Economic implications

The Burden of Disease framework and DALY measure can be used in economic evaluations of health interventions. Economics provides an independent method for evaluating health care interventions and assists in health service planning and priority setting. Cost-effectiveness or cost-utility studies based on DALYs can be used to guide the allocation of health resources so as to maximise the amount of health gained per dollar expended. However, measures of health gain or DALYs do not take distribution and equity explicitly into account, with DALYs’ being of equal value regardless of who receives them. Traditional public health practices have contributed to health inequality by failing to reach disadvantaged groups, those populations that have the poorer health status.

To address inequality, there is a need to develop effective policy and programs that will improve the situation of indigenous and socio-economically disadvantaged communities, an approach known as positive discrimination. The Burden of Disease framework can identify these disadvantaged populations. Health planning should aim for an equitable distribution of health amongst the whole population even if the total health across a population (i.e. DALYs) is not maximised.

Health services planning must reflect the values, ethical considerations and preferences of the community in prioritising alternative programs. The maximisation of health benefits within a finite budget implies prioritising according to cost-effectiveness; however, other factors play a part. These include legislative issues, political issues, and positive discrimination for disadvantaged groups.

Resource allocation in health should aim to improve the health of the population rather than simply to provide or maintain health services.

Key findings

- Mental health disorders, even though only representing 12% of total hospital bed-days, are the leading cause of DALYs in males and are predicted to become the leading cause of illness in females by the year 2016.
- Maternal conditions, comprising of complications related to pregnancy and childbirth, was the leading cause of hospital utilisation and hospital expenditure in females in 2000/01 but was a relatively low cause of disease burden.
- ‘Rehabilitation’ represents a significant component of hospital utilisation in both males and females.
- Conditions utilising a relatively higher number of bed-days are not necessarily those with the greatest impact on quality of life or the more expensive in terms of hospital costs.

Conclusion

Allocation of resources and health services planning has historically been determined from hospital utilisation data. This has the disadvantage of not accurately reflecting those conditions causing ill health across the whole community. The Burden of Disease framework overcomes this problem by considering not only the mortality from a disease, but the total disability experienced by the population regardless of whether hospital admission was provided. The Burden of Disease approach can also provide the proportion of a disease burden that could be prevented through the reduction of associated risk factors.

References


Implications

- The Burden of Disease approach for priority setting can complement the traditional use of hospital-based data by providing a more comprehensive reflection of the causes of ill health being experienced by the whole population.
- The Burden of Disease framework can be used by all disciplines of health care providers to quantify the impact of their services, allowing for comparisons to be made between interventions.
- Disability Adjusted Life Years (DALYs) should be used in conjunction with hospital bed-days and other health service utilisation data to guide decisions in health services planning and delivery.
- The Burden of Disease model can be used to estimate potential health gains and cost offsets resulting from investment in preventative programs of associated risk factors.
- Priority setting and resource allocation must reflect not only economic efficiency but should address health inequities amongst disadvantaged groups.
Ischaemic heart disease is ranked first in disease burden for both males and females. Mental and emotional ill-health, represented by depression, anxiety, suicides and self-inflicted injuries, alcohol dependency and drug dependency, features highly in the leading causes of disease burden. When mental health disorders and suicide were considered together, they were the number one cause of DALYs in males in 2000 ahead of cancer and cardiovascular disease. In females, mental illness and suicide together were the second leading cause of DALYs in females behind cancer but ahead of cardiovascular disease.

The leading cause of hospital bed-day use was rehabilitation, followed by maternal conditions associated with complications in pregnancy and childbirth, schizophrenia, ischaemic heart disease and falls. ‘Maternal conditions’ were also the leading cause of hospital costs followed by ischaemic heart disease, osteoarthritis, ‘rehabilitation’, fall and adverse effects of medical treatment.

Conditions utilising a relatively higher number of bed-days are not necessarily the more expensive in terms of hospital costs. For example, schizophrenia and anxiety disorders have a relatively low hospital cost/bed-day ratio ($355 and $326 respectively) compared to osteoarthritis ($1300) or ischaemic heart disease ($1075). Also hospital utilisation is not an automatic indicator of the disease burden in the population. Conditions with a high burden affecting quality of life may be associated with low bed-day use or low hospital costs eg, anxiety disorders. Conditions with a low/moderate degree of disease burden may have high hospital utilisation rates eg, maternal conditions and falls (Table 1).

Projections into the year 2016 for DALY’s associated with mental health disorders have been performed from 2000 data, using historical trends and adjusting for demographic changes. It is predicted that mental health will displace cancer as the major cause of disease burden in females and that mental disorders will be among the most expensive conditions in Western Australia. Traditional models for health service planning that are based on hospital admissions will neglect and underestimate the burden of mental illness on the community.

### Table 1: Comparison of disease burden and hospital data for selected diseases, 2000/01

<table>
<thead>
<tr>
<th>Disease</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total DALYs</td>
<td>Total Bed-days</td>
</tr>
<tr>
<td>Mental and Emotional Ill-health* including suicide and self-inflicted injuries</td>
<td>10%</td>
<td>12%</td>
</tr>
<tr>
<td>Maternal conditions</td>
<td>1%</td>
<td>0.3%</td>
</tr>
<tr>
<td>Rehabilitation **</td>
<td>See Footnote</td>
<td>See Footnote</td>
</tr>
<tr>
<td>Falls</td>
<td>1%</td>
<td>2%</td>
</tr>
<tr>
<td>IHD</td>
<td>10%</td>
<td>9%</td>
</tr>
<tr>
<td>Stroke</td>
<td>3.5%</td>
<td>2%</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease</td>
<td>4%</td>
<td>2.5%</td>
</tr>
<tr>
<td>Non insulin-dependent diabetes mellitus</td>
<td>3%</td>
<td>2%</td>
</tr>
<tr>
<td>Osteoarthritis</td>
<td>2%</td>
<td>2%</td>
</tr>
</tbody>
</table>

* Mental health disorders – substance-use disorders, depression, anxiety, disorders, schizophrenia and other mental health disorders.

** Criteria: burden not available for ‘Rehabilitation’

***DALY = Disability Adjusted Life Year.
Ischaemic heart disease is ranked first in disease burden for both males and females. Mental and emotional ill-health, represented by depression, anxiety, suicide and self-inflicted injuries, alcohol dependency and drug dependency, features highly in the leading causes of disease burden. When mental health disorders and suicide were considered together, they were the number one cause of DALYs in males in 2000 ahead of cancer and cardiovascular disease. In females, mental illness and suicide together were the second leading cause of DALYs in females behind cancer but ahead of cardiovascular disease.

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The difference in priorities between using burden of disease data and hospital statistics can be demonstrated in the area of mental health.

Conditions associated with mental and emotional ill-health include substance use disorders, depression, anxiety disorders, schizophrenia, suicide and other mental health disorders. These disorders contributed 18-19% of all DALYs in 2000 but only 11-12% of hospital bed-days and 6.5% of hospital costs in 2000/01 (Table 1).

Suicide was the third highest cause of DALYs in males, with 80% attributed to ages between 15 and 44 years. Major depression and anxiety disorders were in the top five conditions for females. Mental disorders were comparatively less featured when considering leading causes of bed-days or hospital costs. This may be because much of the medical care is provided outside the hospital environment; or in the case of suicide, patients may have had inadequate access to medical treatment.

Projections into the year 2016 for DALYs associated with mental health disorders have been performed from 2000 data, using historical trends and adjusting for demographic changes. It is predicted that mental health will displace cardiovascular disease as the major cause of disease burden in females and that mental disorders will be among the most expensive conditions in Western Australia. Traditional models for health service planning that are based on hospital admissions will neglect and underestimate the burden of mental illness on the community.

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<table>
<thead>
<tr>
<th>Condition</th>
<th>Total DALYs</th>
<th>Total Bed-days</th>
<th>Hospital costs</th>
<th>Total DALYs</th>
<th>Total Bed-days</th>
<th>Hospital costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mental and Emotionall iI-health* including suicide and self-inflicted injuries</td>
<td>10%</td>
<td>12%</td>
<td>6.5%</td>
<td>18%</td>
<td>11%</td>
<td>6.5%</td>
</tr>
<tr>
<td>Maternal conditions</td>
<td>10%</td>
<td>4%</td>
<td>6%</td>
<td>8%</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td>Falls</td>
<td>1%</td>
<td>2.5%</td>
<td>2.5%</td>
<td>0.5%</td>
<td>3.5%</td>
<td>3.5%</td>
</tr>
<tr>
<td>Stroke</td>
<td>3.5%</td>
<td>2%</td>
<td>2%</td>
<td>9%</td>
<td>2%</td>
<td>1.5%</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease</td>
<td>4%</td>
<td>2.5%</td>
<td>1.5%</td>
<td>2.5%</td>
<td>1.5%</td>
<td>1%</td>
</tr>
<tr>
<td>Non insulin-dependent diabetes melitus</td>
<td>3%</td>
<td>2%</td>
<td>2%</td>
<td>3%</td>
<td>1.5%</td>
<td>1%</td>
</tr>
<tr>
<td>Other mental health disorders</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
<td>2.5%</td>
<td>2%</td>
<td>3.5%</td>
</tr>
</tbody>
</table>

* Mental health disorders – substance use disorders, depression, anxiety, disorders, schizophrenia and other mental health disorders.
* Chronic burden not included for ‘Rehabilitation’.
* DALY = Disability Adjusted Life Year.

Figure 2: Top 20 Conditions for Disability Adjusted Life Years (DALYs), WA, 2000

Figure 4: Top 20 Conditions for Hospital Costs, WA, 2000/01
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- Priority setting and resource allocation must reflect not only economic efficiency but should address health inequalities amongst disadvantaged groups.

Burden of Disease: a framework for health planning?
Sharon Sorensen, Jim Codde, Liz Geelhoed and Peter Somerford, Epidemiology Branch, Department of Health, Perth, Western Australia

Introduction
Burden of Disease methodology has the potential to enhance the current framework for the planning of health services delivery in a cost effective and efficient manner. The population burden of a disease is expressed in Disability-Adjusted Life Years (DALYs), thus quantifying not only mortality from a disease but also the disability experienced throughout the life course of the disease.

The benefits of the BOD approach
Much of the priority setting and policy development by health authorities has historically focused on hospital activity statistics. This has inadvertently led to the delivery of health services being based on a small proportion of the population at the extreme end of the health-disease spectrum.

The Burden of Disease framework incorporates the entire spectrum from disease development through to death (see Figure 1), and provides an assessment of the health of the whole population based on disability and mortality experienced by the population, not just of those utilising hospital services. As the DALY is not based on hospital admission but rather the total disability and mortality experienced by the population, it provides a more holistic view of ill health.

The framework allows us to recognise the work of non-hospital based health care services such as generic services, health promotion, community health, public health and general practice. These providers can be used to enhance the current framework for the planning of health services delivery in a cost effective and efficient manner.

Features of the Burden of Disease framework
- DALYs can provide a comprehensive measure for incorporating both mortality and disability that allows for comparison with national and international populations.
- DALYs have the capacity to identify disadvantaged population groups through analyses by socio-economic indicators and ethnicity.
- DALYs can provide information on the contribution of risk factors to the burden of disease profile, thus highlighting the proportion of a disease that could be prevented through decreases in risk factor prevalence.

Interventions
- Decreasing the risk factor of a disease and earlier detection of disease (as indicated by the red boxes in Figure 1) can decrease the development and progression of a large number of diseases and injuries.

The shifting of the “disease free – disease-affected” interface at the population level will have enormous impact on the social and actual health costs of disease treatment. While not all of this financial benefit will flow directly through to reducing costs associated with hospital services, reducing the level of “disability” within the population should have flow-on effects of reduced reliance on the demand for health care services.

The burden of disease framework can determine where the largest returns on investments in health interventions can occur.

Based on Western Australian data for the year 2000 and 2000/01, Figures 2 to 4 show the difference in leading disease categories as determined from the BOD methodology (DALYs) and by hospital discharge data (bed-days and cost.)

Figure 1: Schematic showing the full scope of the BOD model

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