

The Estimation of the Economic Cost of Suicide to Australia

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Current Situation

There are no reliable national estimates available on the financial costs associated with suicide and suicide attempts in Australia. This is in stark contrast to the economic costs of road accidents, which have been the subject of modeling and analysis as far back as 1978 (Atkins, 1981) and the most recent studies released in June 2009.

There have been some studies into the costs of schizophrenia and bipolar disorder (Access Economics, 2002 & 2003 respectively).

Why we need a Sound Estimate of the Cost of Suicide

Suicide and suicidal behaviours, including self-harm, bring with them massive human, social and economic impacts. Estimates indicate each suicide impacts directly on at least six other people (Corso et al, 2007). A completed suicide has a multiplier effect, impacting the lives of any number of individuals – from family to friends, colleagues, clinicians, first responders, coronial staff, volunteers of bereavement support services and other associates – who inevitably suffer intense and conflicted emotional distress in response to a death of this kind. The economic costs are enormous given that the greatest number of suicides and self-harm episodes occur before the age of 44 years.

Estimates of the cost of suicide (both attempted and completed suicide) can be useful in two ways. Firstly, the estimate give some idea of the conditions and the populations for which the burden of disease is greatest, and can therefore give some guidance as to where research on developing new interventions might be focused to give the greatest potential gain. Secondly, the detailed estimates of cost components can provide useful input to a cost-effectiveness analysis of a proposed specific intervention, and to its subsequent evaluation.

What to Include in Estimating the Cost of Suicide.

Yang & Lester (2007), have suggested that net cost estimates of suicide should go beyond accounting for direct medical costs and indirect costs from loss of earnings of those who suicide. Yang & Lester (2007) also suggest that the premature death resulting from suicide may actually derive savings to society from the avoidance of having to treat the depressive and other psychiatric disorders of those who suicide; avoidance of pension, social security and nursing home care costs; and assisted suicide.

The most recent mental health survey of Australians (ABS, 2008) estimates the number of Australians personally experiencing suicidal thoughts, making suicide plans and making a suicide attempt. The estimate of days out of role in the 30 days previous to the survey interview gives some indication as to the impact that suicidal behaviour has on people's lives. However, it belies the psycho/social impact of experiencing such deep psychological pain that one is preoccupied with the internal battle of ambivalence between wanting to die to end the pain and wanting to find a way to live.

As well as costs to the individual, it is important to contextualise suicidal behaviour and appreciate the ripple affect caused in the lives of friends, family members, colleagues and acquaintances. The number of people immediately affected by any one suicide has conservatively and historically been estimated as up to 6 (Corso 2006, Maple 2009).

This measure probably underestimates the number of people grieving each suicide death, the ramifications of which are likely to extend more broadly. Potentially, three to four generations can be bereaved: siblings, parents, grandparents, and in some instances, the person's own offspring (Cantor et al. 1999). Relatives, friends and the wider community are also affected. Frank Campbell (*Changing the legacy of Suicide*, 1997) states that there are as many as 28 relationships impacted by one suicide.

People will be impacted in many and various ways by a single suicide and the research has simply not been done to articulate the actual number of people impacted, nor the breadth, depth and length of this impact. Nor has the research addressed the impact of multiple suicides that occur in one family, community or one geographic region. The ripple effect of one suicide affects future generations of that family.

Likewise, the number of people impacted by any one suicide attempt, notwithstanding the individual, and the way in which they are impacted has not been extensively researched.

Estimates of the savings to be made from sound investments in suicide prevention, crisis interventions and postvention services and strategies have not been conducted in Australia. Again, Access Economics have prepared a report estimating the net savings from investment in services to provide evidence-based services for early psychosis (Access Economics, 2008). The methodology has relevance to the question of estimating savings to the community for investments in suicide prevention strategies. Such evidence can help inform decisions by policy makers as to where the greatest potential gain can be achieved through investment in suicide prevention. Detailed estimates of cost components can also provide useful input to a cost-effectiveness analysis of a proposed specific intervention and its subsequent evaluation (O'Dea & Tucker, 2005).

Other Relevant Australian Cost Analyses

There have been some Australian studies examining the economic cost of suicide in relation to specific mental disorders. Access Economics has reported on the economic costs of schizophrenia (Access Economics, 2002) and bipolar disorder (Access Economics, 2003). However, there is no record of a similar exercise being carried out in Australia for any of the other psychotic disorders or other mental illnesses.

The Access Economics report for SANE Australia (2002) indicates that the direct and indirect costs of schizophrenia and associated suicides are enormous. In 2001, for example, real financial costs of illness totalled **\$1.85 billion**, about 0.3% of GDP, and nearly \$50,000 on average for each of more than 37,000 Australians with the illness (Access Economics, SANE Australia, 2002).

The direct and indirect costs of bipolar disorder and associated suicides are also substantial. In 2003, for example, real financial costs totalled **\$1.59 billion** (0.2% of GDP) and over \$16,000 on average for each

of nearly 100,000 Australians with the illness. Moreover, the burden of disease – the pain, suffering, disability and death – associated with bipolar disorder is greater than that of ovarian cancer, rheumatoid arthritis or HIV/AIDS, and similar to schizophrenia and melanoma; resulting in 4,843 years lost due to suicide and self-harm (Access Economics; SANE Australia, 2003).

Quantitative data is also available on the national injury burden or burden of disease in Australia, which is notably dominated by suicide and self-inflicted injuries, road traffic accidents and accidental falls (Cripps & Harrison, 2008; Begg et al., 2007).

International literature and potential costing models

Despite the limited estimates and detailed research on the economic costs of suicide in Australia, some excellent material, somewhat comparable to the Australian cultural context, is available internationally, from jurisdictions including California, Ireland and New Zealand.

International studies of the cost of suicide can be broadly summarised as adopting the following methods, which may or may not function as a useful guide to proposed Australian measures:

- The **use of a human capital approach** to valuing lost life years, rather than a willingness-to-pay approach.
- The **extension of the human capital approach** to valuing the lost life years, even for those years in which the person would not be in paid employment – for instance, for those years past the age of retirement (usually assumed to be 65 years), or for the ages 15 to 64 when not actually in paid employment. This brings up the question of the value of **time not in paid employment**.
- The **use of a cut-off** of 75 years of age, beyond which lost years of life are not counted.
- The **discount rate** used for discounting future earnings or life years.

The New Zealand study estimated that, in 2002, the total cost of suicide was around \$1.4 billion, incorporating both economic costs (i.e. services used in cases of suicide and attempted suicide, and lost production from exit or absence from the workforce) and non-economic costs (i.e. lost years of disability-free life and grief of family and friends). To put this in perspective, at the time of the study, figures suggested that around 500 deaths in New Zealand were attributable to suicide annually, working out to nearly \$2.5m per suicide (O’Dea & Tucker, 2005).

Corso et al (2007) also provide a formula and estimates of the cost of both suicide and suicide attempts for California. This work was used to inform the development of the Californian Suicide Prevention Strategy, released in mid 2008.

“The economic burden of suicide is spread throughout a variety of systems, including education, hospitals, primary care, mental health, and corrections. To estimate these costs, a formula has been derived based on costs incurred by individuals that attempted or died by suicide, families, employers, government programs, insurers, and taxpayer. Estimates of the cost of self-injuries take into account hospitalizations and follow-up treatment; coroner and medical examiner costs; and transport, emergency department, and nursing home costs. Lifetime productivity estimates take into account lost wages, fringe benefits, and costs related to permanent or long-term disability for each individual who attempts or dies by suicide.”

Using this formula based on suicide data from 1999 to 2003, Corso et al estimated the average medical cost per suicide in California was \$4,781 and the average lifetime productivity loss for each individual was more than \$1.2 million. The resulting cost of suicide deaths in a given year is nearly \$15 million per year in medical costs and \$3.8 billion in lost lifetime productivity for the individuals who die by suicide in a given year. This estimate did not include the 'ripple effect' on others, in terms of services needs and lost productivity. In 2003, there were over 16,000 hospitalisations for suicide attempts in California. The average medical cost per hospitalization was more than \$12,000 and the average work loss per case was over \$14,000. The resulting cost of suicide attempts in a given year in California is \$435 million. Based on these figures, the combined estimated cost of suicides and suicide attempts in California is \$4.2 billion per year.

Obviously, it is important to remember in these studies that the economic burden of suicide is spread throughout a number of systems, not least of all, employment, education, primary care, hospitals, mental health and criminal justice. The appropriateness of adding together such different cost concepts (i.e. economic costs, relative to personal and social costs) warrants some attention also; suggesting that a more appropriate approach may be to measure economic and non-economic costs separately (O'Dea & Tucker, 2005; Insel, 2008).

The Statistical Value of a Life and Most Recent Estimations

"The valuation of life is generally an emotive issue fraught with philosophical and conceptual problems. Consequently, it is an issue riddled with controversy and debate. It is also associated with seeming irrationalities. For example, society will usually go to great lengths to save identified lives such as sailors stranded in mid-ocean or a child in need of expensive surgery. However, when the lives to be saved are anonymous, as for example in the case of funding research into cures for disease that would save lives in the future, public response may not be quite as generous. This apparent irrationality may be due to the greater sense of responsibility and claims of conscience associate with identified lives as opposed to anonymous lives." Motha (1990:1).

The concept of a 'statistical' life has developed in order to distinguish the value of the life of an anonymous or unknown individual from the life of a known or particular person, for the purposes of policy making.

There continues to be some debate amongst economic theorists as to how to most accurately estimate the Value of a Statistical Life (VoSL). In recent years, there has been heightened interest in the development of health outcome measures that combine morbidity (quality of life) and mortality (quantity of life) in a single measure. Candidates include the Quality of Life Years (QALYs) and Disability Adjusted Life Years, DALYs. Discounting is commonly employed to reflect society's preference for health gains that accrue sooner rather than later in time and costs that occur later, rather than sooner, in time. A variety of methods have been used to value life and health e.g. human capital (foregone earnings), willingness-to-pay (WTP) estimated through indirect market methods and cost of illness. The advantages and disadvantages of these two approaches are set out in Table 1.

The most recent research re-evaluating the cost of human lives lost in car accidents calculates the average cost of a life at \$6million, four times the \$1.5 million that was previously used to estimate the

cost of road accident deaths (Hensher et al 2009). Hensher states that “the figure of \$1.5 million used by many policy makers is more of an accounting figure, putting a present value on income lost when and individual dies in a road accident.”

The methodology used in this research increases the cost of death and, therefore, should alter the cost-benefit analyses of proposed safety measures designed to lower road deaths. Hensher cites the use of this formula in the US, UK, New Zealand and Sweden.

Comparison with Road Deaths

Thanks to three decades of sustained investment and coordinated policy and program action, Australian roads are now among the safest in the world. The annual economic cost of road crashes in Australia has been conservatively estimated to be at least \$18 billion in 2005 (Australian Transport Safety Bureau, 2009).

Road injuries and deaths receive extraordinary scrutiny, analysis and timeliness of reporting and ease of access to detailed reporting. The Bureau of Infrastructure, Transport and Regional Economics (BITRE) provide up-to-date road safety statistics and a publicly accessible database of over 500 research, evaluation and monitoring reports.

As a consequence of developing an understanding of the economic cost of road deaths from as far back as 1981, a sustained, well-founded road safety program within a robust policy framework has existed and continued to develop over the past 30 years. Furthermore, the savings made by investments in road safety are presented to government to support ongoing targeted investments.

The National Road Safety Action Plan 2009 – 2010 states:

“General investment in road infrastructure maintenance and improvement, and targeted investment in road safety improvements (such as black spot remediation and application of low-cost, high-effectiveness treatments to lengths of road) are both important for safety outcomes. The economic benefit of such expenditure is estimated to average around \$5 per dollar spent, with an accumulating safety benefit of about 24 deaths prevented per year from a \$287 million program. Sustained expenditure of \$287 million per year over four years would reduce annual deaths by almost 100. Greater investment in these programs would produce commensurately larger benefits.”

Investment in *Black Spot Road Safety* programs have been one example when the dollars invested and economic benefit return calculated. An independent evaluation done of that program for the 3 year period 1990-1993 by the Bureau of Infrastructure, Transport and Regional Economics (BITRE) reported:

“The results indicate that the entire Black Spot Program has delivered net benefits to the Australian community of at least \$800 million generating returns of around \$4 for each dollar of expenditure. The results of the evaluation strongly suggest that the Program has achieved its aim of improving locations with a history of crashes involving death or serious injury.”

<http://www.bitre.gov.au/publications/48/Files/R090.pdf>

The contrast between road safety research, strategy and investment and that in suicide prevention could not be starker.

Table 1: A Comparison of Approaches to Valuing Human Life

Advantages	Disadvantages
HUMAN CAPITAL APPROACH	
Data reliable and readily available	Values some lives higher than others due to labour market imperfections such as wage discrimination. If simplistically applied, the very young and old are undervalued.
Consistent and transparent results	Overestimates costs in an economy with less than full employment
Simple to use	Does not reflect a key reason for investment in safety: aversion to death/injury rather than income protection
	Ignores the loss of 'joy of life' while values pain suffering and grief are often arbitrary
	Actuarial uncertainties regarding life expectancy and earnings
	Selection of appropriate discount rate is controversial
WILLINGNESS TO PAY APPROACH	
Comprehensiveness	People have difficulty in understanding and valuing small risks (generally less than 1 in 10,000)
	Individual perceptions of risk may differ
Incorporates subjective welfare costs	Willingness to pay does not necessarily imply ability to pay
	Differences exist between people's expenditure patterns/actions and their real preferences
Reflects individual preferences	Aggregating individual's willingness to pay may not produce the social willingness to pay, as individuals may ignore external social costs
	Difficulty in applying concept of a statistical life rather than a particular life
	Methodological differences (e.g. inaccurate responses) and strategic behaviour in surveys
	Equity is not taken into account, as results are income related
	Discrepancy in results using willingness to pay and willingness to accept approaches
	Value will change with incomes and variations in road safety

Source: Bureau of Transport Economics, 1998

What is Required

Clearly, research is urgently required into not only the economic costs of suicide and suicide attempts in Australia, but more comprehensively, the financial costs associated with the complex trajectory of suicidality – from prevention to intervention and postvention.

Clearly, more work is required to more accurately and fully cost the economic impact of suicide and suicidal behaviour on the Australian economy. The Table below lists the components that may be used to calculate the total cost of suicide and self-harm to the Australian community.

Table 2: Possible components for costing suicide and self-harm in Australia

Total number of suicides	Lost Production Value	Cost of Ambulatory services
Years of Life Lost due to premature mortality (YLL)	Estimated social losses for self harm and suicide	Productivity losses for survivors (bereaved and attempters)
Years of Life Lost due to disability	Cost of insurance and superannuation claims	Cost of prevention & intervention programs
Hospital separations for intentional self-harm	The present value of future work efforts	Cost of bereavement programs
Emergency services for intentional suicide & self harm	Severity of Self-Harm Injuries ICD -10	Value of a statistical life year

An Estimation of the Monetary Cost of Suicide and Suicidal Behaviour

In estimating the cost of suicide and suicidal behaviour the available ABS, AIHW and other relevant reports and articles have been used. This data is presented in Tables 3-5

Table 3 shows the results from the ABS National Survey of Mental Health and Wellbeing conducted in 2007 (Slade et al, ABS, 2009) for the prevalence of suicidal behaviour.

Table 3: Prevalence & population estimate of lifetime & 12-month suicidality

(Australians 16-85 y.o., n=8,800)

	Lifetime prevalence %	Population estimate	12-month prevalence %	Population estimate	Days out of role
Suicidal ideation	13.3	2.1 million	2.3	370,000	
Suicide plans	4.0	Over 600,000	0.6	91,000	8.2 days per month
Suicide attempts	3.3	Over 5000,000	0.4	65,000	8.5 days per month
Any suicidality	13.3		2.4	Over 380,000	6.7 days per month

Note: Any suicidality is lower than the sum, as people may have reported more than one type of suicidality in the 12 months.

Source: The Mental Health of Australians 2, 2008

In 2007-8, the AIHW report on Hospital Admissions Data shows there were a total of 31,509 hospital separations for intentional self-harm for all hospitals (i.e. public and private), with an average length of hospital stay of 4.5 days.

Table 4: Separations for females for intentional self-harm 2007-8

Age

<1	1-4	5-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	85+	Total
0	3	505	5,794	4,073	4,315	2,803	1,090	374	265	87	19,309

Source: AIHW (2009). Hospital Separations Data, 2007-8.

Table 5: Separations for males for intentional self-harm 2007-8

Age

<1	1-4	5-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	85+	Total
0	5	113	2,783	3,056	2,880	1,866	812	347	246	89	12,197

Source: AIHW (2009). Hospital Separations Data, 2007-8.

Table 6 shows the application of the most recent formula available (Hensher, 2009) and extrapolated to the number of suicides in Australia in a given year, using the published ABS data (ABS, 2009), the recently released revised AIHW data for 2004 (Harrison et al, 2009) and a 'Plausible Figure'. The 'Plausible Figure' includes a conservative estimate of the likely impact of the Global Financial Crisis on Australia's annual deaths from suicide. An increase of 10% in total suicides for 2009 has been assumed using the AIHW revised number. A 10 per cent increase would be at the low end of 'expectations', based on the historical data (Morrell et al, 1993).

Furthermore, the 'Plausible Figure' does not include any allowance for the deaths in single vehicle road accidents which may be intentional (De Leo et al, in press). It is important to note that single vehicle accidents (SVA) now account for almost 50% of all road deaths in Australia (Department of Infrastructure, Transport, Regional Development and Local Government, 2009). SVA deaths are proving to be resistant to road safety strategies and show a long term upward trend as a proportion of all road fatalities.

The calculation for attempted suicides, suicide plans and suicidality amounts to between \$770M and \$1.2B. This is based on the 2007 ABS National Mental Health and Wellbeing study, which provided prevalence rates and the numbers of days out of role and Average Weekly Earnings¹. Again this would be a conservative estimate as it excludes all health care and emergency services costs.

¹ AWE was based on published ABS data for full time work and applied to 70% of the time out of role indicated against each 'condition' in the ABS Mental Health Survey.

In calculating the productivity losses for others affected by the suicide and suicidal behaviour again the ABS data and the application of Corso's (2007) and Maple et al's (2009) estimates of other affected have been used. Corso and Maple estimate that on average at least six people would be directly affected by every suicide – for the purposes here it has been estimated that each of these six people would be out of role for just five days.

The productivity loss for those affected by a suicide attempts has also been calculated - even if they were only out of role for 2 days this would amount to a productivity loss of \$136.5M. The impact on others on suicidal ideation, suicide plans or other suicidality has been excluded as it has been assumed because may not be aware of the behaviour.

Based on AIHW hospital admission and cost data, then a further \$133.3M would be added for cases of self-inflicted harm. Therefore, based on these figures, a conservative estimate for the economic cost of suicide and suicidal behaviour on the Australian community is **\$17.5B every year**.

Table 6: An estimated cost of suicide & Attempted Suicide using different annual numbers

	ABS	AIHW	Plausible
Suicides			
Number of Suicides annually	1,800	2,458	2,704
Cost (VoSL) @ \$6m/life	\$10.8B	\$14.75B	\$16.2B
Lost Productivity due to Suicide	\$9.5M	\$12.9M	\$14.2M
Attempted Suicides	n/a	65,000 cases	65,000 cases
Cost of Suicidal behaviour	n/a	\$770-1,200M (\$985M)	\$770-1,200M (\$985M)
Cost of Hospitalisation due to Self-Harm	n/a	\$133.3M	\$133.3M
Lost Productivity due to Suicidal Behaviour to others	n/a	\$136.5M	\$136.5M
TOTAL ESTIMATES	\$10.9B	\$16.02B	\$17.5B

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