioeconomic impact of rheumatic illness in Sweden and to discuss the consequences for technology assessment studies.
Methods: A cost-of-illness study based on data from official statistics and treatment studies.
Results: The total socioeconomic cost was 52 billion Swedish kronor (SEK) in 1994. The imbalance between direct (10% of total) and indirect costs (90effectiveness of the healthcare sector, the need for new treatment methods, appropriate information systems, and technology assessment studies as well as the institutional arrangements for rehabilitation and basic medical research.
Conclusions: A discussion of solutions for financial cooperation between county councils and regional social insurance offices should be considered. The new biotechnological pharmaceuticals will increase the cost for drugs in health care about 20 times, but the total socioeconomic cost for society may remain at the same level due to a decrease of inpatient costs and indirect costs for loss of production as well as a decrease of transfer payments from social insurance. It is unavoidable that the new pharmaceuticals require priority discussions and active resource allocation in health care and in other sectors of society.

Keywords: Rheumatic diseases, Socioeconomic, Cost of illness, Quality of life, Rehabilitation

Rheumatic disease in society is an issue of major importance. When resources in the health-care sector diminish, decision makers are brought face-to-face with difficult decisions of prioritizing treatment among patients. To make these decisions, one must have an information base that illustrates the costs and effectiveness of healthcare interventions. Musculoskeletal diseases are common contributors to the number of early retirement pensions and days of sick leave (16;17). Approximately 30% of all sick leave days are caused by pain in the back, neck, or shoulders. In 1987, an estimated 30 million sick leave days were attributed to back disorders. The direct costs for health care in 1990 were estimated at 1,400 million Swedish kronor (SEK), and the indirect costs at 22.5 million SEK (34). A questionnaire study from two primary healthcare areas in Sweden found that 45% of the subjects aged 25 through 74 years stated they had been troubled by musculoskeletal pain that had persisted more than 6 months (2). Population studies have estimated that 1 million people in Sweden, 16% of the population, between the ages of 16 and 84 years have musculoskeletal diseases, with 44% more women than men having these diseases (31). As regards more specific diagnoses, the prevalence rates are 0.7% to 1.6% for rheumatoid arthritis, about 0.06% for juvenile arthritis, 1% to 1.9% for soft tissue rheumatism, and 8.5% for arthrosis (36).

In Western countries, back and neck pain are leading causes of sick leave compensation and early retirement expenditures (22;38). The costs for back pain have increased over time (33). It was found that the costs for back pain amounted to approximately 1.7% of the gross national product, and 7% of the expenditure was spent on health care. Half of this cost was attributed to hospital visits, and 6% to visits in primary (37). Indirect costs accounted for 93% of the total cost. The mean total cost per case for absenteeism and disability was US $9,493. There are indications that back pain management programs (18) and certain occupational-oriented rehabilitation programs (20) could be effective. A review of 23 studies based on different economic methods showed that injury prevention programs and post-incidence management programs for patients with low back pain appear to save costs as a result of reduced absenteeism (11;12).

The economic impact of rheumatologic disorders on society has been recognized, as well as treatment effects, costs for different treatment methods, and health economic evaluations (9;28). Research has shown that there is not a trend toward increasing incidence with declining social class (4). The economic impact of arthritis in the United States was estimated to exceed $60 billion in 1988 (26), and a high cost for osteoarthritis has been noted (10). The indirect costs for rheumatoid arthritis have been shown to exceed the direct costs, and further knowledge is needed about allocating resources to effective treatment methods (7). Another study showed that treatment of rheumatoid arthritis correlated to increased costs for disability pensions but decreased costs for sick leave (19). In 1990, the average annual cost per patient for rheumatoid arthritis in Sweden was estimated at SEK 60,000, and the cost increased with declining locomotive scores (13). The mean annualized direct costs for juvenile rheumatoid arthritis was estimated at US $8,000, while the average cost for families was estimated at $1,500, corresponding to 5% of mean family income (1).

The total annual cost for a hip fracture in the United States has been calculated at $37,000 (6). In Sweden, the direct cost per patient for a hip fracture during 12 months has been estimated at US $40,000. The potential cost saving per patient from preventing hip fractures was about $22,000. Total costs for hip fractures among women can be explained by age, mortality during the year after fracture, type of fracture, costs before fracture, and hospital admission (39). The direct cost for primary care was 1% of the total direct cost for a hip fracture (5). By emphasizing continuity in the postoperative phase, the total cost for treatment and rehabilitation of a hip fracture can be decreased by 12% (32). There are studies that indicate that the use of wrist orthoses and different special kitchen utensils led to decreased pain and improved function inpatients with rheumatoid arthritis. One study established that the effects are good compared to the costs (25). Another study indicates that training programs increase the use of, and benefit from, certain assistive devices (8). In some trials, health care has been allocated resources to help reduce the costs to the social insurance system. A study of rehabilitation teams in ambulatory care (14) showed that healthcare costs decreased and the total cost to society increased. Overviews that illustrate the international research in the field of rehabilitation (15;21) show that more health economic studies are needed to draw any general conclusions as to whether the costs correspond to the effects achieved.

OBJECTIVE AND METHODS

The aim of this study is to examine the socioeconomic consequences of rheumatic diseases from a societal perspective. A rather broad definition of rheumatic conditions is used. The diagnoses in the statistics concerning health care and social insurance are available via the ICD system, the so-called 99 codes. The groups are rheumatoid arthritis (code 79), osteoarthrosis (code 80), back diagnoses (code 81), and other diseases of the musculoskeletal system (code 82).

Doing a cost-of-illness study enables one to compare the direct and indirect economic costs and study how these costs are divided among different types of healthcare providers. Then it is possible to identify potential deficiencies, which can be subject to discussion. The socioeconomic costs are generally calculated by the prevalence approach, but the value of production loss due to people taking early retirement has been calculated from an incidence approach due to the lack of prevalence data. Direct costs refer to those costs, which arise in society when patients with rheumatic diseases are given health care. These costs consist of healthcare consumption divided among primary care, outpatient care, inpatient care, institutional care, and medications. The indirect costs are the costs that arise because patients cannot work; a so-called production loss arises. The costs have been taken from public statistics, internal reports, data output, and other statistics available in the field. The consumption of inpatient care has been taken from the National Board of Health and Welfare's register of institutional care for 1981, 1986, and 1991. Primary care consumption and the use of medications have been estimated with the help of information from the Diagnosis-Prescription Survey. This is a biannual survey including 6% of all prescribing physicians in Sweden where individual data are extrapolated to the national level (3). Over-the-counter (OTC) medications, which do not require a prescription, are not covered by the survey. Primary healthcare consumption data have also been taken from the Tierp Survey, a survey that has been gathering population data since 1975 (29). As regards sick leave, diagnosis-related statistics are published only about every tenth year. The estimates in this study have been done by recalculating the figures for 1990 by adjusting for inflation and changes in consumption of care (24). Calculations of production loss resulting from early retirement pensions are based on recently granted pensions and complemented with information concerning the stock of people with early retirement pensions (23). All costs were calculated for the normal retirement age of 65 years. Short-term sick leave without physician certification is associated with some uncertainty for diagnoses such as back problems.

Healthcare Utilization

Musculoskeletal diseases accounted for 4.8% of all care episodes and 3.4% of all inpatient days in short-term care. Although the number of care episodes increased during the period, they became shorter. This led to a decrease in the total number of days of care for the groups as a whole. The trend toward more but shorter episodes of care was not unique for these diagnoses. The same trend was observed in large parts of the healthcare sector during this period (30).

Physician visits increased in both primary care centers (ambulatory care) and private practices, while visits to hospitals decreased. Looking at trends for the healthcare sector overall, the number of visits to doctors in private practice increased by nearly 50% between 1985 and 1993. During the same period, primary care visits increased by 10%, and visits to doctors in hospitals increased by less than 2%.

Costs

When reviewing both primary and institutional care, a shift has taken place toward less expensive forms of care for patients with musculoskeletal diseases. Institutional care admissions have increased, but the length of stay is shorter. Visits to doctors have shifted toward the less expensive forms of primary health care and private care. Given the distribution of institutional care days between nursing homes and clinics, the average cost per care day in long-term care was SEK 1,567. In 1994, it cost about SEK 680 to visit a doctor in primary care. The same year, an outpatient visit to a doctor in a hospital cost about SEK 1,300 (depending on the type of clinic), while a visit to a private practitioner cost about SEK 390 (35).

The cost for ambulatory health care was estimated to be SEK 2,000 million in 1994. Visits to hospitals accounted for the major part of the total costs. A visit to a hospital is

more expensive since it includes tests, minor procedures, and input from a greater number of people. Institutional care for the diseases cost about SEK 2,500 million. Short-term institutional care cost about SEK 1,900 million, and long-term care about SEK 700 million. The diagnostic groups responsible for the major share of the costs for institutional care were rheumatoid arthritis and osteoarthrosis. These diagnostic groups also accounted for a high proportion of the costs for institutional care in the form of long-term care.

Costs for medications containing gold decreased between 1987 and 1994. During the same period, costs increased for different methotrexate medications and these started to be used even for diagnoses other than rheumatoid arthritis. The costs for nonsteroidal anti-inflammatory drugs (NSAIDs) decreased during the same period. Apart from the direct costs for a medication, the use of a medication can generate extra costs for monitoring and treating side effects (27). The total cost for medications was SEK 400 million. The direct cost for medication was a relatively small part of the total healthcare cost (8%). The groups of medications that accounted for the greatest share of the total medication costs were anti-inflammatory and anti-rheumatic medications, and above all, NSAIDs, gastric medicines, laxatives, pain relievers, and muscle relaxants.

The cost of sick leave in 1994 was about SEK 16,600 million. The group of back disorders and other diseases in musculoskeletal organs were responsible for the major part of these costs. Sick leave due to rheumatoid arthritis and osteoarthrosis was a relatively minor part of the costs. Problems in the musculoskeletal system were the reason behind about 43% of the early retirement pensions. Such problems accounted for 48% of the newly granted early retirement pensions. More women than men received early retirement pensions. This was the case for all the diagnostic groups studied. Only the osteoarthrosis group demonstrated a fairly even gender distribution. The group "other diseases in musculoskeletal organs" demonstrated the greatest gender difference. This group included different types of soft tissue rheumatism, which is much more common among women. The diagnostic groups of "back" disorders and "other diseases in musculoskeletal organs" accounted for the greatest part of the increase in recently granted early retirement pensions, and the greatest share of the increase was attributed to those over 50 years of age. Early retirement pensions due to osteoarthrosis also increased. For rheumatoid arthritis there was even a marginal decrease in the younger age groups. In total these cost SEK 31,000 million in the form of production losses. "Back" diagnoses were mainly responsible for early retirement pensions. Looking at the number of early retirement pensioners, women dominate greatly.

The socioeconomic costs for these diseases are high. The total cost for all groups is estimated to be SEK 53,000 million (Table 1), placing rheumatic disorders in a class with cardiovascular diseases and psychiatric illnesses and among the most expensive illnesses in society. The distribution between indirect and direct costs highlights the small amount of resources directed to health care. The indirect costs resulting from these diseases not responding effectively to treatment are generally high. The proportion of indirect costs varies among groups (Figure 1). For rheumatoid arthritis, the proportion was about 67%, which corresponds to a normal distribution. For the other diagnostic groups, the distribution was more extreme. For osteoarthrosis the proportion was 87%, for "back" diagnoses about 97%, and for "other diseases in musculoskeletal organs" it was 91%. It is plausible to characterize the diseases as social insurance diseases, due to the high expenditures for payment of sickness cash benefits and early retirement pensions.

DISCUSSION

In recent years, the healthcare sector has moved toward a greater utilization of primary care and shorter institutional care episodes. This is also true for rheumatic diseases. Between 1981 and 1993, the number of admissions to institutional care increased. The diagnostic

Table 1. Total Socioeconomic Costs in 1994, Million SEK

Costs	Rheumatoid arthritis (79)	Arthrosis (80)	Back (81)	Other (82)	Sum
Inpatient care					
Short term	471	567	195	627	1,860
Long term	227	172	40	231	670
Sum	698	739	235	858	2,530
Outpatient care					
Primary health care	24	84	181	405	694
Hospital visits	205	117	224	634	1,180
Private practitioners	7	26	55	122	210
Drugs	70	55	137	148	410
Sum	306	282	597	1,309	2,494
Total direct cost	1,004	1,021	832	2,167	5,024
Loss of production					
Sick leave	584	988	9,308	5,734	16,615
Early retirement	1,319	5,410	14,949	9,445	31,123
Total indirect cost	1,903	6,398	24,257	15,179	47,738
Total cost	2,907	7,419	25,089	17,346	52,762

groups that accounted for the greatest share of the costs for institutional care were rheumatoid arthritis (code 79) and osteoarthrosis (code 80). The cost for visits to hospitals represented the largest share of outpatient care. Consumption of NSAIDs, gastric medicines, and different types of pain relievers represented the major share of costs for medication.

The greatest share of production loss due to sick leave was attributed to "back" diagnoses (code 81) and "other diseases of musculoskeletal organs" (code 82). "Back" diagnoses was the main reason for early retirement pensions, which represent the greatest socioeconomic cost for all of the diagnoses. The high proportion of indirect costs could be interpreted to mean that treatment methods available today are not sufficiently effective or are not being used to a sufficient extent, but also that basic medical research is needed. The high indirect cost may also reflect that people of working age, and not only the elderly, are afflicted by rheumatic conditions, and the conditions are chronic. Hence, there may be some room to increase healthcare contributions for these groups without increasing the total cost to society.

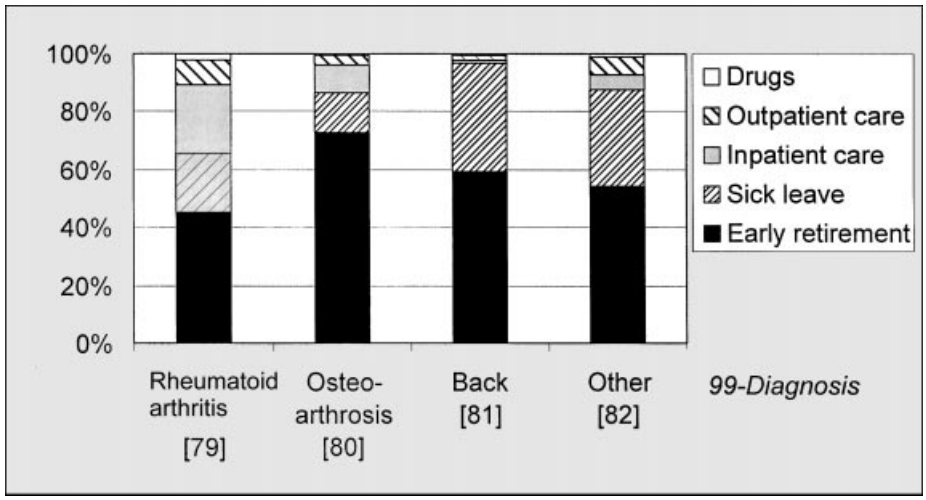

Figure 1. Distribution of socioeconomic costs, 1994 (%).

Of course, this would apply only on the condition that effective forms of care are available and used for the right groups. To be able to assess this, however, it would be necessary to evaluate the individual treatment alternatives.

POLICY IMPLICATIONS

The imbalance between direct (10%) and indirect costs (90%) raises questions about the cost-effectiveness of the healthcare sector, the need for new treatment methods, appropriate information systems, and technology assessment studies as well as the institutional arrangements for rehabilitation and basic medical research. There are many reasons, which support further socioeconomic studies. The introduction of new and expensive biotechnological pharmaceuticals for treatment of patients with rheumatoid arthritis is a good example. The economic consequences for health care and society will be substantial. Only a few health economic studies in technology assessment have been carried out in this field, and additional studies are needed to facilitate priority setting in health care.

Rheumatoid arthritis has been discussed in society, especially with respect to changed resource allocation in health care and the introduction of new and expensive pharmaceuticals. The new biotechnological pharmaceuticals will increase the cost for pharmaceuticals in health care about 20 times, but the total socioeconomic cost for society may remain at the same level due to a decrease of inpatient costs and indirect costs for loss of production as well as a decrease of transfer payments from social insurance. Against this background, a discussion of solutions for financial cooperation between county councils and regional social insurance offices should be considered. It is unavoidable that the new biotechnological pharmaceuticals require priority discussions and active resource allocation in health care and in other sectors of society. Therefore, it is necessary to know the treatment effects on patient's health status and quality of life, the direct treatment costs, and indirect costs for society, including transfer payments from social insurance and quality of care as well as the cost-effectiveness of the treatment methods.

Long-term evaluations are necessary, particularly with respect to human suffering, therapeutic effects, and side effects but also with respect to the great accumulated cost of chronic diseases compared to short-term diseases. To reduce the uncertainty of accessible statistics and information about treatment methods, it would be desirable if the budgeting and bookkeeping were set up in a uniform manner among the responsible authorities. To be able to follow treatment methods, the exchange of statistics and information between the authorities also should be strengthened.

It is desirable to place national resources in interdisciplinary and health economic evaluations for the purpose of improving the basis for the prioritization discussions that will become necessary in health care and social insurance. Certain neglected areas should be prioritized, for example, new and expensive drugs and rehabilitation. Great emphasis has been placed on the importance of priority analyses of chronic illnesses, and it is no longer acceptable to neglect them. In addition, it is important to evaluate the collaboration between clinics and primary health care, as well as the coordination of the qualifications of medical and paramedical treatment methods. The same applies to strategies that reduce high social costs resulting from inadequate coordination between the authorities who are responsible for the health and welfare of the citizens. Finding new types of cost-effective treatment methods, reduced work absence due to illness, improved health and quality of life as well as improved use of a society's resources may be difficult without the use of planned strategies, including health economics. A good method of attack is interdisciplinary evaluations and the interplay between patients and their relatives, patient associations, health and nursing care, the community, the social insurance office, employers, and the authorities in the labor market as well as researchers at universities and colleges.

REFERENCES

1. Allaire S, DeNardo B, Szer I, et al. The economic impact of juvenile rheumatoid arthritis. *J Rheumatol*. 1996;19:952-955.
2. Anderson I, Ejlerson G, Leden, Rosenberg C. *Kronisk smärta: En epidemiologisk studie i Kristianstads län*. Kristianstads läns landsting, 1989.
3. Apoteksbolaget AB. *Diagnosis and therapy survey*. Stockholm: Apoteksbolaget AB; 1995.
4. Bankhead C, Silman A, Barrett B, et al. Incidence of rheumatoid arthritis is not related to indicators of socioeconomic deprivation. *J Rheumatol*. 1996;23:2039-2042.
5. Borgquist L, Lindelöw G, Thorngren KG. Costs of hip fracture: Rehabilitation of 180 patients in primary health care. *Acta Orthop Scand*. 1991;62:39-48.
6. Brainsky A, Glick H, Lydick E, et al. The economic cost of hip fractures in community-dwelling older adults: A prospective study. *J Am Geriatr Soc*. 1997;45:281-287.
7. Carke A, Zowall H, Levinton C, et al. Direct and indirect medical costs incurred by Canadian patients with rheumatoid arthritis: A 12-year study. *J Rheumatol*. 1997;24:1051-1060.
8. Chamberlain MA, Thornely GL, Stowe J, Wright V. An evaluation of aids and equipment for the bath: A possible solution to the problem. *Rheumatol Rehabil*. 1982;20:28-43.
9. Ferraz M, Maetzel A, Bombardier C. A summary of economic evaluations published in the field of rheumatology and related disciplines. *Arthritis Rheum*. 1997;40:1587-1593.
10. Gabriel S, Crowson C, Campion M, O'Fallon M. Indirect and nonmedical costs among people with rheumatoid arthritis and ostearthritis compared with nonarthritic controls. *J Rheumatol*. 1997;24:43-48.
11. Goossens M, Evers S. Economic evaluation of back pain interventions. *J Occup Rehabil*. 1997; 7:15-32.
12. Goosens M, Rutten van Mölken M, Kole-Snijder A, et al. Health economic assessment of behavioural rehabilitation in chronic low back pain: A randomized clinical trial. *Health Econ*. 1998;7:39-51.
13. Jonsson B, Rehnberg C, Borgquist L, Larsson S-E. Locomotion status and costs in destructive rheumatoid arthritis: A comprehensive study of 82 patients from a population of 13,000. *Acta Orthop Scand*. 1992;63:207-212.
14. Jonsson D, Husberg M. *Hälsoekonomisk utvärdering av rehabilitering för personer sjukskrivna mer än 30 dagar—en jämförande studie i Östergötland*. CMT Rapport. Linköping, 1995.
15. Jonsson E. *Urval av kontrollerade prospektiva studier (RCTs) inom rehabilitering av reumatiska tillstånd*. Stockholm: SBU; 1995.
16. Lindgren B. *Vad kostar sjukdomarna? Sjukvårdskostnader och produktionsbortfall fördelat på sjukdomsgrupper 1980 och 1991*. Stockholm: Socialstyrelsen; 1996.
17. Lindgren B. The economic impact of illness. In: Abshagen U, Münnich FE, eds. *Cost of illness and benefits of drug treatment*. München: Zucckschwert Verlag; 1990.
18. Linton S. The socioeconomic impact of chronic back pain: Is anyone benefiting? *Pain*. 1998; 75:163-168.
19. Magnusson S. Treatment of rheumatoid arthritis: Does it affect society's cost for disease? *Br J Rheumatol*. 1996;35:791-795.
20. Marklund S. *Risk och friskfaktorer: Sjukskrivning och rehabilitering i Sverige (Sickness absenteeism and vocational rehabilitation in Sweden: A summary)*. Stockholm: National Social Insurance Board; 1997.
21. McKenna M, Maynard A, Wright K. *Is rehabilitation cost effective?* York: Centre for Health Economics, Health Economic Consortium, University of York; October 1992, Discussion paper 101.
22. Nachemson A. Newest knowledge of low back pain. *Clin Orthop*. 1992;279:8-20.
23. National Social Insurance Board (RFV). *Sjukdomar som orsakar pensionering: Bland förtidspensionärerna i december 1991*. Statistisk rapport Is-R. Stockholm: RFV; 1995:2.
24. National Social Insurance Board (RFV). *Sjukfrånvarons diagnoser och avslutningsanledningar 1990*. Stockholm: RFV; 1996:3.
25. Nordenskiöld U. Evaluation of assistive devices after a course in joint protection. *Int J Technol Assess Health Care*. 1994:10;293-304.
26. Praemer A, Furner S, Rice D. Costs of musculoskeletal conditions. In: *Musculoskeletal conditions in the United States*. Park Ridge, Ill: American Academy of Orthopaedic Surgeons; 1992;145-170.

27. Prashker MJ, Meenan RF. The total cost of drug therapy for rheumatoid arthritis: A model based on cost on drug, monitoring and toxicity. *Arthritis Rheum*. 1995:3;318-325.
28. Sangha O, Stucki G. Economic impact of rheumatologic disorders. *Curr Opin Rheumatol*. 1997; 9:102-105.
29. Smedby B, Borgqvist L, Korpela M. *Diagnosredovisning för läkarbesök år 1993 vid vårdcentralen i Tierp*. Uppsala universitet. Rapport 1994-06-15.
30. SOU. *Teknologi och vårdkonsumtion inom sluten somatisk korttidsvård 1981–2001*. Stockholm, 1994.
31. Statistical source (SCB). *Ohälsa och sjukvård: Levnadsförhållanden 1975–83*. Stockholm: SCB; 1985:42.
32. Strömberg L, Öhlén G, Svensson O. Prospective payment and hip fracture treatment costs. *Acta Orthop Scand*. 1997;68:6-12.
33. The Swedish Council on Technology Assessment in Health Care. *Back pain: Causes, diagnostics and treatment*. Stockholm; SBU; 1991:200.
34. The Swedish Council on Technology Assessment in Health Care. *Ont i ryggen: Orsaker, diagnostik och behandling. Statens beredning för utvärdering av medicinsk metodik*. Stockholm: SBU; 1991.
35. The Swedish Federation of County Councils. *Kostnader per intagen patient, vårddag, läkarbesök mm: 1991*. Stockholm: Swedish Federation of County Councils; 1993.
36. Thelle DS. Revmatiske sykedommers epidemiologi. In: Ur Jansson B, Thelle DS, Reds. *Reumatikernas situation i norden: Kartläggning och rapport från en konferens på Nordiska hälsovårdshögskolan*. Göteborg, 1993.
37. van Tulder M, Koes B, Bouter L. A cost-of-illness study of back pain in the Netherlands. *Pain*. 1995;62:233-240.
38. Waddell G. Low back pain: A twentieth century health care enigma. *Spine*. 1996;21:2820-2825.
39. Zethraeus N, Gerdtham U. Estimating the costs of hip fractures and potential savings. *Int J Technol Assess Health Care*. 1998;14:255-267.