

Economic Considerations in Overactive Bladder

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Presentation Summary

Many costs are associated with overactive bladder (OAB). They include direct costs, such as those associated with treatment, diagnosis, routine care, and the consequences of the disease; indirect costs of lost wages and productivity; and intangible costs associated with pain, suffering, and decreased quality of life. Quantification of all these costs is essential for establishing the total economic burden of a disease on society. Currently, the total economic

burden of OAB is unknown. However, various studies have determined that the economic burden of urinary incontinence, one of the symptoms of OAB, is substantial.

It is also important to establish the economic impact of various interventions for OAB. Cost-minimization, cost-outcome, cost-utility, and cost-benefit models can be used for these analyses. The most difficult aspect of evaluating the economic impact of a treatment is estimating the intangible costs.

A significant portion of the US population endures the economic, physical, and emotional burdens of overactive bladder (OAB). It is important to quantify the total economic burden of OAB on society to ensure that appropriate healthcare resources are allocated for this disorder. Economic evaluations are often considered as a way to control costs through cost containment; however, the most important benefit, determining the value of new interventions for the disease, should not be overlooked. Approaches for quantifying the economic burden of OAB and analyzing the economic implications of new interventions for the disease are reviewed.

Economic Burden

Information about the economic

burden or economic impact of diseases is important when determining how best to use limited healthcare resources and how to prioritize research efforts. Currently, the total economic costs associated with OAB are unknown. However, several studies have evaluated the economic burden of urinary incontinence, one of the symptoms of OAB. These studies have demonstrated that urinary incontinence has a substantial economic impact on society. By understanding the costs associated with urinary incontinence, insight can be gained into the economic burden of OAB, which is likely to be significantly greater than that of urinary incontinence.

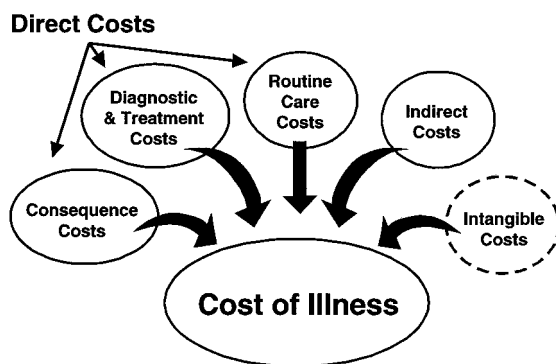
Calculating Economic Burden.

The economic burden of an illness is

the total value of all resources used or lost by society as a result of it. To determine the economic burden of any disease, 3 types of costs must be determined: direct costs, indirect

costs, and intangible costs (Figure 1). Direct costs include routine care, treatment, diagnostic, and consequence costs. There are multiple costs to consider as directly contributing to the economic burden of OAB, many of which are listed in Table 1.

Figure 1. Cost of Illness: Resources Consumed



Indirect costs of a disease include lost wages for both patients and their caregivers, the time spent by unpaid caregivers assisting in the management of the disease, and lost productivity as a result of mortality. The intangible costs of a disease consist of the value of pain and suffering and decreased quality of life. By adding direct, indirect, and intangible costs, the total economic burden of an illness can be calculated.

In 1995, the costs associated with urinary incontinence in the United States totaled \$26.3 billion, or \$3565 per incontinent individual.¹ This estimate included only direct and indirect costs incurred in individuals 65 years of age or older. The costs associated with urinary incontinence in individuals younger than 65 years of age and intangible costs were not included in the analysis, because data were not available to reliably estimate these costs. This study can be used to illustrate the process by which the economic burden of an illness is calculated.

Table 1. Direct Costs Associated With OAB

Routine care costs of OAB
■ Laundry
■ Indwelling urinary catheters
■ Incontinence pads and briefs
■ Disposable bed pads
■ Nursing time
■ New clothing to replace those worn from frequent laundering
■ Cleaning/replacing carpet and/or furniture
Treatment costs of OAB
■ Medication
■ Surgery
■ Behavioral therapy
Diagnostic costs of OAB
■ Laboratory tests
■ Physician consultations
■ Physical examinations
■ Urodynamic evaluations
Consequence costs of OAB
■ Treatment for falls
■ Treatment of skin infections related to incontinence
■ Treatment of UTIs
■ Nursing home admission
■ Lengthened hospital stay

UTIs = urinary tract infections.

The first step in determining the economic burden of a disease is to ascertain the number of individuals affected by it. In 1995, there were 7.4 million Americans 65 years of age or older who had urinary incontinence. This figure was calculated by assuming that there were approximately 33.64 million individuals in the United States older than 65 years of age, 31.76 million of whom were not institutionalized and 1.89 million of whom were institutionalized. This calculation also assumed a prevalence rate of urinary incontinence of 18.77% in the community and 56% in nursing homes. Most important, this is probably an underestimation of the

true prevalence rate of urinary incontinence. Underreporting of the condition because of embarrassment and/or the belief that it is part of normal aging complicates the calculation of a prevalence rate. Determination of the overall prevalence of urinary incontinence in society is also complicated by variations in the prevalence resulting from age and gender and the use of various definitions of the disease.²

The percentage of individuals who have a disease must be determined to assess resource utilization and to ascertain the percentage who incur indirect costs. With urinary incontinence, the use of resources is often different in the community and institutional settings. For example, urinary catheterization is more likely to be a part of routine care for urinary incontinence in the institutional setting than in the community setting. The use of treatment also varies between the institutional and community settings.

It is estimated that 2% of individuals in the community and 5% of individuals in institutions who have urinary incontinence seek treatment for the disease. These figures were based on analysis of 1992 data from the National Hospital Ambulatory Medical Care Survey and 1993 data from the National Hospital Discharge Survey. Based on a 1995 survey, 23.3%, 19.8%, 38.8%, and 19.7% of patients who sought treatment received surgical treatment, medical treatment, behavioral therapy, or were left untreated, respectively. It was also assumed that 30% of individuals with urinary incontinence incurred indirect costs.

The third step in determining the economic burden of an illness is to determine the cost per unit of services. The cost of some resources, for example, laundry, will vary depending on whether the patient resides in the community or in an institution. Cost information is compiled from multiple sources, including published literature,

Medicare claims data, outpatient data, and the *Drug Topics Red Book*; when appropriate, figures were adjusted for inflation.¹

Next, the number of individuals who receive a service is multiplied by the cost of that service. Table 2 lists the direct and indirect costs for urinary incontinence.¹ All the direct and indirect costs are then added to provide an estimate of the total economic burden of the disease. In 1995, the direct cost of urinary incontinence was \$25.6 billion, the majority of which was allocated to consequence and routine costs (Figure 2); the indirect cost was \$700 million.¹

Finally, a sensitivity analysis is conducted to determine the impact of varying key parameters in the analysis. For example, our analysis was minimally affected by changes in the proportion of individuals seeking treatment; the proportion of patients receiving behavioral, pharmacologic, or surgical treatment; and the cost of

Table 2. Costs of Urinary Incontinence in 1995 (in millions)

Cost Factor	Cost (in Millions US \$)
Diagnostic costs	393.5
Treatment costs	
Behavioral	64.0
Pharmacologic	9.3
Surgical	655.0
Routine care costs	1,1405.9
Incontinence consequence costs	
Skin irritation	419.1
UTIs	4,181.6
Falls	58.4
Additional admissions to institutions	2,172.1
Longer hospitalization periods	6,229.1
Total direct costs	25,588.0
Indirect costs (value of home care services)	704.4
Total costs of urinary incontinence	26,292.4

Source: Wagner TH, Hu T. Economic costs of urinary incontinence in 1995. *Urology* 1998;51:355-361. Reprinted with permission from Elsevier Science Inc. UTIs = urinary tract infections.

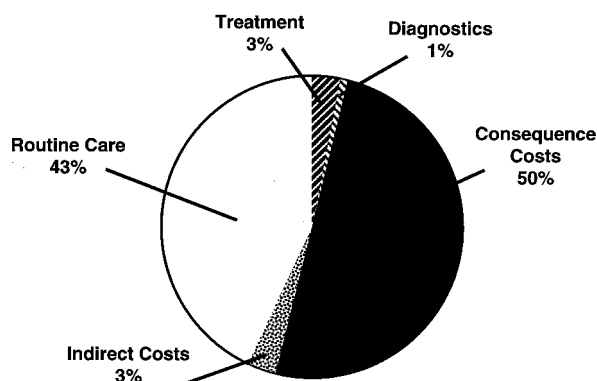
each of the 3 categories of treatment.¹ The total costs were most sensitive to a change in the prevalence rate, that is, if the prevalence of incontinence among noninstitutionalized individuals decreased from 19% to 9%, the total costs decreased to \$16.1 billion.

The current economic impact of urinary incontinence can be expected to be greater than the 1995 figures. When these estimates are updated using 1998 dollars, the total economic burden is \$28.4 billion, an 8% increase. However, because previous studies have shown that the costs associated with urinary incontinence are increasing at a rate greater than that of inflation (Figure 3), the actual costs in 1998 probably exceed this estimate. Factors that may be contributing to increases in the cost of urinary incontinence include an increase in the proportion of the population older than 65 years of age, an increased awareness of urinary incontinence, and greater use of treatment. The increased use of treatment is most likely the result of the availability of new approaches that may be better tolerated, such as the drug tolterodine. It is also important to note that the analysis¹ included only individu-

als 65 years of age or older; the total cost is likely to increase substantially if individuals younger than 65 years of age who suffer from urinary incontinence are considered. Inclusion of the intangible costs associated with incontinence, such as those associated with decreased quality of life and pain and suffering, would also increase the total cost. Other factors that may affect the total cost estimate include considerations regarding the use of managed care, cost variations for different types of urinary incontinence, and the cost effectiveness of long-term treatment.

Whereas many other investigators have evaluated the economic impact associated with urinary incontinence, most have only considered direct costs, particularly the routine care costs. For example, in 1999 Dowell and associates³ described an instrument that can be used to calculate the direct costs of urinary incontinence. With this instrument, they found that women living in the community who suffered from stress, urge, or mixed incontinence incurred median direct costs of \$12.89 per week in Australian dollars (US \$7.81). This amount included a median personal cost of \$5.61 (US \$3.40) per week and a median treatment cost of \$4.96 (US \$3.00) per week. Personal costs mainly included the purchase of pads and laundry. Treatment costs included medication, surgery, visits to a healthcare provider, diagnostic testing, and travel expenses related to treatment.

Figure 2. Allocation of Costs for the Management of Urinary Incontinence



Economic Evaluation of Interventions

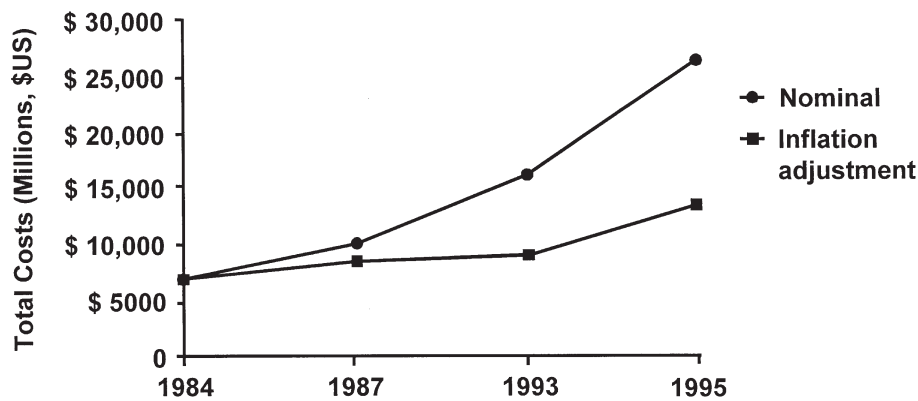
It is also important to use economic evaluations in determining whether various interventions have an impact on the economic burden of a disease. These evaluations are particularly important when new treatments become available. Such evaluations should consider both the costs and outcomes of competing interventions,

with direct, indirect, and intangible costs being accounted for. There are alternative approaches to estimating the indirect and intangible costs, including quality-adjusted life-years (QALYs), disability-adjusted life-years (DALYs), and human capital evaluation.

Several types of models can be used to evaluate the economic

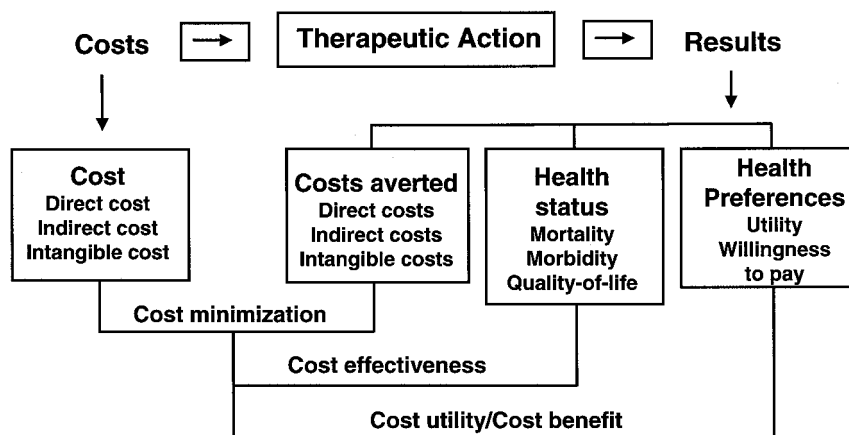
impact of new interventions, including cost-minimization, cost-effectiveness or cost-outcome, cost-utility, and cost-benefit analyses (Figure 4 and Table 3). Generally, when a new intervention becomes available, cost-minimization studies are conducted first, followed by cost-effectiveness, cost-utility, and cost-benefit studies.

Figure 3. Total Cost of Treating Urinary Incontinence Over Time, 1984 to 1995



Source: T.W. Hu, unpublished data.

Figure 4. Comparison of Economic Evaluation Types



Cost Minimization. With a cost-minimization analysis, only the costs of the 2 interventions are compared.

This method of evaluation is appropriate when the interventions being compared are associated with identical outcomes.⁴

Cost Effectiveness/Outcome. Cost-effectiveness analyses are useful in comparing 2 treatments that are associated with similar outcomes but to a different degree. This type of analysis considers both the costs and outcomes of treatment.⁴ With some diseases, such as OAB, defining an outcome may be difficult. Outcomes related to improvements in morbidity, for example, dryness, number of wetting episodes, or controlled days or nights, and quality of life might be considered. A cost-effectiveness analysis can be used to calculate the incremental cost of achieving an incremental unit of effectiveness.⁴ For example, Kobelt and colleagues⁵ found that in patients with OAB who received tolterodine rather than no treatment, the marginal cost of being in a controlled or basically normal state was \$215 per month.

Table 3. Comparison of Economic Evaluation Types

Type of Analysis	Measurement/Valuation of Costs in Both Alternatives	Identification of Consequences	Measurement/Valuation of Consequences
Cost minimization	Dollars	Identical in all relevant respects	None
Cost effectiveness	Dollars	Single effect of interest, common to both alternatives, but achieved to different degrees	Natural units (eg, life-years gained, disability days saved, points of blood pressure reduction, etc)
Cost utility	Dollars	Single or multiple effects, not necessarily common to both alternatives	QALYs or healthy years
Cost benefit	Dollars	Single or multiple effects, not necessarily common to both alternatives	Dollars

QALYs = quality-adjusted life-years.

Table 4. Comparison of Approaches for Estimating Intangible Costs

Approaches	Common Denominator	Assumptions	Data Requirement	Weights Used	Equity/Efficiency	Psychosocial	Individual/Population
Willingness to pay	Monetary value	Welfare/well-being	Prevalence	Revealed preference/contingent preferences	Efficiency	Yes	Individual
QALYs	Time (years)	Positive utility/Quality of life	Prevalence/Incidence	Delphi/expert assignment	Equity	Yes	Individual
DALY	Time (years)	Negative utility/Disability	Prevalence/incidence/duration/severity	Delphi/expert assignment	Equity	Yes	Individual/Population
Human capital	Monetary value	Productivity	Prevalence	Wages, employment	Efficiency	No	Population

QALYs = quality-adjusted life-years; DALY = disability-adjusted life-years.

Cost Utility. A cost-utility analysis also considers both the costs and outcomes of treatment. The difference between cost-effectiveness and cost-utility analyses is that the former only accounts for quantity of outcome, whereas the latter accounts for both quantity of outcome and quality of life. The results of a cost-utility analysis are usually expressed as QALYs.⁴ Using a cost-utility analysis, Kobelt and colleagues⁵ determined that the marginal cost of a QALY gained with tolterodine treatment compared with no treatment was approximately \$28,000. Cost-utility analyses are useful for comparing the cost of treating different diseases. This type of analysis is particularly important for diseases that have a major impact on quality of life, such as incontinence and OAB.

Cost Benefit. A cost-benefit analysis considers patients' willingness to pay. This type of analysis also accounts for the quantity of the outcome and quality of life. A cost-benefit analysis allows comparisons to be made of interventions within and outside of healthcare.⁴

Estimating Intangible Costs

The greatest challenge in evaluating the economic impact of a treatment is estimating the intangible costs. Approaches that may be used to estimate intangible costs include determination of willingness to pay, QALYs, human capital, and DALYs. Each of these 4 methods has its strengths and weaknesses (Table 4). The following sections describe how each of these methods may be used.

Willingness to Pay. The willingness-to-pay method addresses both the physical and psychological burden of a disease.⁴ This approach, also referred to as a money trade-off approach, was used by Johannesson and associates⁶ to estimate how much patients in Sweden with urge or mixed incontinence would pay for a treatment that reduces the number of

micturitions and urinary leakages. Patients answered the following question in a self-administered questionnaire: "Imagine that a new drug against incontinence, free of side effects, becomes available that is not paid for by the state. This new drug reduces the number of times you need to go to the bathroom and the number of urinary leakages per day by X%; this means that if you, for instance, at present need to go to the bathroom 12 times per day and have 4 urinary leakages per day, this will be reduced to X bathroom visits and X urinary leakages per day. Would you choose to take this drug if you, out of your income, have to pay \$X per month for the drug? (Answer Yes or No)." The price of the new drug was varied from \$15 to \$400, and the size of the reduction in micturitions and leakages was varied between 25% and 50%. The survey found that patients were willing to pay a median of \$31 per month for a 25% reduction in micturitions and leakage and \$62 per month for a 50% reduction. Interestingly, a recent study demonstrated that the incremental cost of treating a patient with tolterodine was \$50 per month.⁵

Quality-Adjusted Life-Years. In the QALY, or time trade-off approach, a patient answers the question, "Taking into account your age, pain and suffering, immobility, and loss of earnings, what fraction of your years of life would you be willing to give up to be completely healthy for your remaining years?" This information is then used to calculate QALYs. This approach has been used successfully in cardiology and in dialysis patients. Whereas to date there is no published information regarding use of this approach in patients with incontinence or OAB, it appears to be a reasonable one in these populations.

Disability-Adjusted Life-Years. These can be thought of as a person trade-off approach. With this

approach, one considers the entire population and determines how many people would need to be treated for 1 disease to be cured compared with having, saving, or giving up another disease. To date, use of this method is very limited, because it requires expert panels to assign relative person-trade-off weights, which may not represent societal preferences.

Human Capital Valuation. This approach considers wages and earnings as the value of an individual's productivity. The economic value of premature death or time lost because of illness can be calculated according to lost wages or earnings. A limitation to this approach is that the valuation may reflect the labor market bias against the elderly, women, and minorities.

All 4 approaches have some limitations. Because of the nature of OAB, perhaps the QALY approach would be the best to use among these 4 alternatives.

Conclusion

Quantification of the total economic burden of OAB will help establish the importance of the disease in society. To date, most studies have only examined the economic burden of 1 symptom of the disease—urinary incontinence. It is likely that the economic burden of OAB is significantly greater than that of urinary incontinence. In the future, the cost of OAB may be determined using a method similar to that used for determining the total cost of urinary incontinence.

Economic evaluations are also important for comparing the various

interventions used in patients with OAB. One study has shown that tolterodine is more cost effective than no treatment,⁵ but further studies are clearly needed. The most difficult aspect of conducting comparative economic analyses is determining intangible costs. It appears that willingness to pay and potentially QALYs are the approaches best suited to determining intangible costs in patients with OAB. The use of comparative economic analyses is a new and evolving field of study. In the future, we can expect these types of analyses to provide important information on the value of different interventions for many diseases, including OAB.

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