

# The Costs of Low Vision and Blindness

Preventing vision loss can save governments money.

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The seminal work by Frick and Foster<sup>1</sup> estimated the global costs of blindness and low vision in 2000 at \$42 billion.<sup>1</sup> The investigators calculated figures not only to document the current expense of vision loss, but also to show that, if Vision 2020: the Right to Sight<sup>2</sup> was effective in reducing the prevalence of vision loss, then those costs could be reduced. The Right to Sight is an initiative of the World Health Organization (WHO; Geneva, Switzerland) and the International Agency for Prevention of Blindness (IAPB; Hyderabad, India) that aims to prevent avoidable blindness by the target year 2020.

Frick and Foster calculated these costs first using regional prevalence data. They derived the amounts by estimating productivity loss, which they based on gross domestic product per capita, restricted to working-age individuals who were blind or had low vision. The investigators determined the proportion of productivity loss using disability-adjusted life-year values for blindness (0.600) and low vision (0.245) where 0 indicates best health and 1 is the worst.<sup>1</sup>

As they predicted, the number of visually impaired people worldwide has decreased, as have the total related costs for their care. The WHO published figures for 2002 showing that there were 161 million people who were visually impaired,<sup>3</sup> compared with 180 million in 1994.<sup>4</sup> The decrease seems to be the result of increasing rates of cataract surgery particularly in India. Because cataract is responsible for 48% of visual impairment worldwide, the prospects of significantly reducing the numbers of people who have impaired vision are encouraging.

## FINANCIAL RETURNS ON A BLINDNESS PREVENTION PROGRAM

The prevention of blindness program in the Gambia is an example of success. From 1986 to 1996, the prevalence of blindness decreased from 0.7% to 0.42% in that country.<sup>5</sup> Subsidies to the Gambia Eye Care Program came from both the country's government and nongovernmental organizations (mainly Sight Savers International, West Sussex, United Kingdom).

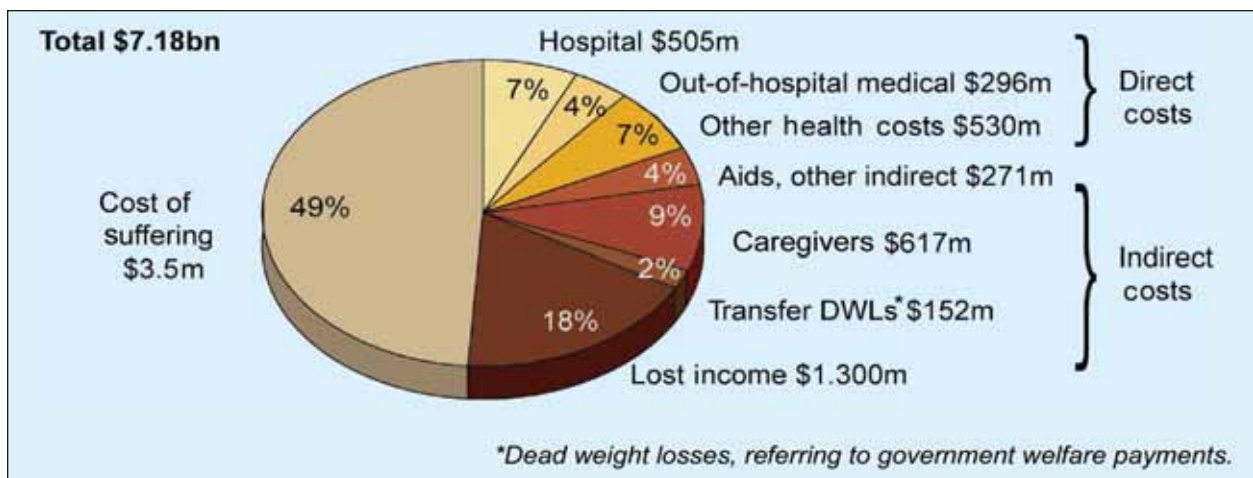


Figure 1. This graph shows the composition of total costs of vision disorders in Australia in 2004.

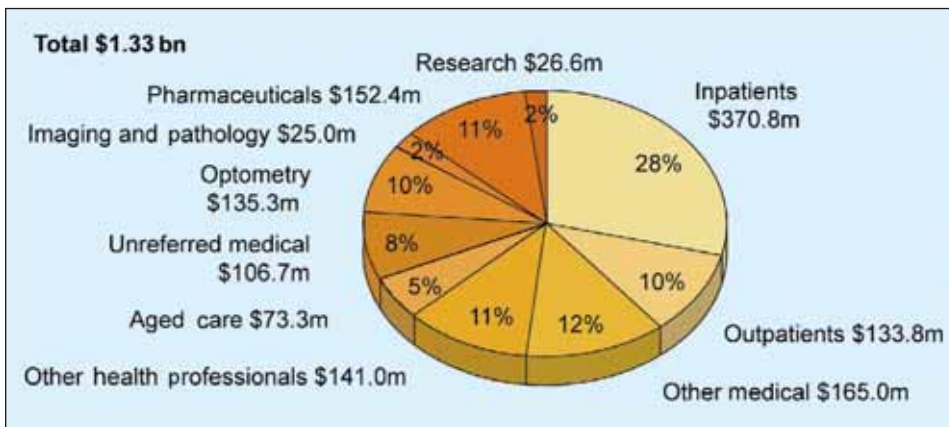


Figure 2. This graph shows the costs in millions of diseases of the eye and adnexa by cost type in Australia in 2004.

Investigators took these monies into account. They calculated a gain in productivity by using census data, gross national income per capita, and a blindness weighting of 60%. They assumed that, if not blind, people of working age would be in the labor force. The researchers found that people over 65 years old were half as productive as those aged 15 to 64, and that each person who was blind required a caregiver that demanded one-tenth of the time of a productive person.<sup>5</sup> The investigators further calculated annual and lifetime benefits of living with good vision by estimating the number of people who did not lose their vision or had it restored through the Gambia Eye Care Program. They used very conservative assumptions in modeling the benefit of the aforementioned subsidies, with the lowest estimate being a 10% rate of return on investment in health, although the rate could be as high as 42%.

### COSTS OF VISION LOSS IN AUSTRALIA

The costs of vision loss were \$7.19 billion in Australia for the year 2004, according to one source (Figure 1).<sup>6</sup> Others have projected costs out to 2020 and included direct healthcare, indirect expenses, and the indirect nonfinancial burden of the loss of well-being (burden of disease). Prevalence data are based on the combined figures from the Melbourne Visual Impairment Project and the

Blue Mountains Eye Study.<sup>7</sup>

The direct health costs included those of running hospitals and nursing homes, general and specialist medical services, pharmaceuticals, allied health services, research, and other costs.<sup>8</sup> The total health expenses were \$1.33 billion (Figure 2). Hospitals (38%) and medical specialists (12%) were responsible for half of the costs. The charge for

managing cataract (18%) was the largest single condition (Figure 3).

In addition to the loss of production and costs of caregivers, indirect costs included aids, equipment, paid assistance around the home, modifications to the home, the use of community services, and other expenses such as taxis. People both younger and older than 65 years with impaired vision were employed at lower rates than the general population. Of those aged 40 to 65 years, 34.5% of people with impaired vision were employed, versus 68.8% of the general population. Of those older than 65, only 2% were employed compared with 5.8% of the general population. Analysts used average weekly earnings to determine the value of the lost production of workers and caregivers.

Aids and equipment included glasses and magnifiers, daily living aids, recording and talking devices, enhanced lighting, and adapted computer equipment and software.

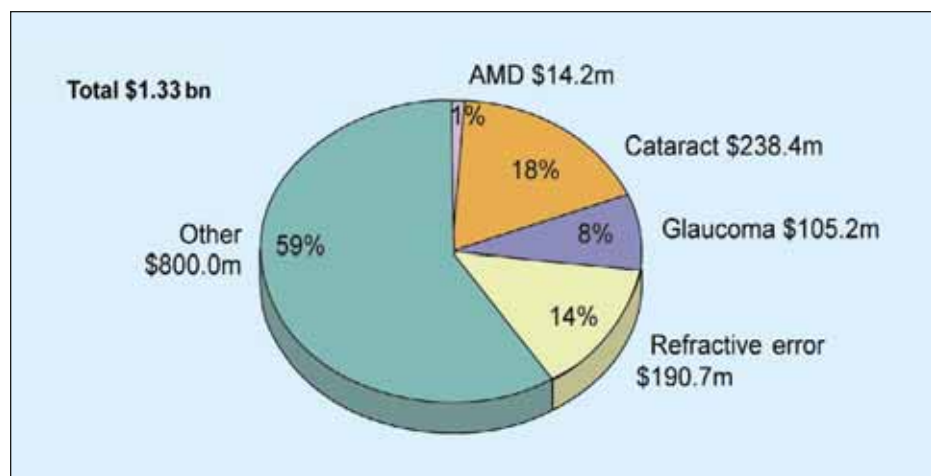


Figure 3. This graph shows the costs in millions of diseases of the eye and adnexa by condition in Australia in 2004.

Analysts composed the list of personal costs during a period of 12 months from the diaries of people who were blind or had low vision.<sup>9</sup>

The Clear Insight report used the “Burden of Disease” methodology to estimate the number of years of well-being (healthy life) that people lost due to vision loss. The researchers used conservative estimates to ascribe a value to a year of life, \$122,226.<sup>6</sup> They used utility values of 0.43 for blindness, 0.17 for moderate vision loss, and 0.07 for mild vision loss.<sup>10</sup> They calculated the years of life lived with a disability for cataract, glaucoma, diabetic retinopathy, and age-related vision disorders. Australian women bore three-quarters of the 40,068 years of life lived with a vision loss disability, 2.7% of the total loss of well-being in the country. To put this finding into perspective, loss of well-being due to impaired vision is only slightly less than diabetes and coronary heart disease, both more than 3% each. The net cost of lost well-being, excluding lost earnings and payments to caregivers, was \$3.62 billion. The loss of well-being constituted 49% of the total costs of vision loss in Australia (Figure 1).

## COST EFFECTIVENESS OF PREVENTING VISUAL IMPAIRMENT

Researchers used the data on costs in Australia to model the cost effectiveness of interventions to prevent vision loss from its most common causes in the country—age-related macular degeneration, cataract, glaucoma, diabetic retinopathy, and refractive error.<sup>11</sup> The intervention package would cost \$137.8 million to implement in its first year (\$4,081 per quality-adjusted life year), but it would save money thereafter. The package would bring a net return of \$119 million in direct costs during the first year, and there would be an overall savings to the country of \$665 million, a 4.8-fold return on investment, including dollars saved from indirect costs. During the lifetime of the interventions, a total return of 6.2-fold would be realized. As in the example of the Gambia, such a return on investment is substantial.

Costs such as those determined on a national basis for Australia would be difficult to extrapolate to obtain global figures of direct and indirect expenses. Direct costs vary widely depending on the price and financing of eye care systems. Even using conservative figures, the indirect costs may be quite substantial.<sup>6</sup> In the study, the expense of lost production and caregivers in Australia was 27% of the total costs (Figure 1). Therefore, based on the Frick and Foster costs of lost production and caregivers, the total direct and indirect global costs of low vision and blindness could be \$155.50 billion. There are many limitations to making such estimates given different eye care systems, the rates of employment of people whose vision is impaired, and the

ability of governments and people to spend money on care, aids, and necessary equipment.

## CONCLUSION

Determining costs and using cost-effectiveness analyses is useful for advocacy as part of Vision 2020: the Right to Sight. As the examples from the Gambia and Australia show, preventing blindness is financially worthwhile to governments in addition to improving citizens' quality of life. ■

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<sup>1</sup> Note: The conversion for AUD to USD used was the 2004 purchasing power parity conversion from the Organisation for Economic Co-operation and Development (Paris, France) data for AUD to USD - 1.37.

1. Frick KD, Foster A. The magnitude and cost of global blindness: an increasing problem that can be alleviated. *Am J Ophthalmol.* 2003;135:471-476.
2. World Health Organization. Global Initiative for the elimination of avoidable blindness. WHO/PBL/97.61, Geneva.
3. Resnikoff S, Pascolini D, Etyale D, et al. Global data on visual impairment in the year 2002. *Bull World Health Organ.* 2004;82:844-851.
4. World Health Organization. Available Data on Blindness (Update 1994). WHP/PBL/94.38, Geneva.
5. Frick KD, Foster A, Bah M, Faal H. Analysis of costs and benefits of the Gambian Eye Care Program. *Arch Ophthalmol.* 2005;123:239-243.
6. Access Economics. Clear Insight: the Economic Impact and Cost of Vision Loss in Australia. Available at: www.cera.org.au. Accessed August 31, 2005.
7. Taylor HR, Keefe JE, Vu H, et al. Vision loss in Australia: the unseen impost. *Med J Aust.* 2005;182:565-568.
8. Australian Institute of Health and Welfare. Health system expenditure on disease and injury in Australia, 2000-01. AIHW Cat No. HWE 26 Canberra: AIHW (Health and Welfare Expenditure Series no. 19), 2004.
9. Chou SL, Misajon RA, Lamoureux EL, et al. Measurement of indirect costs for people with vision impairment. *Clin Exp Ophthalmol.* 2003;31:336-340.
10. Mathers C, Vos T, Stevenson C. The Burden of Disease and Injury in Australia. AIHW Cat No PHE-17, Australian Institute for Health and Welfare, 1999.
11. Access Economics. Investing In Sight: Strategic Interventions to Prevent Vision Loss in Australia. Available at: www.cera.org.au. Accessed August 31, 2005.