The evidence on the costs and impacts on the economy and productivity due to mental ill health: a rapid review

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An **Evidence Check** review brokered by the Sax Institute for the Mental Health Commission of NSW

April 2013





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April 2013

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#### Suggested Citation:

Doran CM. The evidence on the costs and impacts on the economy and productivity due to mental ill health: an Evidence Check rapid review brokered by the Sax Institute (<u>www.saxinstitute.org.au</u>) for the Mental Health Commission of NSW, 2013.

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#### Abbreviations and terms used in this report

ABS	Australian Bureau of Statistics
ACE-MH	Assessing cost-effectiveness of Mental Health
ACE-Prevention	Assessing cost-effectiveness of Prevention
ACT	Assertive community treatment
ADHD	Attention deficit hyperactivity disorder
AIHW	Australian Institute of Health and Welfare
ALOS	Average length of stay
BFM	Behavioural family management
BIM	Behavioural intervention for families
BOD	Burden of disease
CBT	Cognitive behaviour therapy
CCBT	Computerised cognitive behaviour therapy
CD	Conduct disorder
CEA	Cost-effectiveness analysis
СМНР	Collaborative mental health care program
COI	Cost of illness
DALY	Disability-adjusted life year
DEX	Dexamphetamine
GAD	Generalised anxiety disorder
GP	General practitioner
HASI	Housing and Accommodation Support Initiative
HILDA	Household, Income and Labour Dynamics in Australia
HTA	Health Technology Assessment
HCA	Human capital approach
HRQOL	Health related quality of life
IPS	Individual placement and support
LOS	Length of stay
LPDS	Low Prevalence Disorders Study
MATISSE	Multicentre evaluation of art therapy In schizophrenia: systematic evaluation
MDD	Major depressive disorder
MDU	Mood disorder unit
МРН	Methylphenidate
MFG	Multiple family groups
NHS	National Health Service
NICE	National Institute Clinical Excellence
NPHS	National population health survey
NSMHWB	National Survey of Mental Health and Wellbeing
OHP	Optimal health program
PD	Psychiatric diagnoses
PEP	Primary care evidence-based psychological interventions
PRIZE	Partial responders international schizophrenia evaluation
QALY	Quality-adjusted life year

QOL	Quality of life
REACT	Randomised evaluation of assertive community treatment
SCAP	Schizophrenia care and assessment programme
SE	Supported employment
SGA	Second-generation antipsychotics
SNRIs	Serotonin and noradrenaline reuptake inhibitor
SWAN	Supported work and needs trial
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#### **EXECUTIVE SUMMARY**

Mental illness is a term describing a diverse range of behavioural and psychological conditions. The most common illnesses in Australia are anxiety, affective and substance use disorders with low prevalence conditions including eating disorders and severe personality disorder. The economic cost of mental illness in the community is high. Outlays by governments and health insurers on mental health services totalled \$5.32 billion in 2007–2008 representing 7.5% of all government health spending. An additional \$4.63 billion was spent by the Australian Government in providing other support services for people with mental illness, including income support, housing assistance, community and domiciliary care, employment and training opportunities. In addition to government expenditure, mental disorders have large economic impacts in other areas including out of pocket personal expenses, carer/family costs, lost productivity and costs to other non-government organisations. Evidence suggests that these costs are at least equal to, if not more, than government expenditures.

The Mental Health Commission of NSW is an independent body which helps drive reform that benefits people who experience mental illness and their families and carers. The Commission is working with the mental health community towards sustained change regarding all aspects of mental illness and its impact on employment, education, housing, justice and general health. The Commission has been tasked with developing a draft strategic plan for Government by March 2014. To inform the development of the draft strategic plan, a rapid review was commissioned to examine the costs and impacts on the economy and productivity due to mental illness (broken down by mental health disorder).

A rapid review of the literature was conducted with the assistance of an accredited librarian. A total of 45 studies were identified and included in this review. The vast majority of identified studies were from Australia (N=22) followed by Canada (N=12) and the UK (N=10). Only one New Zealand study was located. Nineteen studies were classified under the general heading of mental disorder, 11 focussed on depression, seven schizophrenia and two each on eating disorders and psychological distress.

The quality of the studies reviewed was assessed using a well-known economic instrument – the Drummond 10-point checklist. This checklist considers: the research question; description of study; study design; identification, measurement and valuation of costs and consequences; discounting; presentation of results; and discussion of results in context of policy relevance and existing literature. Of the 45 studies reviewed, 26 had conducted a cost of illness analysis. All 26 were rated as good quality.

In assessing the evidence base underpinning the studies a number of observations have been made. First, variations in study design and methods limit comparison – across disorders and country. Second, there is a lack of evidence related to the costs and impacts of mental illness. Third, more recent efforts have taken advantage of the increased availability of linked data that enable a better understanding of the trajectory of mental health disorders and treatment pathways.

All of the reviewed studies highlight the substantial impact mental disorders have on individuals, families, workplaces, society and the economy. III health and disability, including poor mental health, is a significant barrier to school completion. Evidence suggests that those who complete high school are more likely to be employed in higher skilled occupations and to obtain other (non-school) educational qualifications. Australian individuals with a mental health condition have unemployment rates up to four times higher than healthy people, tend to use a higher amount of medical resources, be reluctant or unable to join the labour force and, will

predominantly rely on social welfare. Research in Canada estimate that the total economic costs associated with mental illness will increase sixfold over the next 30 years with total cumulative costs exceeding \$2.5 trillion dollars (in 2011 present value dollars).

A key purpose of this rapid review has been to provide guidance to the Commission on the development of the draft strategic plan. In terms of specific advice, the Commission may consider the following:

- NSW has a range of good quality data available to further investigate the impact and economic cost associated with mental disorders. Linked data including the 45 and Up study and the Australian Longitudinal Study of Women Health; administrative data including Medicare data and the NSW admitted patient data collection; and, general health and mental health survey data. These data sources could be further explored to shed more light on the impact of mental disorders in NSW.
- 2. The Commission could call for research projects and partners to answer high priority questions. A first priority would be to conduct a comprehensive assessment of mental health disorders to quantify the current and future life and economic outcomes associated with mental illness in NSW. Other projects would seek to address research gaps and may include: research to tease out the relationship between cognitive function, ADHD and the impact of strategies to alleviate this burden; further investigation of employment support programs and the potential to use the work place as a setting for mental health promotion and prevention; more research into continuity of care and, in particular, whether shifting resources from hospital to community would result in improvements in continuity of care and subsequent health outcomes; and, the development of a multifaceted strategy that aims to prevent the onset of mental health conditions, assist sufferers to manage their condition when it is occurring and assist individuals to remain integrated within society.
- 3. The whole of government draft strategic plan will address health, housing, employment, education and justice. Increased involvement of people with mental illness with these agencies increases the benefits of service improvements within and across these agencies. To improve connectivity between different parts and players of the system, the Commission could explore options to collaborate more effectively with researchers and service providers through partnership grants and other multi-agency arrangements.

## 1 Background

The Mental Health Commission of NSW is an independent body which helps drive reform that benefits people who experience mental illness and their families and carers.<sup>1</sup> The Commission is working with the mental health community towards sustained change regarding all aspects of mental illness and its impact on employment, education, housing, justice and general health.<sup>1</sup> The Commission has recently begun the process of developing a draft strategic plan for the NSW mental health system. To inform the development of the draft strategic plan, a rapid review was commissioned to examine the evidence on the costs and impacts on the economy and productivity due to mental illness (broken down by mental health disorder). It is anticipated that this work will help create an evidence base to inform the allocation of resources towards best practice cost-effective services and discontinuing of non-cost-effective services. The evidence on the costs and impacts on the economy and productivity due to mental ill health: a rapid review

### 2 Introduction

Mental illness is a term describing a diverse range of behavioural and psychological conditions. The most common illnesses are anxiety, affective (mood) and substance use disorders.<sup>2</sup> Results from the 2007 survey, conducted by the Australian Bureau of Statistics (ABS), indicated that one in five (20%) Australians aged 16–85 years experienced one of these more common mental illnesses in the preceding 12 months, equivalent to 3.2 million people.<sup>3</sup> Mental illness also includes low prevalence conditions such as eating disorders and severe personality disorder. Although no official statistics exist on the prevalence of these conditions, estimates suggest that they may affect another 2–3% of the adult population.<sup>4</sup> Further, the Australian child and adolescent survey conducted in 1998 found that 14% of children and young people (or 500,000 persons) are affected by mental disorders within any six month period.<sup>5</sup>

The economic cost of mental illness in the community is high. The National Mental Health Report (2010) suggests that outlays by governments and health insurers on mental health services in 2007–2008 totalled \$5.32 billion, representing 7.5% of all government health spending.<sup>2</sup> These figures reflect the cost of operating the mental health service system. An additional \$4.63 billion was spent by the Australian Government in providing other support services for people with mental illness, including income support, housing assistance, community and domiciliary care, employment and training opportunities. In addition to healthcare expenditure, mental disorders have large economic impacts in other areas including out of pocket personal expenses, carer/family costs, lost productivity and costs to other non-government organisations. Australian and international cost of illness studies suggest that these costs are at least equal to, if not more, than total government expenditures.<sup>6–8</sup>

#### 3 Method used in current rapid review

An accredited librarian working at a leading Australian University assisted with the literature review of the peer-reviewed literature. The Mental Health Commission of NSW assisted with identification of grey literature – i.e. information that may not have been published in journal articles or books.

#### Information sources

The following databases were searched:

 Medline /Ovid; Embase /Ovid; PsycINFO /Ovid; EBM Reviews- Cochrane Database of Systematic Reviews / Ovid; The Campbell Library; APAIS-Health /Informit; CINAHL /Ebsco; Global Health /Ovid; EconLit /Proquest; PAIS International /Proquest; ABI/INFORM Global /Proquest.

#### Search strategy

In order to find studies on the costs and impacts on the economy and productivity due to mental illness, the databases were searched with both keywords and subject headings specific to each database using the following strategy:

- mental health OR mental disorders OR anxiety disorders OR mood disorders OR affective disorders OR depressive disorders OR schizophrenia disorders OR bipolar disorder OR depression OR post-traumatic stress disorder OR Obsessive compulsive disorder OR Phobia OR Panic disorders OR Eating disorders OR Personality disorders OR Mental illness OR ADHD OR Conduct disorders OR Oppositional defiant disorder
- 2. costs OR impact OR productivity OR workforce OR economy
- 3. Australia OR United Kingdom OR Canada OR New Zealand
- 4. AND / 1-4

The search was limited to studies published from 2000 to current (2013). Key journals were also hand searched to increase coverage of those research articles recently published.

The following terms were not included in this literature search: dementia; intellectual disability; substance use and abuse (including opioid, opiate, heroin, alcohol); or, behavioural problems in youth (except ADHD).

#### Results

This search strategy returned 278 references. The author reviewed the abstracts of all references and deleted records for the following reasons: different country; not a cost or impact study; thesis, commentary or editorial; alcohol study or inappropriate search term. A total of 229 studies were deleted leaving 49 references. The author obtained full copies of all 49 articles and reviewed each study individually. Twenty-one references were excluded for the following reasons: duplicate of another study; different country; commentary; not a cost or impact study; and, study conducted outside of time frame. A further 17 references were added, located through searching grey literature and the Commission's contacts. A total of 45 references are included in this review.

Table 1 provides an overview of studies relating to the costs and impacts on the economy and productivity due to mental illness by mental health disorder. The vast majority of studies had been conducted in Australia (N=22) followed by Canada (N=12) and the UK (N=10). Only one New Zealand study was located in the area of mental disorder. In terms of specific mental disorder, a total of 19 studies were located under the general heading of mental disorder, 11 studies focussed on depression, seven on schizophrenia and two each on eating disorders and psychological distress.

Mental disorder	Australia	Canada	New Zealand	United Kingdom	TOTAL
ADHD	0	0	0	1	1
Anxiety	1	0	0	0	1
Cognitive function	0	0	0	1	1
Conduct disorder	0	0	0	1	1
Depression	6	2	0	3	11
Eating disorder	1	0	0	1	2
Mental disorder	7	9	1	2	19
Psychological distress	2	0	0	0	2
Schizophrenia	5	1	0	1	7
TOTAL	22	12	1	10	45

#### Table 1 Summary of studies included in this rapid review

## 4 Review question 1: What is the evidence on the costs and impacts on the economy and productivity due to mental illness?

# The timeframe of estimated costs and impacts should be included; short, medium and long-term timeframes are all of interest

The majority of studies assessed costs or impact over relatively short time frames (i.e. six months to two years). These studies generally used administrative data or survey data. The majority of the Australian studies developed annual impact assessments using survey data from the National Survey of Mental Health and Wellbeing (NSMHWB), the Low Prevalence Disorders Study (LPDS), generic health and specific mental health surveys and various administrative data sets from the Australian Institute of Health and Welfare (AIHW) and ABS. For example, Hilton used the health and performance at work questionnaire to examine the relationship between psychological distress and workplace productivity.<sup>9,10</sup> In the earlier study the authors found that high psychological distress increases absenteeism by 1.7%, decreases employee performance at work by 6.1%, resulting in a net productivity loss of 6.7%.<sup>9</sup> In the latter study, Hilton et al. (2010) estimated that psychological distress produces an \$5.9 billion reduction in Australian employee productivity per annum.<sup>10</sup> Schofield used a combination of data sources to populate a microsimulation model of health and disability.<sup>11,12</sup> The authors found that individuals who had retired early due to depression had 73% lower income then their full-time employed counterparts. The national aggregate cost of this early retirement equated to \$278 million in lost income taxation revenue, \$407 million in additional transfer payments and around \$1.7 billion in gross domestic product.<sup>11</sup> Laplagne et al. (2007) used data from Household, Income and Labour Dynamics in Australia (HILDA) to examine the effects of health and education within an integrated modelling framework on labour productivity.<sup>13</sup> The authors found that a mental health or nervous condition is associated with a low likelihood of being in the labour force, especially for males. Further, they suggest that the causality between mental health and labour force participation can run both ways: poor mental health may lead to a reduced likelihood of labour force participation and labour force participation can, in turn, influence a person's mental health, i.e. working may have a positive or negative impact on mental health.<sup>13</sup> Morgan et al. (2011) report the findings of the second Australian national survey of psychotic illness.<sup>14</sup> The authors report a range of findings from the survey: an estimated 3.1 cases per 1,000 population aged between 18 and 64 years had a psychotic illness in 2010; schizophrenia (47.0%) was most common psychotic disorder; two thirds of people experienced their first episode before the age of 25 years; most (91.6%) people were taking prescribed medications in the previous four weeks, with four-fifths (81.6%) taking antipsychotics; Government pensions were the main source of income for 85.0% of people; and, 30.5% were employed on a full-time basis. The findings also suggest that people with psychotic illness have substantially poorer physical health than the general population, and remain at considerably greater risk of higher levels of obesity, smoking, alcohol and drug use.<sup>14</sup>

The majority of Canadian and UK studies also used either survey or administrative data to explore annual (short-term) impacts of mental disorders.

A limited number of studies were able to take advantage of linked data to examine a more medium to longer-term impact of mental disorder. In Australia, Fitzgerald et al. (2007) used data

from the Schizophrenia Care and Assessment Programme study, a prospective, longitudinal, study of global health outcomes for 347 people with schizophrenia, to describe the cost associated with schizophrenia.<sup>15</sup> The authors estimated that the average annual societal cost of treatment was 32,160 during the first year decreasing to 29,181 in the third year.<sup>15</sup> Another Australian study by Paradise et al. (2012) used the 45 and Up Study data to examine the association of heart disease, depression and ill health retirement in a large community sample.<sup>16</sup> The authors found that nearly one in five of the participants retired early due to ill health. A prior diagnosis of depression was associated with a threefold increase in the risk of ill health retirement.<sup>16</sup> In New Zealand, Gibb et al. (2010) used longitudinal data collected as part of the Christchurch Health and Development Study to examine whether the extent of common psychiatric disorder between ages 18 and 25 is associated with negative economic and educational outcomes at age 30.<sup>17</sup> The authors found that increasing episodes of psychiatric disorder have increasingly negative effects on life outcomes even after adjustment for confounding factors. Further, those individuals most at risk of negative outcomes are not those who experience any specific psychiatric disorder, but rather, those who experience multiple episodes of disorder. The authors contend that this finding suggest there is a need to develop targeted interventions for those with multiple psychiatric disorders in order to reduce the risks of negative life outcomes among this group.<sup>17</sup> In the UK, Stansfeld et al. (2010) used the Longitudinal Whitehall II Study of British Civil Servants to examine the association of common mental disorders and long spells of psychiatric and non-psychiatric sickness absence.<sup>18</sup> The authors found that that clinical but not sub-threshold common mental disorders were associated with increased risk of long spells of psychiatric sickness absence for men, but not for women, after adjusting for covariates. Risk of psychiatric sickness absence was associated with recent common mental disorders and disorder present on two occasions.<sup>18</sup> Another UK study by Henderson et al. (2011) used data from British cohort studies to test the relationship between childhood cognitive function and long-term sick leave in adult life and whether any relationship was mediated by educational attainment, adult social class or adult mental ill-health.<sup>19</sup> The authors found that a clear dose-response relationship exist between lower cognitive function in childhood and increased odds of being on long-term sick leave in adulthood. The authors contend that this association is mediated in part by education attainment suggesting improved education especially for those with lower cognitive abilities may help inoculate them from the risk of longterm sickness absence.<sup>19</sup>

Four studies adopted a longer-term time frame. Schlander (2007) developed a model to estimate future trends (2002–2012) of ADHD-related drug expenditures in Germany and the UK.<sup>20</sup> The authors found that even for an extreme low case scenario, a more than sixfold increase of pharmaceutical spending for children and adolescents is predicted over the decade from 2002 to 2012.<sup>20</sup> Scott et al. (2011) assessed the costs to the public sector incurred to age 28 in dealing with children with different levels of antisocial behaviour.<sup>21</sup> The authors found that by age 28, costs for individuals with conduct disorder are 10.0 times higher than for those with no problems and 3.5 times higher than for those with conduct problems. In all groups crime incurred the greatest cost, followed by extra educational provision, foster and residential care, and state benefits; health costs were smaller.<sup>21</sup> McCrone et al. (2008) led a study commissioned by the King's Fund to estimate mental health expenditure in England for the next 20 years to 2026.<sup>22</sup> This study is an extremely useful piece of analysis that calculates future prevalence and cost estimates for depression, anxiety disorders, schizophrenic disorders, bipolar disorder/related conditions, eating disorders, personality disorder, child/adolescent disorders and dementia. The authors estimate the number of people in England who experience a mental health problem will increase by 14.2% with service costs estimated to increase by 45% to £32.6 billion in 2026 (at 2007 prices).<sup>22</sup> In Canada, Smetanin et al. (2011) undertook a modelling exercise using RiskAnalytica's Life at Risk simulation platform to generate a base model of the current and future life and economic outcomes associated with major mental illness including: mood disorders, anxiety disorders, schizophrenia, disorders of childhood and adolescence, cognitive impairment including dementia and substance use disorders.<sup>23</sup> The authors estimate that, in 2011 present value terms, the total cumulative costs over the next 30 years of mental illness could exceed \$2.5 trillion dollars. <sup>23</sup>

#### Key assumptions of the economic modelling approaches used should be included

Over half of the studies reviewed were costing studies (N=26) followed by impact/review studies (N=12) and modelling studies (N=7). Cost-of-illness (COI) studies aim to quantify the economic costs borne by individuals and organizations arising from a particular disease. The extent of impact assessed is determined by the viewpoint of the analysis. The majority of studies adopted a social perspective (N=14), followed by health sector (N=6) and other (N=6). The gold standard in costing studies is the social viewpoint as it aims to capture the full extent of resource use including patient out of pocket expenses, healthcare utilisation, other services utilisation and productivity costs.<sup>24</sup> In this rapid review, the key difference between social and health perspective seemed to be the inclusion of indirect or productivity costs (such as for example, lost earnings or lost earning potential) and not a comprehensive assessment of all possible resource use.

COI studies can also be based on either prevalence or incidence figures. Prevalence-based estimates assess the economic burden of all cases of a disease (both pre-existing and new cases) in a given population over a defined period, usually a year. Incidence-based estimates assess the lifetime economic burden of all new cases of a disease occurring in a given population in a defined period, again usually a year. Thus, prevalence estimates can be used as an indication of the costs of providing health care, while incidence-based studies are particularly useful for estimating the potential benefits of prevention programs. The prevalence-based approach was found to be used more frequently in these COI studies.

Related to data availability is the method for calculating costs – either the top-down approach or the bottom-up approach. The former approach involves disaggregating national or regional expenditure records by diagnosis, while the latter involves the application of unit cost estimates (i.e. for each element of service use) to each individual, which are then averaged. Survey data enables the researcher to use the more precise bottom-up measure whereas national estimates relying on administrative data tend to use the top-down approach. Only three studies (all Australian) included in this rapid review used a combination of approaches. Access Economics (2002) conducted an analysis of the burden of schizophrenia and related suicide in Australia on behalf of SANE Australia.<sup>25</sup> The authors used a range of data sources to examine direct and indirect costs. The authors estimated a total cost of \$1.85 billion in 2001 (\$50,000 on average for each of more than 37,000 Australians with the illness). Access Economics (2003) were also commissioned to examine the burden of bipolar and related suicide in Australia.<sup>26</sup> The authors used a similar methodology to the 2002 study in deriving an estimated total cost of \$1.59 billion in 2003 (\$16,000 on average for each of nearly 100,000 Australians with the illness). In 2012, Deloitte Access Economics was commissioned by the Butterfly Foundation to examine the economic and social costs of eating disorders in Australia.<sup>27</sup> Using a range of data sources and assumptions, the authors estimated that in 2012, there were 913,986 people with an eating disorder in Australia with a total economic cost of \$69.7 billion.

Within the COI literature, costs are generally defined as direct or indirect costs.<sup>24</sup> Direct costs encompass the goods and services, medical and non-medical, used in relation to a given disease. Indirect (or productivity) costs represent economic products (goods and services) that are not produced owing to the morbidity and mortality associated with the disease. The measurement of direct costs is standard in all studies and is relatively straightforward (once the choice of measurement is adopted). Indirect costs on the other hand are more controversial as they can inflate cost figures to an unbelievable level. Traditionally, indirect costs have been measured using the human capital approach in which lost productivity is estimated as discounted earnings, with earnings reflecting productivity at the margin. The 2012 Deloitte study is a good example of potentially inflated indirect costs.<sup>27</sup> The authors estimated that in 2012 there were 913,986 people with an eating disorder in Australia with a total economic cost of \$69.7 billion (direct cost of \$17.18 billion and indirect cost of \$52.6 billion). This is equivalent to \$76,000 per person each year with an eating disorder – substantially higher than gross domestic product per person in Australia. A key problem with this estimate is the value that Deloitte attached to a year of life – \$172,955 in 2012 dollars. The authors use what is called the value of a statistical life rather than the more accepted gross domestic product per capita which is estimated at around \$50,000 in Australia.

The majority of studies included in this rapid review use the human capital approach. An alternative method, the friction cost approach, has been put forward recently, which is based on the time taken to reorganise production processes owing to the loss of a worker through illness or death. This method does not include the full costs of lost productivity only the social cost of employment transition and therefore results in lower cost estimates. There are various estimates and assumptions made in every COI and the valuation of indirect costs is by far the most controversial one.

#### Include expert opinion of the quality of the evidence

A number of guidelines for critical appraisal of economic evaluations are available in the literature.<sup>24,28,29</sup> The Drummond 10-point checklist is perhaps the most widely used appraisal tool.<sup>24</sup> The 10-point checklist considers: the research question; description of interventions; study design; identification, measurement and valuation of costs and consequences; discounting; a clear presentation of results with sensitivity and uncertainty analysis; and discussion of results in context of policy relevance and existing literature. Although the Drummond 10-point checklist relates specifically to economic evaluations, the points are equally applied to costing studies. The key difference perhaps is in the analysis section where economic evaluation costs and consequences of competing healthcare interventions are compared. In a costing study there still needs to be an analysis but the focus is on costing not comparison. With this caveat in mind, the Drummond checklist was considered appropriate and used in this rapid review to assess the quality of those studies (N=26) that had conducted a COI.

Each of the COI studies included in this rapid review was subsequently scrutinised against the Drummond checklist. For the purpose of this review each item has been given a potential score of 1 with aggregate results categorised into studies that reflect, from an economic appraisal viewpoint, poor quality (scores ranging from 1–3), average quality (scores ranging from 4–7) and good quality (scores ranging from 8–10). This approach has been used by the author in the past.<sup>30</sup>

The Drummond checklist was applied to the 26 COI studies with all of them rated as good. This rating reflects that all of the COI studies had identified a research question, implemented an appropriate methodology, interpreted and discussed their results. This is not to say that the methodology was best practice but rather it was feasible and appropriate for the question at hand.

From the author's perspective there are a few additional issues that may be worth noting.

First, although the COI studies are rated as good, there are potential problems with comparing studies conducted over time and geographical region due to various methods and measures. For example, in the review of published COI studies of depression, Luppa et al. (2007) found that across all studies, perspectives and methods differed substantially with only a few studies reporting indirect costs.<sup>31</sup> The authors suggest that methodological differences restricted

comparison across studies and recommend that results of COI should be linked to outcome data to increase effectiveness and efficiency in depression management.

Second, Table 1 highlights the paucity of evidence related to the costs and impacts on the economy and productivity due to mental illness by mental health disorder. Apart from depression and schizophrenia there is very little evidence on other mental disorders. Two studies examined eating disorders – Simon et al. (2005) and Deloitte (2012).<sup>27,32</sup> Both studies demonstrate that eating disorders represent a considerable cost burden to the society but both studies are constrained by quality of evidence underpinning the analysis. Simon et al. (2005) suggests that to be able to estimate the net cost arising from these trends, more comprehensive data on the current healthcare resource use pattern of patients with eating disorders and more trials with good health economic components are urgently required.<sup>32</sup> Deloitte (2012) suggests that there is a pressing need to collect better information, particularly in relation to tracking prevalence, mortality and health system costs, and better defining less well known eating disorders.<sup>27</sup>

Third, with the increased availability of linked data researchers will be able to conduct longerterm impact studies examining cost, treatment utilisation and quality of life. Although only a small number of studies in this review had utilised linked data, the findings from these studies are particularly interesting as trends can be seen in mental illness progression. Knowing the trajectory of mental health disorders and subsequent costs allows policy makers to better measure the effectiveness of strategies along the continuum of care as well as plan for workforce or budgetary implications.

#### Where available, include evidence on the costs and impacts relative to those of other common health conditions (for example, cancer, diabetes, cardiovascular disease)

In Australia the AIHW have used estimates of the burden of disease in 2003 together with disease trends to project potential disability-adjusted life years (DALYs) in 2010 (Figure 1).<sup>33</sup> The DALY is calculated as the sum of the years of life lost due to premature mortality (YLL) in the population and the equivalent 'healthy' years lost due to disability (YLD) for incident cases of the health condition: one DALY is one year of healthy life lost due to premature death, prolonged illness or disability, or a combination of these factors.<sup>34</sup> Figure 1 provides a relative weighting of diseases by DALYs with cancer being the major disease group causing the greatest disease burden in Australia, followed by cardiovascular disease, nervous system/sense disorders and mental disorders.





The 2003 Australian burden of disease study reports a breakdown of DALYs by YLL and YLD by broad cause group (Table 2).<sup>34</sup> Mental disorders were responsible for 13.3% of the total burden of disease and injury in Australia in 2003. Mental disorders are a relatively low contributor to mortality compared to other diseases (1.8% of all YLL in Australia) while mental disorders are a major disabling condition which is reflected in YLD (24.2% of all YLD). Evidence also suggests that there is a higher level of physical disorders in people with mental disorders both in absolute terms and when expressed as a rate per head of population was greater in early adulthood than at other ages. This is partly due to the peak in new cases of chronic mental illnesses at this life stage, the burden of which was experienced throughout adult life. Anxiety and depression contributed most until age 60, after which the contribution from alcohol abuse and personality disorders becomes more prominent.

Cause	YLD	% total	YLL	%total	DALY	%total
Cancers	87,463	6.5%	411,953	32.2%	499,416	19.0%
Cardiovascular disease	104,429	7.7%	369,365	28.9%	473,794	18.0%
Mental disorders	327,391	24.2%	23,154	1.8%	350,545	13.3%
Neurological and sense disorders	258,638	19.1%	54,127	4.2%	312,765	11.9%
Chronic respiratory disorders	115,398	8.5%	71,339	5.6%	186,737	7.1%
Diabetes mellitus	111,536	8.2%	32,295	2.5%	143,831	5.5%
Unintentional injuries	41,263	3.0%	84,599	6.6%	125,862	4.8%
Total burden	1,353,992	100%	1,278,778	100%	2,632,770	100%

Table 2	Burden (YLD.	YLL and DALYs	by broad gr	oup. Australia.	2003 <sup>34</sup>
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In 2008–2009, \$74.2 billion, or 64% of total recurrent health spending, could be allocated to 18 broad disease groups (Figure 2).<sup>33</sup> Of the specific disease groups, cardiovascular diseases accounted for the greatest spending (\$7.9 billion, or 11%), followed by oral health (\$7.1 billion, or 10%) and mental health (\$6.1 billion, or 8%). The majority of recurrent expenditure for mental

disorders was for admitted patients followed by community and public health services and then prescription pharmaceuticals.



Figure 2 Recurrent health care expenditure by disease group and area of expenditure, 2008–2009<sup>33</sup>

Laplagne et al. (2007) was commissioned by the Productivity Commission to obtain labour force participation effects related to the health and education variables targeted by the National Reform Agenda.<sup>13</sup> Table 3 presents labour force participation rates, averaged over the period 2001–2004, for people with or without the following health conditions: cancer; cardiovascular disease; mental/nervous condition; major injury; diabetes; and arthritis. Participation rates are consistently and considerably lower for people with a health condition. Of those listed, a mental health or nervous condition is associated with the lowest likelihood of being in the labour force, especially for males. The participation rate for males with a mental health condition is less than half that of males without that condition.<sup>13</sup>

Table 3	Labour force participation rates by health condition, 2001–2004 <sup>1</sup>	13
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Condition	Cancer	Cardiovascular	Mental/ nervous	Major injury	Diabetes	Arthritis
Total population						
Does not have condition	80.3%	82.0%	80.7%	80.2%	80.7%	82.6%
Has condition	68.6%	64.0%	39.3%	60.1%	56.6%	63.1%
Males						
Does not have condition	89.0%	90.8%	89.0%	88.6%	89.1%	91.2%
Has condition	67.8%	70.6%	37.5%	67.1%	64.6%	68.0%
Females						
Does not have condition	72.3%	74.1%	73.0%	72.5%	72.8%	74.5%
Has condition	69.4%	56.7%	40.8%	52.1%	46.0%	59.3%

#### Include expert opinion on the potential gains to the economy and productivity from optimising the prevention and treatment of mental ill health across the population

All of the studies included in this rapid review highlight the substantial impact mental disorders have on individuals, families, workplaces, society and the economy. A mental disorder reduces the likelihood of: completing school; getting a full-time job; working in a highly paid professional career; and quality of life.

Laplagne et al. (2007) was commissioned by the Productivity Commission to obtain labour force participation effects related to the health and education variables targeted by the National Reform Agenda.<sup>13</sup> Policy makers reason that by preventing the occurrence of health conditions, and by promoting better education and training, greater incentives to work may be created, thus alleviating the predicted decline in labour force participation due to the ageing of the population. In particular the author's examine the effects of health and education within an integrated modelling framework on labour productivity and found that a mental health or nervous condition is associated with the lowest likelihood of being in the labour force, especially for males. The authors suggest that causality between mental health and labour force participation can run both ways: poor mental health may lead to a reduced likelihood of labour force participation and labour force participation can, in turn, influence a person's mental health, i.e. working may have a positive or negative impact on mental health. The authors use data from HILDA to model the marginal effects of a health or education variable by preventing or averting six conditions including mental/nervous conditions. The authors suggest that the marginal effects are largest for either males or females for whom a mental health or nervous condition is averted or successfully treated (range from 17 to 25 percentage point increase in labour force participation). The authors contend that their results can help quantify the potential benefits of the National Reform Agenda and provide an improved basis for cost-benefit analyses of possible changes in specific health or education policies.<sup>13</sup>

Leach et al. (2012) discusses the fact that age of onset of mental disorders has been shown to be an important factor in predicting the course of illness and psychosocial factors such as educational attainment.<sup>35</sup> Evidence also suggests that those who complete high school are more likely to be employed in higher skilled occupations and to obtain other (non-school) educational qualifications.<sup>11</sup> III health and disability including poor mental health is a significant barrier to school completion. For a workplace, employees with a mental disorder tend to work less productivity (presenteeism) and take more sick leave (absenteesism). Schofield et al. (2011) suggest that Australian individuals with a mental health condition have unemployment rates up to four times higher than healthy Australians and that people that suffer from a mental disorder tend to use a higher amount of medical resources, be reluctant or unable to join the labour force and will predominantly rely on social welfare.<sup>11</sup> Degney et al. (2012) estimate that mental illness in young men aged 12-25 costs the Australian economy \$3.27 billion per annum.<sup>7</sup> The Federal Government bears 31% of this cost via direct health costs, disability welfare payments, unemployment benefits and the direct costs of imprisonment. Further, Australia loses over 9 million working days per annum to young men with mental illness. On average they have an additional 9.5 days out of role per year.<sup>7</sup>

In Canada, Smetanin et al. (2011) examined the current and future life and economic outcomes associated with major mental illness.<sup>23</sup> The authors found that mental illness was estimated to cost the Canadian economy over \$42.3 billion dollars in 2011 in direct costs. Approximately two of every nine workers (or 21.4% of the working population) are estimated to suffer from a mental illness that potentially affects their work productivity – this translates into an annual wage based productivity impact of over \$6.3 billion dollars. In nominal terms, the total annual economic costs associated with mental illness will increase by over sixfold to exceed \$306 billion by 2041. In 2011

present value terms, the total cumulative costs over the next 30 years could exceed \$2.5 trillion dollars.  $^{23}$ 

In the face of this evidence there is substantial economic gain to be made from optimising the prevention and treatment of mental ill health across the population. Various experts in the field recommend a plethora of strategies. Leach et al. (2012) suggest that policies and interventions promoting prevention and early intervention and offering educational support for young people with psychiatric illness and substance use problems should intervene prior to the middle years of high school to help prevent adverse social and economic consequences.<sup>35</sup> Henderson et al. (2011) suggest that education should form part of the policy response to long-term sickness absence for future generations, equipping children with skills necessary for labour market flexibility may inoculate them from the risk of long-term sickness absence.<sup>19</sup> Schofield et al. (2011) adds that the current Australian employment system is failing to maximise the employment of those with a mental health condition in the labour force.<sup>12</sup> The authors suggest that a multifaceted strategy is required that aims to prevent the onset on mental health conditions, assist sufferers to manage much of their mental health conditions when it is occurring, and also helping individuals remain integrated within society.

Several experts also point to the need for workplaces to become better equipped to handle psychological stress within their own companies. For example, Lim et al. (2000) suggest that if employers were more aware of the economic consequences of the impact of mental disorders on their employees, the workplace could provide an ideal setting for mental health promotion and prevention.<sup>36</sup> Hilton et al. (2008) suggests that effective treatment for mental health problems yields substantial increases in employee productivity and would be a sound economic investment for employers.<sup>9</sup>

## 5 Review question 2: What evidence gaps have been identified that would benefit from additional research particularly relevant to the NSW context?

## Include gaps/key unanswered questions based on the findings from Review question 1

Several gaps and unanswered questions are evident from this rapid review.

First, there is a paucity of research relating to the costs and impacts on the economy and productivity due to mental illness. This review includes 45 studies: 19 under the general heading of mental disorder, 11 under depression, seven on schizophrenia and two each related to eating disorders and psychological distress. More research is required on each disorder to better understand the economic impact of these illnesses.

Second, no Australian studies were found in the area of ADHD or cognitive function. Only one UK study examined ADHD and this study considered ADHD pharmacotherapy expenditures - not efficacy or potential impacts on users or their families.<sup>20</sup> In this study, Schlander (2007) predicted a more than sixfold increase of pharmaceutical spending for children and adolescents over the decade from 2002 to 2012.<sup>20</sup> Preliminary investigation by the current author using Australian Medicare data suggests that over the period 2000–2010 there were a total of 2,156,434 scripts filled for dexamphetamine (a a Pharmaceutical Benefits Scheme (PBS) subsidised drug used in Australia for ADHD) at a total cost to the government of \$34,144,006. Although the growth in this drug was not the same as predicted by Schlander (2007), the fact that the Australian Government has spent an average of \$3.4 million per year over the past 10 years on this one product suggests that ADHD should be a better researched area. This is particularly true in the context of Henderson et al. (2011) who suggest a clear dose-response relationship between lower cognitive function in childhood and increased odds of being on long-term sick leave in adulthood.<sup>19</sup> Henderson et al. (2011) suggests that this association is mediated in part by education attainment suggesting improved education especially for those with lower cognitive abilities may help inoculate them from the risk of long-term sickness absence.<sup>19</sup> More research is required to tease out these relationships and measure of the potential impact of strategies to alleviate the problem.

Third, this review found limited evidence of employment programs. Although a number of studies assessed the impact of lost productivity associated with mental disorders only one study was found that examined the economic impacts of supported employment.<sup>37</sup> This study was a review by Latimer (2001) that examined the economic impacts of supported employment (SE) programs.<sup>37</sup> Eight studies were found by Latimer (2001) but they were either US studies or occurred outside the timeframe of this rapid review. Nevertheless the findings from Latimer (2001) suggest that the impact of SE depends on context.<sup>37</sup> For example, in a setting where no, or hardly any, vocational rehabilitation services are provided at the outset introducing a SE service is likely to increase vocational rehabilitation costs, simply because there is no opportunity for substitution. At the other extreme, converting existing vocational programs into supported employment appears to allow a significant cost reduction. The author argues that where such conversions are not possible, development of SE programs can be justified on the grounds that they promote

community integration of persons with severe mental illness more effectively than do other methods currently available.<sup>37</sup> Given the importance of employment programs and impact that mental disorders have on lost productivity, further investigation of SE in the Australian context may be considered a research priority.

Fourth, very little research was found on continuity of care. Carr et al. (2003) raised two specific questions related to community care. First, have savings resulting from bed reductions and the closure of stand-alone psychiatric hospitals in Australia been redirected efficiently to other mental health and community services? Second, how can we best demonstrate that actual improvements in community care for people with psychotic disorders (e.g. increased provision of psychosocial treatments, early interventions, rehabilitation programs, and supported accommodation) lead to better outcomes and proportionate reductions in hospitalisation and associated costs?<sup>6</sup>

Mitton et al. (2005) examined the relationship between continuity of care and healthcare costs in Canada and found that poorer continuity of care is related to higher hospital costs and lower community costs or, conversely, better continuity is related to lower hospital costs and higher community costs.<sup>38</sup> The authors suggest that more research is required to examine whether shifting resources from hospital to community, particularly for high-need patients, would result in improvements in continuity of care and subsequent health outcomes.<sup>38</sup> This is particularly relevant in Australia given the vast amount of money spent on community and public health services by the Australian Government.<sup>2</sup> More research is required to better understand the impact community care is having and will have as more beds are closed and costs are shifted out of the hospital into community care.

Fifth, none of the studies included in this rapid review considered the intangible elements of pain and suffering of people and their families with depressive disorders. From an economic point, most authors contend that the effects on quality of life (QOL) cannot be quantified in monetary terms. However, QOL issues are addressed in epidemiological studies – and in particular the DALY estimates. Understanding how different mental disorders impacts on QOL can add value to costing assessments and treatment options.

Sixth, while Canada and the UK have developed comprehensive assessments of current and future economic impacts of mental disorders, no such estimates exist in Australia. The research in Australia seems to be piecemeal, ad hoc and a result of advocacy by certain groups. A comprehensive national study exploring the far reaching economic impacts of mental disorders in Australia is warranted. Such an assessment would assist policy makers in budgetary planning and highlight areas of future expenditure that are likely to escalate with an aging population (such as dementia). Although the AIHW efforts to understand and update estimates of the burden of mental disease are to be commended, very little detail on the costs of mental disorders are available and when it is, it relates to recurrent health expenditure. Understanding the burden of disease and economic cost of a disease provides the platform by which policy makers can make effective and informed decisions about priority areas and allocate resources to strategies (preferably cost-effective options) to reduce this burden.

Finally, as with most research there is always scope to improve the evidence base. The majority of studies conclude with recommendations for further research. Some of these issues have been raised above but several other comments are worth noting. Slomp et al. (2012) suggest that further analysis is warranted to ascertain the degree to which homogenous care is provided to patients with depression with similar levels of severity.<sup>39</sup> Degney et al. (2012) suggest that efforts should be made by all sectors of the community to evaluate the effectiveness of current policy responses and investments in mental health.<sup>7</sup> Stephens et al. (2001) contend a different kind of investment is needed to promote the population's mental health by developing individual and community resourcefulness, and promoting resilience among individuals of all ages.<sup>40</sup> McCrone et al. (2008) recommends the establishment of better systems of early detection and treatment.<sup>22</sup>

Stansfeld et al. (2010) suggest that future research should concentrate more on distinguishing the predictors of psychiatric and non-psychiatric sickness absence and exploring the reasons for the gender differences in risk.<sup>18</sup> Carr et al. (2003) contend that some of the findings from the LPDS suggest that there may be substantial opportunity costs in not delivering effective treatments in sufficient volume to people with psychotic disorders, not intervening early, and not improving access to rehabilitation and supported accommodation.<sup>6</sup> None of these issues have been adequately addressed.

Include expert opinion regarding other gaps/unanswered questions that are relevant to the NSW context and what could be done to address these gaps/unanswered questions

The research gaps and unanswered questions raised in the preceding section are relevant to the Commission. In developing the draft strategic plan, the Commission may consider the following.

First, NSW has a range of good quality data available to further investigate the impact and economic cost associated with mental disorders. In particular, linked data provides a gold standard data source by which a researcher may investigate patterns/trends of mental disorders in NSW (through for example the 45 and Up Study data or the Australian Longitudinal Study of Women Health), costs of medical or pharmaceutical costs and utilisation (through for example, Medicare data), hospital admissions (through for example the NSW Admitted Patient Data Collection) and other relevant administrative and survey data. Medicare data can also be used (at no cost) to examine trends in healthcare utilisation and patterns of pharmaceutical use across a range of mental disorders – the author highlights this using ADHD drug use in Australia. There is a range of good quality data that could be used to shed more light on the impact of mental disorders in NSW.

Second, the Commission could call for research projects and partners to answer high priority questions. A first priority would be to conduct a comprehensive assessment of mental health disorders to quantify the current and future life and economic outcomes associated with mental illness in NSW. Other projects would seek to address research gaps and may include: research to tease out the relationship between cognitive function, ADHD and the impact of strategies to alleviate this burden; further investigation of employment support programs and the potential to use the workplace as a setting for mental health promotion and prevention; more research into continuity of care and in particular whether shifting resources from hospital to community would result in improvements in continuity of care and subsequent health outcomes; and, the development of a multifaceted strategy that aims to prevent the onset of mental health conditions, assist sufferers to manage their condition when it is occurring and assist individuals to remain integrated within society.

The whole of government draft strategic plan will focus on health, housing, employment, education and justice. Increased involvement of people with mental illness with these agencies increases the benefits of service improvements within and across these agencies. To improve connectivity between different parts and players of the system, the Commission could explore options to collaborate more effectively with researchers and service providers through partnership grants and other multi-agency arrangements. Both the Australian Research Council and the National Health and Medical Research Council fund partnership projects. Researchers are always looking for relevant partners, particularly when it comes to being exposed to service delivery. Related to this is the need for mental health service providers (both primary and secondary) to work more collaboratively. Only one Australian study by Parker et al. (2000)

touched on this collaborative model of care.<sup>41</sup> Parker et al. (2000) examined the cost impact of referral to a Mood Disorder Unit (MDU) by comparing pre-service and post-service costs between MDU and control.<sup>41</sup> Without going into the complexities of the study the authors suggest that the MDU may have improved the outcome trajectory of those with the more biological depressive disorders (i.e. bipolar disorder, psychotic and melancholic depression), presumably achieved by review and modification of pharmacological treatments and attention to second-order factors through pointers to treatments such as cognitive behaviour therapy (CBT) and strategies such as anxiety management.

#### **6** Tabulation of relevant studies

Each study included in this review is summarised in text and table format in Appendix 1 and 2.

#### 7 Conclusions

This rapid review has been conducted to provide evidence on the costs and impacts on the economy and productivity due to mental illness (broken down by mental health disorder). Before discussing the key findings of this review it is important to reflect on several potential shortcomings.

First, although an accredited librarian assisted in the search strategy there is always scope to miss literature. The search strategy was purposely limited using specific key words, timing and country of interest. Studies from the US were omitted which may have impacted on the range of impact assessments.

Second, given that the majority of articles were identified from the peer-reviewed literature, there is some possibility of publication bias on the nature of evidence available to inform the review. Publication bias, or more specifically the inability to identify studies that reported negative results, may distort any conclusions or recommendations. In this context it is important that the NSW Mental Health Commission take advantage of other available information sources that can be used to assist the identification of priorities, particularly in the area of research and evaluation. This includes information on service use from sources such as the AIHW and information on prevalence and help seeking behaviours from generic health and specific mental health surveys.

Third, the format of this rapid review aids the answering of scope questions for the commissioning agency. However, this format may contribute to readers experiencing challenges in synthesising the implications of the findings. Overlap in headings may result in duplication of key messages. Efforts to simplify the findings may have limited the coverage or description of certain studies. The interested reader is encouraged to read the appendices (text and table) and reference list to garner additional study information.

In assessing the evidence base, a number of observations have been made. First, there are potential problems with comparing studies conducted over time and countries due to variations in methods and measures. Second, there is a paucity of evidence related to the costs and impacts on the economy and productivity due to mental illness by mental health disorder. Apart from depression and schizophrenia there is very little evidence on other mental disorders. Third, none of the studies address comorbidity among people with mental illness. These comorbidities add an additional complexity to appropriate and efficient treatment options that need to be explored. Fourth, the potential availability and use of linked data sources will allow researchers to develop a better understanding of the trajectory of mental health disorders and treatment pathways.

All of the reviewed studies highlight the substantial impact mental disorders have on individuals, families, workplaces, society and the economy. III health and disability, including poor mental health, is a significant barrier to school completion. Australian individuals with a mental health

condition have unemployment rates up to four times higher than healthy Australians. Researchers in Canada estimated that total annual economic costs associated with mental illness will increase by over sixfold to exceed \$306 billion by 2041. In 2011 present value terms, the total cumulative costs over the next 30 years could exceed \$2.5 trillion dollars.

In the face of this evidence, there is substantial economic gain to be made from optimising the prevention and treatment of mental ill health across the population. Various experts in the field recommend a plethora of strategies ranging from policies and interventions promoting prevention and early intervention to educational support for young people with psychiatric illness. Others suggest that a multifaceted strategy is required that aims to prevent the onset of mental health conditions, assist sufferers to manage their condition when it is occurring and assist individuals to remain integrated within society. Several experts also point to the need for workplaces to become better equipped to handle psychological stress within their own companies. If employers were more aware of the economic consequences of the impact of mental disorders on their employees, the workplace could provide an ideal setting for mental health promotion and prevention.

In assessing the evidence, a number of gaps in the evidence base have been identified with possible research suggested to address these gaps. Addressing these research gaps and evaluation priorities requires investment by both the NSW Government and potentially the Federal Government. First, more research is required to better understand the economic impact of mental illness in Australia. Second, given the importance of employment programs and impact that mental disorders have on lost productivity, further investigation of employment support programs is warranted. Third, in regards to continuity of care, more research is required to examine whether shifting resources from hospital to community, particularly for high-need patients, results in improvements in continuity of care and subsequent health outcomes. Finally, Australia would benefit from a comprehensive national study exploring the far reaching economic impacts of mental disorders.

The Commission may consider the following issues when developing the draft strategic plan:

- 1. NSW has a range of good quality data available to further investigate the impact and economic cost associated with mental disorders. In particular, linked data provides a gold standard data source by which a researcher may investigate patterns/trends of mental disorders in NSW (through for example the 45 and Up Study data or the Australian Longitudinal Study of Women Health), costs of medical or pharmaceutical costs and utilisation (through for example, Medicare data), hospital admissions (through for example the NSW Admitted Patient Data Collection) and other relevant administrative and survey data. Medicare data can also be used (at no cost) to examine trends in healthcare utilisation and patterns of pharmaceutical use across a range of mental disorders the author highlights this using ADHD drug use in Australia. There is a range of good quality data sources that could be used to shed more light on the impact of mental disorders in NSW
- 2. The Commission could call for research projects and partners to answer high priority questions. A first priority would be to conduct a comprehensive assessment of mental health disorders to quantify the current and future life and economic outcomes associated with mental illness in NSW. Other projects would seek to address research gaps and may include: research to tease out the relationship between cognitive function, ADHD and the impact of strategies to alleviate this burden; further investigation of employment support programs and the potential to use the workplace as a setting for mental health promotion and prevention; more research into continuity of care and in

particular whether shifting resources from hospital to community would result in improvements in continuity of care and subsequent health outcomes; and, the development of a multifaceted strategy that aims to prevent the onset on mental health conditions, assist sufferers to manage their condition when it is occurring and assist individuals remain integrated within society.

3. The whole of government draft strategic plan will address health, housing, employment, education and justice. Increased involvement of people with mental illness with these agencies increases the benefits of service improvements within and across these agencies. To improve connectivity between different parts and players of the system, the Commission could explore options to collaborate more effectively with researchers and service providers through partnership grants and other multi-agency arrangements.

#### 8 References

- 1. Mental Health Commision of NSW. [Internet] [cited 1 April 2013]. Available from: www.nswmentalhealthcommission.com.au/
- Department of Health and Ageing. National Mental Health Report 2010: Summary of 15 Years of reform in Australia's Mental Health Services under the National Mental Health Strategy 1993–2008. Canberra: Commonwealth of Australia, 2010.
- 3. Australian Bureau of Statistics. National Survey of Mental Health and Wellbeing: Summary of Results. ABS Catalogue No. 4326.0. Canberra: ABS, 2008.
- 4. Andrews G, Henderson S, Hall W. Prevalence, comorbidity, disability and service utilisation. Overview of the Australian National Mental Health Survey. Br J Psychiatry 2001; 178:145–153.
- 5. Sawyer M, Arney F, Baghurst P. The mental health of young people in Australia. Canberra: Australian Government Publishing Service, 2000.
- 6. Carr V, Neil A, Halpin S et al. Costs of schizophrenia and other psychoses in urban Australia: findings from the Low Prevalence (Psychotic) Disorders Study. Aust NZ J Psychiatry 2003;37(1):31–40.
- 7. Degney J, Hopkins B, Hosie A et al. Counting the cost: the impact of young men's mental health on the Australian economy. Canberra: Inspire Foundation and Ernst and Young, 2012.
- 8. Jacobs P, Dewa C, Lesage A et al. The cost of mental health services in Canada: A report of the Mental Health Commission of Canada. Alberta: Institute of Health Economics, 2010.
- 9. Hilton M, Scuffham P, Sheridan J et al. Mental ill-health and the differential effect of employee type on absenteeism and presenteeism. J Occup Environ Med 2008;50(11):1228–1243.
- 10. Hilton M, Scuffham P, Vecchio N et al. Using the interaction of mental health symptoms and treatment status to estimate lost employee productivity. Aust NZ J Psychiatry 2010;44(2):151–161.
- 11. Schofield D, Kelly S, Shrestha R et al. How depression and other mental health problems can affect future living standards of those out of the labour force. Aging Ment Health 2011;15(5):654–662.
- 12. Schofield D, Shrestha R, Percival R et al. The personal and national costs of mental health conditions: impacts on income, taxes, government support payments due to lost labour force participation. BMC Psychiatry 2011;11:72.
- 13. Laplagne P, Glover M, Shomos A. Effects of health and education on labour force participation. Melbourne: Productivity Commission, 2007.
- 14. Morgan V, Waterreus A, Jablensky A et al. People living with psychotic illness 2010: Report on the second Australian national survey. Canberra: Commonwealth of Australia, 2011.
- 15. Fitzgerald P, Montgomery W, De Castella A et al. Australian Schizophrenia Care and Assessment Programme: real-world schizophrenia: economics. Aust NZ J Psychiatry 2007;41(10):819–829.
- 16. Paradise M, Naismith S, Davenport T et al. The impact of gender on early ill-health retirement in people with heart disease and depression. Aust NZ J Psychiatry 2012;46(3):249–256.
- 17. Gibb S, Fergusson D, Horwood L. Burden of psychiatric disorder in young adulthood and life outcomes at age 30. Br J Psychiatry 2010;197(2):122–127.
- 18. Stansfeld S, Fuhrer R, Head J. Impact of common mental disorders on sickness absence in an occupational cohort study. Occup Environ Med 2011;68(6):408–413.
- Henderson M, Richards M, Stansfeld S et al. The association between childhood cognitive ability and adult long-term sickness absence in three British birth cohorts: a cohort study. BMJ Open 2011;2(2):e000777.
- Schlander M. Impact of attention-deficit/hyperactivity disorder (ADHD) on prescription dug spending for children and adolescents: increasing relevance of health economic evidence. Child Adol Psychiatry Mental Health 2007;1(13).

- 21. Scott S, Knapp M, Henderson J et al. Financial cost of social exclusion: follow up study of antisocial children into adulthood. BMJ 2001;323(7306):191.
- 22. McCrone P, Dhanasiri S, Patel A et al. Paying the price: the cost of mental health care in England to 2026. London: King's Fund, 2008.
- 23. Smetanin P, Stiff D, Briante C et al. The life and economic impact of major mental illnesses in Canada: 2011 to 2041. Mental Health Commission of Canada, 2011.
- 24. Drummond M, Torrance G, O'Brien B et al. Methods for the economic evaluation of health care programmes. New York: Oxford University Press, 2005.
- 25. Access Economics. Schizophrenia: costs. An analysis of the burden of schizophrenia and related suicide in Australia. Melbourne: SANE Australia, 2002.
- 26. Access Economics. Bipolar disorder: costs: An analysis of the burden of bipolar disorder and related suicide in Australia. Melbourne: SANE Australia 2003.
- 27. Deloitte Access Economic. Paying the price The economic and social impact of eating disorders in Australia. Melbourne: The Butterfly Foundation, 2012.
- 28. Gold M, Siegel J, Russell L et al. Cost-effectiveness in health and medicine. New York: Oxford University Press, 1996.
- 29. Mason J, Eccles M, Freemantle N et al. Incorporating economic analysis in evidence-based guidelines for mental health: the profile approach. J.Ment Health Policy Econ 1999;2:13–19.
- 30. Doran CM. Economic evaluation of interventions to treat opiate dependence: a review of the evidence. Pharmacoeconomics 2008;26(5):371–393.
- 31. Luppa M, Heinrich S, Angermeyer M et al. Cost of illness studies of depression: a systematic review. J Affect Disor 2007;98:29–43.
- 32. Simon J, Schmidt U, Pilling S. The health service use and cost of eating disorders. Psychol Med 2005; 35(11):1543–1551.
- 33. Australian Institute of Health and Welfare. Australia's health 2012. Australia's health series no.13. Cat. no. AUS 156. Canberra: AIHW, 2012.
- 34. Begg S, Vos T, Barker B et al. The burden of disease and injury in Australia 2003. PHE 82. Canberra: AIHW, 2007.
- 35. Leach L, Butterworth P. The effect of early onset common mental disorders on educational attainment in Australia. Psychiatry Research 2012;199(1):51–7.
- 36. Lim D, Sanderson K, Andrews G. Lost productivity among full-time workers with mental disorders. J Ment Health Policy Econ 2000;3(3):139–146.
- 37. Latimer E. Economic impacts of supported employment for persons with severe mental illness. Can J Psychiatry 2001;46(6):496–505.
- 38. Mitton C, Adair C, Mcdougall G et al. Continuity of care and health care costs among persons with severe mental illness. Psychiatr Serv 2005;56(9):1070–1076.
- 39. Slomp M, Jacobs P, Ohinmaa A et al. The distribution of mental health service costs for depression in the Alberta population. Can J Psychiatry 2012;57(9):564–569.
- 40. Stephens T, Joubert N. The economic burden of mental health problems in Canada. Chronic Dis Can 2001;22(1):18–23.
- Parker G, Roy K, Mitchell P et al. Costing depression and its management: an Australian study. Aust NZ J Psychiatry 2000;34(2):290–299.
- 42. Waghorn G, Chant D, White P et al. Disability, employment and work performance among people with ICD-10 anxiety disorders. Aust NZ J Psychiatry 2005;39(1–2):55–66.
- Goldney R, Fisher L, Grande E et al. Have education and publicity about depression made a difference? Comparison of prevalence, service use and excess costs in South Australia: 1998 and 2004. Aust NZ J Psychiatry 2007;41(1):38–53.

- 44. Dewa C, Thompson A, Jacobs P. The association of treatment of depressive episodes and work productivity. Can J Psychiatry 2011;56(12):743–750.
- 45. Thomas C, Morris S. Cost of depression among adults in England in 2000. Br J Psychiatry 2003;183:514– 519.
- 46. Young A, Rigney U, Shaw S et al. Annual cost of managing bipolar disorder to the UK healthcare system. J Affect Disord 2011;133(3):450–456.
- 47. Dewa C, Lasage A, Goering P et al. Nature and prevalence of mental illness in the workplace. Healthcare Papers 2004;5(2):12–25.
- 48. Lim KI, Jacobs P, Ohinmaa A et al. A new population-based measure of the economic burden of mental illness in Canada. Chronic Dis Can 2008;28(3):92–98.
- 49. Lim K, Jacobs P, Dewa C. How much should we spend on mental health. Alberta: Institute of Health Economics and Alberta Health Services, 2008.
- 50. Cawthorpe D, Wilkes T, Guyn L et al. Association of Mental Health with Health Care Use and Cost: a Population Study. Can J Psychiatry 2011;56(8):490–494.
- 51. Carr V, Lewin T, Neil A et al. Premorbid, psychosocial and clinical predictors of the costs of schizophrenia and other psychoses. Br J Psychiatry 2004;184:517–525.
- 52. Fitzgerald P, De Castella A, Arya D et al. The cost of relapse in schizophrenia and schizoaffective disorder. Australasian Psychiatry 2009;17(4):265–272.
- 53. Goeree R, Farahati F, Burke N, et al. The economic burden of schizophrenia in Canada in 2004. Curr Med Res Opin 2005; 21(12):2017-28.
- 54. Munro J, Osborne S, Dearden L et al. Hospital treatment and management in relapse of schizophrenia in the UK: Associated costs. Psychiatrist 2011;35(3):95–100.
- 55. Bruce J, Mcdermott S, Ramia I et al. Evaluation of the Housing and Accommodation Support Initiative (HASI) Sydney: Social Policy Research Centre, 2012.

#### Appendix 1: Text summary of studies included in this rapid review

#### ADHD – UK study

Schlander (2007)<sup>20</sup> developed a model to estimate future trends (2002–2012) of ADHD-related drug expenditures in Germany and the UK. The authors found that annual ADHD pharmacotherapy expenditures for children and adolescents will further increase. During this period, overall drug spending by individual physicians may increase 2.3 to 9.5-fold. Even for an extreme low case scenario, a more than sixfold increase of pharmaceutical spending for children and adolescents is predicted over the decade from 2002 to 2012.

#### Anxiety – Australian study

Waghorn et al. (2005)<sup>42</sup> used population survey data to ascertain patterns of disability, labour force participation, employment and work performance among people with anxiety disorders in comparison to people without. There is evidence that when anxiety is treated previously impaired work performance can be restored. Authors' found proportionally more people with anxiety disorders were not in the labour force; fewer people with anxiety disorders were employed; more people with anxiety worked in agriculture, forestry or fishing, and in transport and storage industries; more people with anxiety received government pensions or allowances as their principle source of income; 59% with anxiety disorders reported receiving treatment while 40.9% did not. The authors suggest that scope exists to increase the labour force participation of people with anxiety disorders. For non-labour force participants, increasing the use of evidence-based treatments co-linked to income support arrangements and tailored vocational assistance may be needed. Restoring education disruption may require specialised programs and improved access to secondary education, vocational training and higher education.

#### Cognitive function – UK study

Henderson et al. (2011)<sup>19</sup> used data from British cohort studies to test the relationship between childhood cognitive function and long-term sick leave in adult life and whether any relationship was mediated by educational attainment, adult social class or adult mental ill-health. The authors found that a clear dose-response relationship exist between lower cognitive function in childhood and increased odds of being on long-term sick leave in adulthood. This association is mediated in part by education attainment suggesting improved education especially for those with lower cognitive abilities may help inoculate them from the risk of long-term sickness absence. Although the authors do not specifically target mental disorder, children with mental disorders generally have impaired cognitive function. The authors state that health is only one factor in understanding long-term sickness absence. They suggest that education should form part of the policy response to long-term sickness absence: for future generations, equipping children with skills necessary for labour market flexibility may inoculate them from the risk of long-term sickness absence.

#### Conduct disorder – UK study

Scott et al. (2011)<sup>21</sup> assessed the costs to the public sector incurred to age 28 in dealing with children with different levels of antisocial behaviour. The authors note that conduct disorder is strongly associated with social and educational disadvantage. It occurs four times more often in families with unskilled occupations than in professional families; reading difficulties are common, and many children leave school without qualifications or are permanently excluded. The results of this research suggest that by age 28, costs for individuals with conduct disorder are 10.0 times higher than for those with no problems and 3.5 times higher than for those with conduct problems. In all groups crime incurred the greatest cost, followed by extra educational provision, foster and residential care, and state benefits; health costs were smaller. The authors conclude that antisocial behaviour in childhood is a major predictor of how much an individual will cost society. The authors suggest that there are effective interventions for antisocial behaviour in children, but they are seldom routinely available. Parent training programs have the most promise. Authors suggest that health commissioners have little direct financial incentive to give priority to effective intervention because their service bears little of the long-term cost. Interventions of proven effectiveness could considerably reduce the costs of antisocial children when they are grown up.

#### Depression – Australian studies

Parker et al. (2000)<sup>41</sup> examined the cost impact of referral to a Mood Disorder Unit (MDU) by comparing pre-service and post-service costs between MDU and control. After initial assessment or treatment at MDU, patients were referred back to their clinician for ongoing management. A cost questionnaire was embedded in an MDU intake assessment protocol. The authors found that overall group costs in the MDU-assessed tertiary referrals were reduced (despite increased costs for ECT and social welfare) by nearly 40% reflecting some reduction in GP and psychiatrist costs, but most distinctly by a reduction in hospitalisation costs. Despite increased hospitalisation costs for those admitted, the percentage hospitalised dropped from 45% to 15%, resulting in a saving of more than \$700,000. Authors suggest that MDU may have improved the outcome trajectory of those with the more 'biological' depressive disorders (i.e. bipolar disorder, psychotic and melancholic depression), presumably achieved by review and modification of pharmacological treatments, recommendations for ECT for some, and attention to second-order factors through pointers to treatments such as CBT and strategies such as anxiety management.

Access Economics (2003)<sup>26</sup> conducted an analysis of the burden of bipolar and related suicide in Australia on behalf of SANE Australia. The authors used a range of data sources to examine direct and indirect costs. The authors estimate a total cost of \$1.59 billion in 2003 (\$16,000 on average for each of nearly 100,000 Australians with the illness). Indirect costs are estimated at \$833 million, including \$464 million of lost earnings from people unable to work due to the illness. The authors discuss a range of cost-effective treatments are required including: health worker education for better diagnosis, especially differential diagnosis, and earlier intervention; enhanced suicide prevention and community awareness programs; and, research for cause, cure and care.

Goldney et al. (2007)<sup>43</sup> examined changes in depression, its management and associated excess costs, between 1998 and 2004 in South Australia. The authors used a face-to-face Health Omnibus Survey to calculate direct and indirect costs with a social perspective. The total excess cost was estimated to be \$9,751 for those with other depression and \$17,593 per annum for those with major depression. For those having major depression, when compared with those with no depression, they were more than threefold as likely to have visited a GP, 18-fold more likely to have visited a mental health professional, 6.6-fold more likely to have used a community health

service, 5.5-fold more likely to have used another community health worker, 1.6-fold more likely to have visited an alternative health therapist, and 2.7-fold more likely to have used hospital services. The authors suggest that there has been no significant improvement in the prevalence of depression and its associated morbidity and financial burden in the South Australian community between 1998 and 2004 despite a number of professional and community education programs. Further research is required to identify the underlying cost patterns, particularly the indirect costs, in order to develop more targeted strategies for reducing this burden. They suggest that immediate economic gains can probably be made by simply raising the proportion of depressed individuals on treatment.

Schofield et al. (2011)<sup>12</sup> used modelling together with national survey data to quantify for the 45 to 64 year old Australian population the amount of income available to those who have retired early due to depression and also for those with other mental health conditions, the amount of taxation revenue these individuals pay to the Australian Government and the amount of government benefits paid to these individuals. It also quantifies the aggregate cost to the state from lost taxation revenue, increased social welfare payments, and estimates the national gross domestic product (GDP) loss due to individuals exiting the labour force due to depression and other mental health conditions. The authors estimate 25,200 individuals are not in the labour force due to depression and 35,200 individuals not in the labour force due to other mental health conditions. Individuals aged 45 to 64 years who have retired early due to depression personally have 73% lower income then their full-time employed counterparts. The national aggregate cost to government due to early retirement from these conditions equated to \$278 million in lost income taxation revenue, \$407 million in additional transfer payments and around \$1.7 billion in GDP in 2009 alone. The current Australian employment system is failing to maximise the employment of those with a mental health condition in the labour force. This suggests that a multifaceted strategy is required that aims to prevent the onset on mental health conditions, assist sufferers in manage much of their mental health conditions when it is occurring, and also helping individuals remain integrated within society.

Schofield et al. (2011)<sup>11</sup> used modelling together with national survey data to estimate the extent to which those who exit the workforce early due to depression and other mental health problems have less savings by the time they reach retirement age. The authors found that both males and females who were out of the labour force due to depression or other mental health problems had at least 97% less savings and retirement income by age 65 that those who remained employed full-time. The authors suggest that supporting elderly people with mental health problems in retirement will place a large burden upon government finances. There is thus an additional argument for governments to invest in mental health services and prevention and support measures, to stem these costs and improve the quality of life of people suffering from these conditions.

Paradise et al. (2012)<sup>16</sup> used the 45 and Up Study data to examine the association of heart disease, depression and ill health retirement (IHR) in a large community sample. The authors found that nearly one in five of the participants retired early due to ill health. A prior diagnosis of depression was associated with a threefold increase in the risk of IHR. The authors suggest that this study has highlighted the need to consider gender in future studies examining the relationship between depression, heart disease and psychosocial outcomes. Clinicians working in consultation-liaison settings or rehabilitation should be aware of gender differences in the effects of depression, when trying to optimise outcomes for their patients.

#### Depression – Canadian studies

Dewa et al. (2011)<sup>44</sup> used the results from a large-scale community telephone survey of employed and recently employed people in Alberta to examine the association of depression

and its treatment and work productivity. The authors used regression methods controlling for demographic factors and job characteristics. They found about 8.5% experienced a depressive episode in the past year and people who had a severe depressive episode were significantly less likely to be highly productive. Those who did have treatment were significantly more likely to be highly productive. About one-half of workers with a moderate or severe depressive episode did not receive treatment. Key clinical implications of this work are: although they may remain at work, workers with depression are subject to decreased work productivity; there is a positive association between treatment and work productivity; and, a significant proportion of workers who have moderate and severe depressive episodes may not access mental health treatment.

Slomp et al. (2012)<sup>39</sup> estimated the depression care costs of patients with a depression diagnosis, ranking them by the increasing total depression healthcare costs. The authors used administrative data for Albertans (in Canada). The authors found that the total cost of treating depression was \$114.5 million, an average of \$550 per treated person. The costs ranged from \$29 for the lowest decile to \$25,826 for the highest 1% within the highest decile. Hospital costs becoming increasingly prominent contributors to the total cost. The authors suggest that further analysis is warranted to ascertain the degree to which homogenous care is provided to patients with depression with similar levels of severity.

#### Depression – UK studies

Thomas et al. (2003)<sup>45</sup> calculated the total cost of depression in adults in England during 2000. The authors used recorded data on health service use, sickness benefit claims and the number of registered deaths of patients with depression. The authors estimated the cost of adult depression at over £9 billion, of which £370 million was direct treatment costs. There were 109.7 million working days lost and 2,615 deaths due to depression in 2000. The ratio of indirect to direct costs was 23, whereas previous studies in UK report a sevenfold difference. The authors suggest that the cost of depression in England represents a substantial burden on both society and the individual despite improved recognition and awareness, and the availability of effective and accessible treatments. The authors do not cost intangible elements of pain and suffering of people with depressive disorders and their families and the effects on QOL cannot be quantified in monetary terms.

Luppa et al. (2007)<sup>31</sup> conducted a review of published cost of illness studies of depression. The authors found 24 articles – 12 from US and 12 from Europe. No additional studies were identified (i.e. this rapid review had captured all relevant papers). The authors noted that all per capita studies had used a bottom-up approach to estimate costs of illness which means that cost estimation is based on the medical resource consumption of the individual patient. This information was provided by databases of healthcare providers or by cost diaries such as the client service receipt Inventory. National studies tended to use a top down approach. Across all studies, samples differed substantially (primary care, population-based, employee, specialised). All studies reported direct medical costs and only a few measured indirect costs (using human capital approach). The authors suggest that methodological differences restricted comparison across studies and suggest that results of COI should be linked to outcome data to increase effectiveness and efficiency in depression management.

Young et al.  $(2011)^{46}$  estimated the annual cost associated with bipolar disorder to National Health Service (NHS). The authors used a range of clinical sources including: the IMS Disease analyzer for primary care resource use and Hospital Episode Statistics supplemented with mental health minimum dataset statistics to quantify resource use in outpatient and community mental health. The authors estimated the total cost at £342 million of which hospitalisations (admissions and day care) accounted for 60%, outpatient and community mental health contributed 27%

and medications 7%. Contrary to the anticipated positive impact of introducing the NICE bipolar guidelines and the Quality and Outcomes Framework, the cost of managing this illness to the NHS has increased. The authors contend that effort should be directed at preventive interventions in order to keep patients out of hospital and thus reduce costs. Expanding the use of services such as crisis intervention/home treatment teams and early intervention services could lead to a reduced need for services at a later stage and potential cost savings.

#### Eating disorder – Australian study

In 2012 Deloitte Access Economics was commissioned by the Butterfly Foundation to examine the economic and social costs of eating disorders in Australia.<sup>27</sup> Using a range of data sources and assumptions, the authors estimated that in 2012, there were 913,986 people with an eating disorder in Australia with a total socioeconomic impact of \$69.7 billion (financial cost \$17.18 billion + burden of disease estimates \$52.6 billion). Lost productivity accounts for the 88% of financial costs. Authors suggest that there is a pressing need to collect better information, particularly in relation to tracking prevalence, mortality and health system costs, and better defining less well known eating disorders. Relative to prevalence, there appears a lack of focus on treatment for eating disorders across acute and community care settings.

#### Eating disorder – UK study

Simon et al. (2005)<sup>32</sup> conducted a review of the available evidence on the resource use and cost of different eating disorders, taking into account cost to different healthcare sectors and broader social costs. Search was limited to 1980–2002. The authors found only two COI studies from the UK and Germany. The UK paper was conducted outside of the time frame for this rapid review and the German paper is not a country of interest for this review. The authors suggest that the cost of eating disorders is a greatly under-researched area. The two studies do suggest that eating disorders represent a considerable cost burden to the society. The results also suggest that early diagnosis, the use of appropriate and cost-effective treatments and the consequent prevention of chronicity would not just improve the outcomes of eating disorders, but could greatly reduce their economic burden. To be able to estimate the net cost arising from these trends, more comprehensive data on the current healthcare resource use pattern of patients with eating disorders and more trials with good health economic components are urgently required.

#### Mental disorder – Australian studies

Lim et al. (2000)<sup>36</sup> used data on full-time workers identified by the Australian NSMHWB to examine whether different types of disorder have a greater impact on work impairment in some occupations than others. The results suggest that nearly 11% of the full-time workforce had suffered from a mental disorder in the past month. Personality disorders (4.8%) were the most common, followed by substance (3.7%), anxiety (2.6%) and affective disorders (2.5%). In the past month, having a current mental disorder was associated with an average of one lost day from work, and three days of reduced performance. The authors calculate that anxiety and affective disorders are associated with more than 20 million work impairment days annually (in the full-time workforce). When they take into account personality and substance-related disorders, lost work productivity due to mental disorders contributes a loss of \$US1.4 billion (\$AUD2.7 billion) each year. The authors suggest that if employers were more aware of the economic consequences of the impact of mental disorders on their employees, the work place could provide an ideal setting for mental health promotion and prevention.

The Productivity Commission (2006) examined the potential economic and fiscal impacts of the National Reform Agenda. They used an economy-wide general equilibrium model to examine impact of reform on Competition, regulatory reform and improvements to human capital. The Commission acknowledged limited information was available about likely specific reforms and on costs and benefits of reform. Reductions in the prevalence of chronic disease (of which mental illness was one) are likely to have relatively small workforce effects. An outer-envelope scenario suggests that by 2030, NRA consistent health initiatives could increase the participation rate by around 0.6 of a percentage point. On average, these new entrants to the workforce are likely to be around 80 per cent as productive as existing members of the workforce. The authors suggest that despite the relatively small workforce effects, cost-effective improvements in health promotion and disease prevention are likely to lead to significant gains in the quality of life for many individuals.

Laplagne et al. (2007) was commissioned by the Productivity Commission to obtain estimates of the labour force participation effects of the health and education variables targeted by the National Reform Agenda.<sup>13</sup> In particular the authors examine the effects of health and education within an integrated modelling framework on labour productivity. The literature suggests that participation rates are consistently and considerably lower for people with a health condition. Of those listed, a mental health or nervous condition is associated with the lowest likelihood of being in the labour force, especially for males. The causality between mental health and labour force participation can run both ways: poor mental health may lead to a reduced likelihood of labour force participation and labour force participation can, in turn, influence a person's mental health, i.e. working may have a positive or negative impact on mental health. The authors use data from HILDA to model the marginal effects of a health or education variable by preventing or averting six conditions including mental/nervous condition. The authors suggest that the marginal effects are largest for either males or females for whom a mental health or nervous condition is averted or successfully treated (range from 17 to 25 percentage point increase in labour force participation). The authors contend that their results can help quantify the potential benefits of the National Reform Agenda and provide an improved basis for cost-benefit analyses of possible changes in specific health or education policies.

Morgan et al. (2011)<sup>14</sup> report the findings of the second Australian national survey of psychotic illness. A key Australian study that surveyed 1,825 adults with psychotic illnesses aged 18-64 years in contact with public specialised mental health services as well those receiving mental health services from government funded non-government organisations (NGOs).<sup>14</sup> The authors report a range of findings: an estimated 3.1 cases per 1,000 population aged between 18 and 64 years had a psychotic illness in 2010; schizophrenia (47.0%) was most common psychotic disorder; two thirds of people experienced their first episode before the age of 25 years; most (91.6%) people were taking prescribed medications in the previous four weeks, with four-fifths (81.6%) taking antipsychotics; Government pensions were the main source of income for 85.0% of people and 30.5% were employed on a full-time basis. The authors also note main changes between last survey: decrease in hospital admissions, increase in community rehabilitation increase use of drugs and case managers. While the survey results are promising, they also point to the ongoing challenge we face to do better for Australians affected by mental illness. Psychotic illness remains a debilitating illness. The survey shows that people with psychotic illness still have substantially poorer physical health than the general population, and remain at considerably greater risk of higher levels of obesity, smoking, alcohol and drug use. A few other interesting results include the fact that: just 3.7% of participants had used early intervention psychosis programs in the past year and 8.4% reported ever having used them; just over one in eight (12.9%) participants had used drug and alcohol services and programs in the past year; the use of psychosocial services was low – such as counselling, psychotherapy and group therapy (30.5%), cognitive behavioural therapy (22.3%) and family therapy (11.4%) and, the proportion using the internet to access information about mental health was 17.3%. The results reinforce the importance of the Australian Government's investments in early psychosis services, in partnership with the states and territories,

and the new 'Partners in Recovery' initiative to coordinate and provide flexibly funded services and supports for people with severely debilitating, persistent mental illness and complex needs.

Bruce et al. (2012)<sup>55</sup> was commissioned to undertake a longitudinal, mixed method evaluation of the HASI program. The Housing and Accommodation Support Initiative (HASI) in NSW aims to provide adults with a mental health diagnosis with access to stable housing, clinical mental health services and accommodation support. HASI supports over 1,000 mental health consumers across NSW living in social and private housing and ranging from very high support (eight hours per day) to low support (five hours per week) levels. It is a partnership program between Housing NSW, NSW Health, NGO Accommodation Support Providers (ASPs) and community housing providers. The annual cost of HASI per person ranged between \$11,000 and \$58,000, plus project management costs of between \$200 to \$500, depending on the level of accommodation support and the method of calculating the annual unit cost. The HASI program has achieved its aim of stable housing for most HASI consumers.

Degney et al. (2012)<sup>7</sup> was the lead author on a report commissioned by the Inspire Foundation to analyses the cost and impact on the Australian economy from poor mental health among young men. The authors adopted a social perspective in developed an economic model using latest data. The authors estimate that mental illness in young men aged 12–25 costs the Australian economy \$3.27 billion per annum. The Federal Government bears 31% of this cost via direct health costs, disability welfare payments, unemployment benefits and the direct costs of imprisonment. Australia loses over 9 million working days per annum to young men with mental illness. On average they have an additional 9.5 days out of role per year. Young men with mental illness have much lower rates of educational attainment compared to their peers, further limiting their skills development and long-term reduced earning potential by \$559 million per year. The authors suggest that a coordinated response from all sectors of the community holds the promise of considerable economic and individual benefits. The authors suggest that efforts should be made by all sectors of the community to evaluate the effectiveness of current policy responses and investments in mental health.

Leach et al. (2012)<sup>35</sup> examined the impact of early onset affective, anxiety and substance use disorders on the early termination of secondary school education in Australia. The authors used data from those aged between 20 and 34 in the 2007 Australian NSMHWB. The authors found that early onset of mental disorders are significantly associated with the subsequent early termination of education in Australia. As such they suggest that policies and interventions promoting prevention and early intervention and offering educational support for young people with psychiatric illness and substance use problems, should intervene prior to the middle years of high school to help prevent adverse social and economic consequences.

#### Mental disorder – Canadian studies

Latimer (2001)<sup>37</sup> conducted a review of the economic impacts of supported employment (SE) programs. Eight studies were found but they were either US studies or happened outside the timeframe of this rapid review. The authors suggest that overall service costs tend to be lower, but differences are not significant. It all depends on context. For example, in a setting where no, or hardly any, vocational rehabilitation services are provided at the outset, introducing an SE service is likely to increase vocational rehabilitation costs, simply because there is no opportunity for substitution. At the other extreme, converting existing vocational programs into supported employment appears to allow a significant cost reduction. The findings suggest that the cost of SE services ranges roughly from \$2,000 to \$4,000 per client yearly. Conversion of existing day treatment or less effective vocational rehabilitation programs into SE can be cost-neutral or cost-saving from a budgetary point of view and should be carried out in such cases. Where such conversions are not possible, development of SE programs can be justified on the grounds that

they promote community integration of persons with severe mental illness more effectively than do other methods currently available.

Stephens et al. (2001)<sup>40</sup> provide a comprehensive estimate of the economic burden of mental health problems in Canada. The authors use data from the 1996/1997 National Population Health Survey (NPHS) and report total cost of \$14.4 billion (direct cost=\$6.3 billion & indirect costs=\$8.13 billion). The authors suggest that compared to 1993 estimates, the cost of mental illness has increase 71% over a five year period. The authors suggest that promoting the mental health of Canadians would be a sound investment, not only to prevent mental health problems but also to reduce the staggering economic burden associated with them. It is clear that offering only more services will not respond effectively to the population's mental health needs. Since approximately 60% of people with mental health problems do not receive care from a health professional, the apparent gap in services is simply too big to fill. Authors contend that what is needed is a different kind of investment to promote the population's mental health by developing individual and community resourcefulness, and promoting resilience among individuals of all ages.

Dewa et al. (2004)<sup>47</sup> explores the state of knowledge about the prevalence of mental illness and its effect on the working population. In this review the authors' present evidence around mental illness, productivity issues and workplace. Results from an Ontario study suggest about 8% of the working population had a diagnosable mental disorder. About one-third of society's depression related productivity losses can be attributable to work disruptions. Canada annually loses about \$4.5 billion from this decreased productivity. Mental illness related disability claims cost \$15 to \$33 billion annually. More research is required to better understand mental illness among occupational groups and industry sectors.

Mitton et al. (2005)<sup>38</sup> examined the relationship between continuity of care and healthcare costs in Canada. The authors estimated total cost to the system for 437 patients over the 17-month study period was just over \$10.5 million (or approximately \$7.4 million per annum). The authors found that poorer continuity of care is related to higher hospital costs and lower community costs or, conversely, better continuity is related to lower hospital costs and higher community costs. The authors suggest that more research is required to examine whether shifting resources from hospital to community, particularly for high-need patients, would result in improvements in continuity of care and subsequent health outcomes.

Lim et al. (2008)<sup>48</sup> estimates the incremental economic burden of mental illness in Canada. The authors use the 2003 Canadian Community Health Survey to place a dollar value on medical resources, productivity losses and reductions in health related quality of life (HRQOL) (valued at \$50,000/QALY). Considered three mental health categories (diagnosed; undiagnosed; no problem) based upon survey responses. The authors estimate the total incremental burden for of mental illness at \$51 billion, with close to 30% of the cost incurred by the undiagnosed mentally ill population. Loss of health accounted for more than 50% of the total burden or around \$28 billion. The value of work loss from absenteeism (short-term disability) was about 10% higher than the value of work loss from unemployment (long-term disability); and together they account for about 35% of the burden. Although the authors acknowledge that data have improved in recent years, better data in the area of institutional care, community care, and pharmaceuticals are needed to provide global estimates of cost that will be helpful to policy makers.

Lim et al. (2008)<sup>49</sup> examined the question of how much should Canada spend on mental health. The reported was completed by the Institute of Health Economics and Alberta Health Services. The report provides an excellent overview of the prevalence, costs and expenditure on mental disorders in Canada. They present four different approaches that have been used in a variety of contexts to address the issue of government spending – the Benchmark Approach, the Behavioral Approach, the Budgeting Approach and the Economic Evaluation or Cost-Benefit Approach. The authors also present examples using two of these approaches in the Canadian context to justify mental health spending of somewhere between 6–13% of total health spending.

Jacobs et al. (2010)<sup>8</sup> was commissioned by the Mental Health Commission of Canada to determine the economic scope of mental health services in Canada. The report focuses on mental health services related to mental illness - services that are provided, supervised, or ordered by health and mental health professionals; and, other services provided that can either be oriented towards persons with mental illnesses or to broader groups, which include people with mental illness. These include income support, employment support, assisted housing, and other types of support. Hospital inpatient data and physician billings were developed from the Canadian Institute for Health Information's national databases. Pharmaceutical expenses were obtained from the IMS Health database and federal disability pension payments were obtained from Human Development and Resources Canada. Services from non-profit organisations were obtained from Revenue Canada's T3010 annual returns. Total service cost was estimated to be \$14.3 billion with pharmaceuticals most expensive (\$2.8 billion) and then hospitalisation (\$2.7 billion). Of the total reported costs, about \$10.6 billion was for services and \$3.7 billion was for disability payments. In an international context, Canada spends less than most developed countries; the ratio of government mental health to all government health spending is 7.2%, several points lower than the UK and Sweden.

Cawthorpe et al. (2011)<sup>50</sup> compared the health costs of groups with and without psychiatric diagnoses (PDs) using nine years of physician billing data. The authors found a positive association between mental health and overall healthcare use and cost. For the patient PD group, the average cost per patient accumulated during the period from 1994 to 2003 was \$3,437, \$3,265 for the comparison patient PD group and \$1,345 for the patient-comparison patient non-PD group. The authors suggest that more research is required to take advantage of the longitudinal nature of their data to examine the dynamic of patient mix and clinical pathways over time.

Smetanin et al. (2011)<sup>23</sup> undertook a modelling exercise using the RiskAnalytica's Life at Risk simulation platform to generate a base model of the current and future life and economic outcomes associated with major mental illness in Canada including: mood disorders, anxiety disorders, schizophrenia, disorders of childhood and adolescence, .cognitive impairment including dementia, and substance use disorders. The authors found that mental illness was estimated to cost the Canadian economy over \$42.3 billion dollars in 2011 in direct costs. Of this, \$21.3 billion are direct costs to the healthcare system including hospitalisations, physician visits, medication, and care and support staff. Approximately two of every nine workers (or 21.4% of the working population) are estimated to suffer from a mental illness that potentially affects their work productivity – translates to an annual wage based productivity impact of over \$6.3 billion dollars. In nominal terms, the total annual economic costs associated with mental illness will increase by over sixfold to exceed \$306 billion by 2041. In 2011 present value terms, the total cumulative costs over the next 30 years could exceed \$2.5 trillion dollars.

#### Mental disorder – NZ study

Gibb et al. (2010)<sup>17</sup> examined whether the extent of common psychiatric disorder between ages 18 and 25 is associated with negative economic and educational outcomes at age 30, before and after controlling for confounding factors. The study used longitudinal data collected as part of the Christchurch Health and Development Study. Data were collected using a combination of semi-structured interviews, standardised tests and teacher reports. The results suggest that increasing episodes of psychiatric disorder have increasingly negative effects on life outcomes even after adjustment for confounding factors. This suggests a need for further improvements in the diagnosis and treatment of psychiatric illness in order to reduce the negative outcomes

experienced by those with psychiatric disorder. The authors suggest that those individuals most at risk of negative outcomes are not those who experience any specific psychiatric disorder, but rather, those who experience multiple episodes of disorder. This finding suggests that that there is a need to develop targeted interventions for those with multiple psychiatric disorders in order to reduce the risks of negative life outcomes among this group.

#### Mental disorder – UK studies

McCrone et al. (2008)<sup>22</sup> was lead author on a study commissioned in 2006 by the King's Fund to estimate mental health expenditure in England for the next 20 years to 2026. The review had the following broad aims. To assess the current need for mental health services and the costs of services provided; to identify project needs and costs to the year 2026; and, to assess the impact that specific interventions may have on these costs. The authors calculate number and cost of depression, anxiety disorders, schizophrenic disorders, bipolar disorder/related conditions, eating disorders, personality disorder, child/adolescent disorders, and dementia. The number of people in England who experience a mental health problem within the diagnostic groups studied is projected to increase by 14.2%. Current service costs, estimated to be £22.50 billion, are projected to increase by 45% to £32.6 billion in 2026 (at 2007 prices). It is estimated, for example, that 35% of those with depression and 51% of those with anxiety disorders are not in contact with services, and many conduct disorders and eating disorders among children and adolescents are undiagnosed and untreated. This means there is a significant potential to treat more people with these mental disorders if diagnostic services are accessible, treatment is available, and the individuals concerned are willing to accept it. A number of service interventions might lead potentially to reductions in costs. For depression and anxiety disorders, increasing the number of people who are currently in treatment and who receive evidence-based interventions would increase service costs but could result in savings in total costs if treatment is effective and results in increased employment. Increasing the number of people receiving medication provides a much greater economic gain than psychological therapies, which may produce similar benefits compared to medication but are far more expensive. With regard to schizophrenia and bipolar disorder and related conditions, savings (mainly in reduced inpatient costs) could be realised by expanding the use of crisis intervention and early intervention services. Early detection and intervention services for psychosis can lead to a reduced need for services at a later stage and therefore cost savings. Recommendations include: a commitment from future governments to ensure that funding meets expected increased costs; a sustained effort to support people with mental health needs of working age who are not in employment to return to work; the expansion of evidence-based interventions in primary care settings for people with depression and anxiety disorders, crisis services in the community and early intervention services for psychosis; and, the establishment of better systems of early detection and treatment of dementia more research into the cost-effectiveness of a range of interventions, including mental health promotion and prevention initiatives.

Stansfeld et al. (2011)<sup>18</sup> examined the association of common mental disorders and long spells of psychiatric and non-psychiatric sickness absence. The study used the Longitudinal Whitehall II Study of British Civil Servants. The authors found that clinical but not sub-threshold common mental disorders were associated with increased risk of long spells of psychiatric sickness absence for men, but not for women, after adjusting for covariates. Risk of psychiatric sickness absence was associated with recent common mental disorders and disorder present on two occasions. The authors suggest that future research should concentrate more on distinguishing the predictors of psychiatric and non-psychiatric sickness absence and exploring the reasons for the gender differences in risk. For prevention there should be more studies examining the effects of modifying working conditions in order to reduce the risk of common mental disorders and hence sickness absence. In terms of reducing the financial burden on organisations, there should be more

studies of the efficacy of early identification and management of mental health symptoms to see if this might prevent the development of long spells of sickness absence.

#### Psychological distress – Australian studies

Hilton et al. (2008)<sup>9</sup> examined the relationship between employee psychological distress, employee type and productivity. The authors used the health and performance at work questionnaire to measure and value absenteeism and presenteeism. Authors suggest that although the prevalence of mental health problems in blue-collar workers is similar to other employee types, they are responsible for the largest losses in productivity primarily driven by large absenteeism rates. For blue-collar workers, high psychological distress results in an 18% increase in absenteeism rates. Overall high psychological distress increases absenteeism by 1.7%, decreases employee performance at work by 6.1% resulting in a net productivity loss of 6.7%. This translates into the cost estimates for psychological distress in the UK £4.3 billion and in Australia of \$2.7 billion. The authors suggest that the moderate psychological distress employees are a prime target for detection and early intervention.

Hilton et al. (2010)<sup>10</sup> estimated employee work productivity by mental health symptoms while considering different treatment-seeking behaviours. The authors used same sample as reported in Hilton et al. (2008). The authors estimated that estimated that psychological distress produces a \$5.9 billion reduction in Australian employee productivity per annum. Increasing psychological distress from low to moderate then to high levels is associated with increasing productivity decrements (6.4%, 9.4% and 20.9% decrements, respectively) for employees in current treatment. Effective treatment for mental health problems yields substantial increases in employee productivity and would be a sound economic investment for employers.

#### Schizophrenia – Australian studies

Access Economics (2002)<sup>25</sup> conducted an analysis of the burden of schizophrenia and related suicide in Australia on behalf of SANE Australia. The authors used a range of data sources to examine direct and indirect costs. The authors estimated a total cost of \$1.85 billion in 2001 (\$50,000 on average for each of more than 37,000 Australians with the illness). Direct health system costs were \$661 million including 60% hospital costs. Real indirect costs were \$722 million including \$488 million of lost earnings. The authors discuss a range of cost-effective treatments are required including: prevention and early intervention programs; newer improved medications; suicide prevention strategies; and, research into causes and more effective treatments.

Carr et al. (2003)<sup>6</sup> estimated the costs associated of psychosis in Australia based on data from the LPDS. The authors used a prevalence-based bottom-up costing approach with indirect costs estimated using human capital approach (base year 2000). An excellent study that estimates the annual societal costs for the average patient with psychosis around \$46,200 comprising \$27,500 in lost productivity, \$13,800 in inpatient mental health care costs and \$4,900 in other mental health and community services costs. Societal costs of psychosis are at least \$2.25 billion per annum (including \$1.44 billion for schizophrenia). They also report that only 29.5% of males and 25.4% of females had regular full-time or part-time work over the previous year compared with 67.8% of males and 49.9% of females in the general population. Authors argue that the current expenditure on psychosis in Australia is probably inefficient. Some of the findings from the LPDS suggest that there may be substantial opportunity costs in not delivering effective treatments in sufficient volume to people with psychotic disorders, not intervening early, and not improving access to rehabilitation and supported accommodation. Future research: have savings resulting from bed reductions and the closure of stand-alone psychiatric hospitals in Australia been

redirected efficiently to other mental health and community services?; What are the main predictors of healthcare costs and subgroup cost differences among people with psychosis?; What proportion of current healthcare expenditure on psychotic disorders can be regarded as discretionary (i.e. beyond that required for acute admissions, crisis services, emergency shelter, etc.), and how is this likely to change with time?; What magnitude of clinical improvement and reduced disability can we reasonably expect from evidence-based psychosocial interventions and how are these improvements likely to impact on costs?; How can we best demonstrate that actual improvements in community care for people with psychotic disorders (e.g. increased provision of psychosocial treatments, early interventions, rehabilitation programs, and supported accommodation) lead to better outcomes and proportionate reductions in hospitalisation and associated costs?; Does wider deployment of these interventions also deliver additional societal benefits, for example, through increased employment and reduced demands on carers, welfare services, voluntary agencies, and the criminal justice system?; and, are the answers to these questions substantially different for non-psychotic disorders?

Carr et al. (2004)<sup>51</sup> used data from LPDS to identify the predictors of direct mental health care costs and indirect or time-loss costs in psychotic disorders and to discuss their implications for future interventions. The authors found that schizophrenia (52% of all cases) involved greater costs than other psychotic disorders. On average, each treated patient with psychosis cost the Australian Government and society \$29,600 and \$46,200 per annum. From the societal perspective indirect costs contributed 60% to total costs. Non completion of high-school education and chronicity of illness course were predictive of higher costs across all categories, and some factors were linked primarily with mental health care costs (e.g. age at onset, current symptomatology) or indirect costs (e.g. male gender, overall disability). The authors suggest a number of research implications. Early identification of decline in school performance and the emergence of problem behaviours around puberty ought to be taken by teachers as an indication for possible health, psychological and vocational assessments and possible remedial interventions. Appropriate early intervention programs may be a good investment but they would need to be tested for efficacy and have their cost-effectiveness evaluated, particularly in terms of their potential for long-term cost savings. Optimal treatments are likely to differ in type and effects, depending on age, gender, level of education, age at onset, illness duration, course, level of disability, social competence, current symptoms and so on. Schizophrenia, let alone psychosis, is not a homogeneous entity. We need to avoid uninformed and incautious policy decisions and become better informed about the broader societal costs, consequences and outcomes of psychosis and its treatment.

Fitzgerald et al. (2007)<sup>15</sup> used data from the Schizophrenia Care and Assessment Programme (SCAP) study, a prospective, longitudinal, study of global health outcomes for 347 people with schizophrenia, to describe the direct and indirect costs associated with schizophrenia. The authors used a bottom-up approach, indirect methods using human capital (HC) approach. They estimated that the average annual societal cost of treatment was \$32,160 (productivity costs=\$14,776) during the first year decreasing to \$29,181 (productivity costs=\$14,453) in the third year. Hospitalisations were the most expensive direct cost component. There was a progressive increase in total medication costs over the study. Only 24% (9% full-time and 15% part-time) of men and 11% (2% full-time and 9% part-time) of women were in paid work. The highly skewed nature of the costing data demonstrate that for a significant proportion of patients the healthcare costs associated with the treatment of schizophrenia are modest. Identification of those factors contributing to high costs should provide insights into potential interventions to improve the efficiency of overall service delivery. Because healthcare costs are driven to such a marked degree by rates of hospitalisation, the availability of beds and the system structure will play a major role in the determination of the costs of care.

Fitzgerald et al. (2009)<sup>52</sup> quantified the costs and resource utilisation associated with a relapse of schizophrenia or schizoaffective disorder. The study was based on a two-year retrospective

analysis of case notes (inpatient and outpatient medical records plus the hospital's morbidity and clinical costing systems) of 200 patients with schizophrenia or schizoaffective disorder. The authors found increased healthcare resource utilisation and costs results from relapse in patients with schizophrenia or schizoaffective disorder. An increase in service use and costs persist for a considerable time period after an episode of relapse. They suggest that future research should intensively examine strategies to enhance adherence, thereby reducing relapse in patients with schizophrenia and related disorders.

#### Schizophrenia – Canadian study

Goeree et al. (2004)<sup>53</sup> estimated the financial burden of schizophrenia in Canada in 2004. The authors used a prevalence-based approach for health and non-health costs and a friction cost approach for productivity. The primary sources of information included a review of the published literature, a review of published reports and documents, secondary analysis of administrative datasets and information collected directly from various federal and provincial government programs and services. The authors estimated the total cost of schizophrenia at \$6.85 billion with over two thirds attributed to productivity. The authors comment that despite new and more effective medications and changes to programs and services for patients with schizophrenia, the direct healthcare and non-healthcare costs of schizophrenia have remained relatively constant over the past decade. The authors suggest that the most significant factor affecting the cost of schizophrenia in Canada is much higher than average rates of unemployment for both males and females. Programs targeted at improving the workforce participation for patients with schizophrenia have the potential to make a significant contribution in reducing the cost of this severe mental illness in Canada.

#### Schizophrenia – UK study

Munro et al.  $(2011)^{54}$  assessed the cost of a schizophrenia relapse admission two areas of the UK. The authors used clinical records and a patient survey to estimate total cost of hospital treatment (measured as cost of inpatient stay + cost of prescribed inpatient medications). The authors found that the mean inpatient cost of relapse was £25,852 and varied from £1270 to almost £120,000. More than 97% of the costs were attributable to hospital care costs and less than 3% related to pharmacological treatment. Treatment non-adherence was implicated in 76% of relapses. Strategies for improving treatment adherence may reduce the rate of relapse.

#### Appendix 2: Tabular summary of studies included in this rapid review

Mental disorder	First author, yr published	Country	Aim of study	Perspective	Costing approach	Costs valued	Data collection/methods	Key findings / recommendations	Rating
ADHD	Schlander, 2007	UK, Germany	Estimate future trends of attention deficit hyperactivity disorder (ADHD)-related drug expenditures from the perspectives of the statutory health insurance in Germany and National Health Service (NHS) in England for ages 6 to 18 years	Health sector	Modelling	Prescription costs	Model inputs were derived from demographic and epidemiological data, a literature review and an analysis of new drugs in development for ADHD. Conducted scenario analysis	Annual ADHD pharmacotherapy expenditures for children and adolescents will further increase. During this period, overall drug spending by individual physicians may increase 2.3- to 9.5-fold. Even for an extreme low case scenario, a more than sixfold increase of pharmaceutical spending for children and adolescents is predicted	N/A
Anxiety	Waghom, 2005	Australia	To ascertain at a population level, patterns of disability, labour force participation, employment and work performance among people with anxiety disorders in comparison to people without	Workforce	N/A	N/A	Survey data from the Survey of Disability, Ageing and Carers, Australia. All health conditions of at least six months duration were coded to ICD-10	Compared to controls, more people with anxiety disorders were: not in the labour force, fewer were employed, worked in agriculture, forestry or fishing, and in transport and storage industries; received Government pensions or allowances; 59.1% with anxiety disorders reported receiving treatment while 40.9% did not	N/A
Cognitive function	Henderson, 2011	UK	To test the relationship between childhood cognitive function and long-term sick leave in adult life and whether any relationship was mediated by educational attainment, adult social class or adult mental ill-health	N/A	N/A	N/A	Data from the 1946, 1958 and 1970 British birth cohorts	In all three cohorts, a clear dose response effect whereby lower childhood cognitive ability was more strongly associated with long-term sick leave. Education is an important policy response	N/A

Mental disorder	First author, yr published	Country	Aim of study	Perspective	Costing approach	Costs valued	Data collection/methods	Key findings / recommendations	Rating
Conduct disorder	Scott, 2001	UK	Compares the cumulative costs of public services used through to adulthood by individuals with three levels of antisocial behaviour in childhood (no problems, conduct problems and conduct disorder)	Society	Bottom-up	Education, residential, health, crime – 1998 prices	Applied costs to data from the inner London longitudinal study, an epidemiological study of psychiatric problems and attainment in people from a disadvantaged inner London borough	By age 28, the cost of conduct disorder was ten times more than the no problems group and the conduct problem group over three times more. The extra costs of both conduct groups were not only due to crime but also to higher use of services across all domains. Crime was the costliest domain in all the groups and constituted almost two thirds of the total cost in the conduct disorder group. A well-coordinated multiagency approach that used interventions of proved effectiveness could considerably reduce the costs of antisocial children when they are grown up	Good
Depression	Parker, 2000	Australia	Examined the cost impact of referral to a Mood Disorder Unit (MDU) by comparing pre- service and post-service costs between MDU and control - after initial assessment or treatment at MDU, patients are referred back to their clinician for ongoing management	Society	Bottom-up – 1998 prices	Direct and indirect financial costs; social costs (loss of friends/ contacts); relationship costs; personal costs	A cost questionnaire was embedded in an MDU intake assessment protocol	Overall group costs in our MDU-assessed tertiary referral were reduced (despite increased costs for electroconvulsive therapy (ECT) and social welfare) by nearly 40% – most by reduction in hospitalisation costs. Despite increased hospitalisation costs for those admitted, the percentage hospitalised dropped from 45% to 15%, resulting in a saving of more than \$700,000. MDU may have improved the outcome trajectory of those with the more 'biological' depressive disorders presumably achieved by review and modification of pharmacological treatments, recommendations for ECT for some, and attention to second- order factors through pointers to treatments such as cognitive behaviour therapy (CBT) and strategies such as anxiety management	Good
Depression	Access Economics, 2002	Australia	Conducted an analysis of the burden of bipolar disorder and related suicide in Australia	Society	Combination, human capital – 2003 prices	Direct costs (mental health and social services); indirect costs (morbidity, mortality, tax foregone)	The prevalence estimates are obtained from two data sources, the Low Prevalence Disorders Study (LPDS) and Australian Bureau of Statistics (ABS) National Health Survey 1995. Health services utilisation and expenditure for specific diseases and disease groups in Australia based on ICD-9	Real financial costs total \$1.59 billion in 2003 – \$16,000 for each of nearly 100,000 Australians with the illness. Direct health system costs are estimated at \$298 million in 2003, including two- thirds being hospital expenditure. Indirect costs are estimated at \$833 million, including \$464 million of lost earnings from people unable to work due to the illness	Good

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Mental disorder	First author, yr published	Country	Aim of study	Perspective	Costing approach	Costs valued	Data collection/methods	Key findings / recommendations	Rating
Depression	Goldney, 2007	Australia		Society	Bottom up using survey results – 2004 prices	Direct and indirect costs	A face-to-face Health Omnibus Survey was conducted in 2004 in random and representative sample of the South Australian population, and this was compared with a survey conducted in 1998 that used the same methodology	The total excess cost was estimated to be \$9,751 for those with other depression, and \$17,593 per annum for those with major depression. For those having major depression, when compared with those with no depression, they were more than three times as likely to have visited a GP, 18-fold more likely to have visited a mental health professional and 2.7-fold more likely to have used hospital services. Immediate economic gains can probably be made by simply raising the proportion of depressed individuals on treatment	Good
Depression	Schofield, 2011	Australia	Estimates the extent to which those who exit the workforce early due to mental health problems have less savings by the time they reach retirement age	Individual	Modelling	Retirement savings	Microsimulation model of health and disability and the associated impacts on labour force participation, personal income, savings and government revenue and expenditure	Both males and females who were out of the labour force due to depression or other mental health problems had at least 97% less savings and retirement income by age 65 that those who remained employed full-time. Supporting elderly people with mental health problems in retirement will place a large burden upon government finances. There is thus an additional argument for governments to invest in mental health services and prevention and support measures, to stem these costs and improve the quality of life of people suffering from these conditions	N/A
Depression	Schofield, 2012	Australia	This paper quantifies, for the 45 to 64 year old Australian population, the amount of income available to those who have retired early due to depression and also for those with other mental health conditions, the amount of taxation revenue these individuals pay to the Australian Government, and the amount of government benefits paid to these individuals	Society	Modelling	Personal income, taxation revenue, welfare payments, gross domestic product (GDP) loss	Micro simulation model of health and disability and the associated impacts on labour force participation, personal income, savings and government revenue and expenditure	25,200 and 32,200 individuals not in the labour force due to depression and other mental health conditions, respectively. Individuals who retired early due to depression and other mental health problems personally have 73% and 78% lower income then their full-time employed counterparts. The national aggregate cost to government due to early retirement is \$278 million in lost income taxation revenue, \$407 million in additional transfer payments and around \$1.7 billion in GDP in 2009	N/A

Mental disorder	First author, yr published	Country	Aim of study	Perspective	Costing approach	Costs valued	Data collection/methods	Key findings / recommendations	Rating
Depression	Paradise, 2012	Australia	Examined the association of heart disease, depression and ill health retirement	N/A	N/A	N/A	Data from the 45 and Up Study	Nearly one in five of the participants retired early due to ill health. A prior diagnosis of depression was associated with a threefold increase in the risk of IHR. Highlights the need to consider gender in future studies examining the relationship between depression, heart disease and psychosocial outcomes. Clinicians working in consultation-liaison settings or rehabilitation should be aware of gender differences in the effects of depression, when trying to optimise outcomes for their patients	N/A
Depression	Dewa, 2011	Canada	Examined the association of depression and its treatment and work productivity	N/A	N/A	N/A	A large-scale community telephone survey of employed and recently employed people in Alberta. Using the World Health Organization's (WHO's) Health and Work Performance Questionnaire	Three significant trends. First, severe depression has a significant negative association with productivity. Second, a significant proportion of workers who had moderate and severe depressive episodes did not have mental health treatment. Third, compared with people with moderate or severe depressive episodes who did not receive treatment, those who did were significantly more likely to be in the highly productive group	N/A
Depression	Slomp, 2012	Canada	Estimated the depression care costs of patients with a depression diagnosis	Health sector	Bottom-up – 2007–2008 prices	Healthcare costs	Administrative health care records	Total cost of treating depression in this group of Albertans (208,167 people) was \$114.5 million, an average of \$550 per treated person. The costs ranged from \$29 for the lowest decile to \$25,826 for the highest 1%. Within the highest decile, hospital costs becoming increasingly prominent contributors to the total cost. Further analysis is warranted to ascertain the degree to which homogenous care is provided to patients with depression with similar levels of severity	Good
Depression	Thomas, 2003	UK	To calculate the total cost of depression in adults in England during 2000	Society	Prevalence based approach, human capital — 2000 prices	Direct costs (in and outpatient, GP, drugs), indirect costs (morbidity and mortality)	Recorded data on health service use, sickness benefit claims and the number of registered deaths of patients with depression	The total cost of adult depression was estimated at over £9 billion, of which £370 million represents direct treatment costs. There were 109.7 million working days lost and 2615 deaths due to depression in 2000	Good

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Mental disorder	First author, yr published	Country	Aim of study	Perspective	Costing approach	Costs valued	Data collection/methods	Key findings / recommendations	Rating
Depression	Luppa, 2007	UK	Reviews of published cost of illness studies of depression worldwide	N/A	Combination, human capital	Various	Systematic literature search	Twenty four studies in the final review. All studies had methodical differences. Summary estimates from the studies for the average annual costs per case ranged from \$1,000 to \$2,500 for direct costs, from \$2,000 to \$3,700 for morbidity costs and from \$200 to \$400 for mortality costs. Methodological quality limited comparison	
Depression	Young, 2011	UK	Estimated the annual cost associated with bipolar disorder to the UK healthcare system	Health sector	Bottom-up – 2009–2010 prices	Medical resources (inpatient and outpatient)	Retrospective cohort study, the IMS Disease analyser was used to examine primary care resource use; Hospital episode statistics supplemented with Mental Health Minimum Dataset Statistics to quantify resource use in outpatient and community mental health	The total annual NHS cost was estimated to be £342 million at 2009/2010 prices, of which hospitalisations (admissions and day care) accounted for £207 million (60%), outpatient and community mental health contributed £91 million (27%), and medication contributed £25 million (7%) of the overall direct costs of care. Contrary to the anticipated positive impact of introducing the NICE bipolar guidelines and the Quality and Outcomes Framework, the cost of managing this illness to the NHS has increased	Good
Eating disorder	Deloitte, 2012	Australia	In 2012 Deloitte Access Economics was commissioned by the Butterfly Foundation to examine the economic and social costs of eating disorders in Australia	Society	Combination, human capital – 2012 prices	Health system, productivity costs, other financial costs, transfer costs	Australian Institute of Health and Welfare (AIHW ) + survey	In 2012, there were an estimated 913,986 people with an eating disorder in Australia. In 2012, there were 913,986 people with an eating disorder in Australia with a total socioeconomic impact of \$69.7 billion (financial cost \$17.18 billion + burden of disease BOD estimates \$52.6 billion). Lost productivity accounts for the 88% of financial costs. There is a need to collect better information, particularly in relation to tracking prevalence, mortality and health system costs, and better defining less well known eating disorders	Good

Mental disorder	First author, yr published	Country	Aim of study	Perspective	Costing approach	Costs valued	Data collection/methods	Key findings / recommendations	Rating
Eating disorder	Simon, 2005	UK	Review of available evidence on the resource use and cost of different eating disorders, taking into account cost to different health care sectors and also broader social costs	Health/ society	N/A	N/A	Bibliographic electronic databases	The cost of eating disorders is a greatly under researched area compared to that of many other mental disorders. Eating disorders represent a considerable cost burden to the society. The results suggest that effective treatments and the consequent prevention of chronicity would not just improve the outcomes of eating disorders, but could greatly reduce their economic burden. To be able to estimate the net cost arising from these trends, more comprehensive data on the current healthcare resource use pattern of patients with eating disorders and more trials with good health economic components are urgently required	N/A
Mental disorder	Lim, 2000	Australia	Several aims but main one is to examine whether different types of disorder have a greater impact on work impairment in some occupations than others	Workplace	N/A	N/A	Data were based on full- time workers identified by the Australian National Survey of Mental Health and Wellbeing (NSMHWB)	Nearly 11% of the full-time work force had suffered from a mental disorder in the past month. Personality disorders were the most common, followed by substance, anxiety and affective disorders. In the past month, having a current mental disorder was associated with an average of one lost day from work and three days of reduced performance	N/A
Mental disorder	Productivity Commission, 2006	Australia	This study by the Productivity Commission responds to a request to report to Council of Australian Governments (COAG Senior Officials on the potential economic and fiscal impacts of the National Reform Agenda	Society	Quantitative modelling	Competition, regulatory reform and improvements to human capital	Economy-wide general equilibrium model	Reductions in the prevalence of chronic disease (of which mental illness was one) are likely to have relatively small workforce effects. An outer-envelope scenario suggests that by 2030, national reform agenda (NRA) consistent health initiatives could increase the participation rate by around 0.6 of a percentage point. On average, these new entrants to the workforce are likely to be around 80% as productive as existing members of the workforce. The authors suggest that despite the relatively small workforce effects, cost-effective improvements in health promotion and disease prevention are likely to lead to significant gains in the quality of life for many individuals	Good

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Mental disorder	First author, yr published	Country	Aim of study	Perspective	Costing approach	Costs valued	Data collection/methods	Key findings / recommendations	Rating
Mental disorder	Laplagne 2007	Australia	Examines the potential economic benefits of better health and education	Workplace	N/A	N/A	Uses data from Household, Income and Labour Dynamics in Australia (HILDA) to model the marginal effects of a health or education variable by preventing or averting six conditions including mental/nervous condition	Better education leads to a better overall self-assessed health status, which, in turn, leads to higher labour force participation. In the health area, the largest impact is obtained through the prevention of a lasting mental health or nervous condition. Results can provide an improved basis for cost-benefit analyses of possible changes in specific health or education policies	N/A
Mental disorder	Morgan, 2011	Australia	The second Australian national survey of psychotic illness was conducted in 2010. The aim was to provide updated information on the lives of people with psychotic illness who receive public specialised mental health services	Society	N/A	N/A	Survey of 1,825 adults with psychotic illnesses aged 18–64 years in contact with public specialised mental health services as well those receiving mental health services from government funded NGO	In March 2010, an estimated 3.1 cases per 1,000 population aged between 18 and 64 years had a psychotic illness and were in contact with public specialised mental health services. The most common psychotic disorder was schizophrenia (47.0%). Two thirds of people experienced their first episode before the age of 25 years. Education attainment was lower in sample. Most (91.6%) people were taking prescribed medications in the previous four weeks, with four-fifths (81.6%) taking antipsychotics. Government pensions were the main source of income for 85.0% of people and 30.5% were employed on a full- time basis. Main changes include: decrease in hospital admissions, increase in community rehabilitation increase use of drugs and case managers	N/A
Mental disorder	Bruce, 2012	Australia	Commissioned study to undertake a longitudinal, mixed method evaluation of Housing and Accommodation Support Initiative (HASI) program: effectiveness of support for consumers; benefits and limitations of the service model; and the cost of the program	Society	Top down costing	Program costs	The data analysed in the evaluation were interviews with consumers, families and HASI partners and data from secondary sources	Overall, HASI consumers had significantly fewer and shorter mental health hospital admissions after joining HASI. The HASI program has achieved its aim of stable housing for most HASI consumers. HASI consumers were continuing to participate in education and work. The annual cost of HASI per person ranges between \$11,000 and \$58,000, plus project management costs of between \$200 to \$500	Good

Mental disorder	First author, yr published	Country	Aim of study	Perspective	Costing approach	Costs valued	Data collection/methods	Key findings / recommendations	Rating
Mental disorder	Degney, 2012	Australia	Analyses the cost and impact on the Australian economy from poor mental health among young men	Society	Bottom-up and human capital – modelling - 2011 prices	Government; other sectors (welfare, educational services etc.); personal; productivity costs	Various sources including ABS. Developed an economic model	Mental illness in young men aged 12-25 costs the Australian economy \$3.27 billion per annum or \$387,000 per hour across a year in lost productivity. On average they have an additional 9.5 days out of role per year. Young men with mental illness have much lower rates of educational attainment compared to their peers, further limiting their skills development and long term reduced earning potential by \$559 million per year. A coordinated response from all sectors of the community holds the promise of considerable economic and individual benefits	Good
Mental disorder	Leach, 2012	Australia	Examined the impact of early onset affective, anxiety and substance use disorders on the early termination of secondary school education in Australia	Education	N/A	N/A	Used data from those aged between 20 and 34 in the 2007 Australian NSMHWB	Early onset mental disorders are significantly associated with the subsequent early termination of education in Australia. Policies and interventions promoting prevention and early intervention and offering educational support for young people with psychiatric illness and substance use problems, should intervene prior to the middle years of high school to help prevent adverse social and economic consequences	N/A
Mental disorder	Latimer, 2001	Canada	Review of the economic impacts of supported employment (SE)	N/A	N/A	N/A	Studies reporting some service use or monetary outcomes of adding SE programs were identified.	Eight studies found – all US studies and outside timeframe of rapid review. Overall service costs tend to be lower, but differences are not significant. Conversion of existing day treatment or less effective vocational rehabilitation programs into SE can be cost-neutral or cost-saving from a budgetary point of view and should be carried out in such cases	N/A
Mental disorder	Stephens, 2001	Canada	Provide a comprehensive estimate of the economic burden of mental health problems in Canada	Society	Bottom-up and human capital – 1998 prices	Direct and indirect costs	1996/1997 National Population Health Survey (NPHS)	Total cost=\$14.389 billion (direct of \$6.26 billion and indirect of \$8.13 billion). Costs have increased 71% between 1993 and 1998. What is needed is a different kind of investment to promote the population's mental health – developing individual and community resourcefulness and promoting resilience among individuals of all ages	Good

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Mental disorder	First author, yr published	Country	Aim of study	Perspective	Costing approach	Costs valued	Data collection/methods	Key findings / recommendations	Rating
Mental disorder	Dewa, 2004	Canada	Discussion paper that explores the evidence on the prevalence of mental illness and its effect on the working population	Workplace	Review	Productivity issues	Various Canadian sources	Results from an Ontario study suggest about 8% of the working population have a diagnosable mental disorder. About one-third of society's depression related productivity losses can be attributable to work disruptions. Canada annually loses about \$4.5 billion from this decreased productivity. More research is required to better understand mental illness among occupational groups and industry sectors	N/A
Mental disorder	Mitton, 2005	Canada	Examined the relationship between continuity of care and healthcare costs	Health sector	Bottom-up	Healthcare costs	Service use events and costs were tracked through self-reported and administrative data	Cost to the system for 437 patients over 17-month study period was \$10.5 million. Results suggest that poorer continuity of care is related to higher hospital costs and lower community costs, or, conversely, better continuity is related to lower hospital costs and higher community costs	Good
Mental disorder	Lim, 2008	Canada	Estimates the incremental economic burden of mental illness in Canada	Society	Bottom-up, indirect methods – 2003 prices	Medical, productivity, Health related quality of life (HRQOL)	2003 Canadian Community Health Survey. QALYs were multiplied by a figure of \$50,000	The total incremental burden for of mental illness was \$51 billion, with close to 30% of the cost incurred by the undiagnosed mentally ill population. Loss of health accounted for more than 50% of the total burden. The value of work loss from absenteeism was about 10% higher than the value of work loss from unemployment and together they account for about 35% of the burden. Better data in the area of institutional care, community care, and pharmaceuticals are needed	Good
Mental disorder	Lim, 2008	Canada	Authors present what is known about public mental health spending (in Canada) and the economic burden, and what current techniques are being used to answer the question, "How much should we spend?"	Society	N/A	N/A	Review	The economic impact of mental and substance use disorders are substantial. Used Lim et al. (2008) and Jacobs et al. (2010). Using the Benchmark Approach, estimate that starting with a base of \$5.6 billion we should spend \$6.4 billion annually to bring the ratio to 7% of total health spending. Using the Budgeting Approach, we estimated that about \$6.3 billion in additional resources are required to shift services to a community base for those currently treated as hospital inpatients and to provide services to 50% of the currently untreated - more than doubling what we are currently spending to 12.9% of total health spend	N/A

Mental disorder	First author, yr published	Country	Aim of study	Perspective	Costing approach	Costs valued	Data collection/methods	Key findings / recommendations	Rating
Mental disorder	Jacobs, 2010	Canada	Report was carried out at the request of the Mental Health Commission of Canada, who wanted to determine the economic scope of mental health services in Canada	Society	Top down – 2007–2008 prices	Direct costs	Range of sources – Canadian Institute for Health Information's national databases, IMS Health database, Human Development and Resources Canada, Revenue Canada's T3010 annual returns	Total service cost of \$14.3 billion – largest component was pharmaceuticals (\$2.8 billion) and then hospitalisation (\$2.7 billion). Of the total reported costs, about \$10.6 billion was for services and \$3.7 billion was for disability payments. In an international context, Canada spends less than most developed countries; the ratio of government mental health to all government health spending is 7.2%, several points lower than the UK and Sweden	Good
Mental disorder	Cawthorpe, 2011	Canada	To compare the health costs of groups with and without psychiatric diagnoses (PDs) using nine years of physician billing data	Health sector	Bottom-up	Medical costs	Billing records submitted by physicians to Alberta Health and Wellness both for patient and for comparison patient groups	Results show a positive association between mental health and overall health care use and cost. For the patient PD group, the average cost per patient accumulated during the period from 1994 to 2003 was \$3,437; \$3,265 for the comparison patient PD group; and \$1,345 for the patient–comparison patient non-PD group	Good
Mental disorder	Smetanin, 2011	Canada	Estimate the health and economic impact of major mental illnesses in Canada, beginning in 2011 and annually over the next three decades	Society	Prevalence- based and frictional cost approach to indirect costs	Direct and indirect costs	RiskAnalytica's Life at Risk simulation model: mood disorders, anxiety disorders, schizophrenia, disorders of childhood and adolescence, .cognitive impairment including dementia, and substance use disorders	Mental illness was estimated to cost the Canadian economy over \$42.3 billion dollars in 2011 in direct costs (50% due to direct cost). Approximately two of every nine workers (or 21.4% of the working population) are estimated to suffer from a mental illness that potentially affects their work productivity -translates to an annual wage based productivity impact of over \$6.3 billion dollars. Total annual economic costs associated with mental illness are expected to exceed \$306 billion by 2041. In 2011 present value terms, the total cumulative costs over the next 30 years could exceed \$2.5 trillion dollars	Good

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The evidence on the costs and impacts on the economy and productivity due to mental ill health: a rapid review

Mental disorder	First author, yr published	Country	Aim of study	Perspective	Costing approach	Costs valued	Data collection/methods	Key findings / recommendations	Rating
Mental disorder	Gibb, 2010	NZ	Examines whether the extent of common psychiatric disorder between ages 18 and 25 is associated with negative economic and educational outcomes at age 30	N/A	N/A	N/A	Longitudinal data. Data collected using a combination of semi- structured interviews, standardised tests and teacher reports. Data were fitted with regression models	Increasing episodes of psychiatric disorder during young adulthood were significantly associated with a range of negative life outcomes: decreased likelihood of being in paid employment; decreased likelihood of being in full-time employment; fewer hours worked per week; higher likelihood of being welfare dependent; lower total personal income; lower likelihood of owning a home; lower economic living standards; lower likelihood of attaining a university degree; lower likelihood of attaining a tertiary qualification; and, lower overall highest educational achievement	N/A
Mental disorder	McCrone, 2008	UK	King's Fund commissioned a review to estimate mental health expenditure in England for the next 20 years, to 2026	Society	Bottom-up and human capital – 2007 prices	Service costs and total costs	Typical service packages were defined from survey data and individual studies and costs were calculated. These were then combined with the numbers of people in each disorder group to measure the overall costs of services	The number of people in England who experience a mental health problem is projected to increase by 14.2% – dementia biggest problem. Current service costs, estimated to be £22.50 billion, are projected to increase by 45% to £32.6 billion in 2026 (at 2007 prices). A series of recommendations are made	Good
Mental disorder	Stansfeld, 2011	UK	Examined the association of common mental disorders and long spells of psychiatric and non-psychiatric sickness absence	Workforce / economy	N/A	N/A	Longitudinal Whitehall II Study of British Civil Servants, common mental disorders were measured using the 30-item General Health Questionnaire	Clinical but not sub-threshold common mental disorders were associated with increased risk of long spells of psychiatric sickness absence for men, but not for women, after adjusting for covariates. Risk of psychiatric sickness absence was associated with recent common mental disorders and disorder present on two occasions. Public health and clinical services should focus on the identification of workers with elevated mental health symptoms	N/A

Mental disorder	First author, yr published	Country	Aim of study	Perspective	Costing approach	Costs valued	Data collection/methods	Key findings / recommendations	Rating
Psychological distress	Hilton, 2008	Australia	Examined the relationship between employee psychological distress, employee type and productivity	Workplace	Bottom-up using survey results	Absenteeism, presenteeism	Utilised the Health and Performance at Work Questionnaire	Comparison of white-collar workers absenteeism rates by low and high psychological distress reveals no statistically significant difference. The same comparison for blue-collar workers reveals that high psychological distress results in an 18% increase in absenteeism rates. Overall high psychological distress increases absenteeism by 1.7%, decreases employee performance at work by 6.1% resulting in a net productivity loss of 6.7%. This translates into the cost estimates for psychological distress in the UK of £4.3 billion and in Australia \$2.7 billion	Good
Psychological distress	Hilton, 2010	Australia	Estimated employee work productivity by mental health symptoms while considering different treatment-seeking behaviours	Workplace	Bottom-up using survey results	Absenteeism, presenteeism	Utilised the Health and Performance at Work Questionnaire	Psychological distress produces a \$5.9 billion reduction in Australian employee productivity per annum. Increasing psychological distress from low to moderate then to high levels is associated with increasing productivity decrements (6.4%, 9.4% and 20.9% decrements, respectively) for employees in current treatment. Effective treatment for mental health problems yields substantial increases in employee productivity and would be a sound economic investment for employers	Good
Schizophrenia	Access Economics, 2002	Australia	Conducted an analysis of the burden of schizophrenia and related suicide in Australia	Society	Combination bottom-up and top down, human capital – 2001 prices	Direct and indirect costs	The prevalence estimates are obtained from two data sources – the LPDS and ABS National Health Survey 1995. Health services utilisation based on ICD-9	Real financial costs of illness totalled \$1.85 billion in 2001, about 0.3% of GDP and nearly \$50,000 on average for each of more than 37,000 Australians with the illness. Direct health system costs were \$661 million in 2001, including 60% hospital costs. Real indirect costs were \$722 million, including \$488 million of lost earnings from people unable to work due to the illness	Good
Schizophrenia	Carr, 2003	Australia	Estimate the costs associated with the treatment and care of persons with psychosis	Government / society	Prevalence- based bottom- up, indirect costs estimated using human capital (HC) (base year 2000)	Healthcare sector; patient and family; and other sectors	LPDS	Annual societal costs for the average patient with psychosis are of the order of \$46,200 – \$1.45 billion and \$2.25 billion from govt and societal perspective. Mental health care costs amount to \$841 million and \$867 million, government and social. Inpatient costs account for 77% of mental health care costs (ALOS=13.41 weeks). Costs of lost time/productivity estimated at \$570 million and \$1.34 billion, government and social	Good

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The evidence on the costs and impacts on the economy and productivity due to mental ill health: a rapid review

Mental disorder	First author, yr published	Country	Aim of study	Perspective	Costing approach	Costs valued	Data collection/methods	Key findings / recommendations	Rating
Schizophrenia	Carr, 2004	Australia	To identify the predictors of direct mental health care costs and indirect or time-loss costs in psychotic disorders and to discuss their implications for future interventions	Government / society	Bottom-up, human capital approach – 2000 base year	Direct and indirect costs	LPDS	Schizophrenia involved greater costs than other psychotic disorders.On average, each treated patient with psychosis cost the Australian government and society \$29,600 and \$46,200 per annum, respectively. From the societal perspective indirect costs contributed 60% to total costs. Non completion of high-school education and chronicity of illness course were predictive of higher costs across all categories	Good
Schizophrenia	Fitzgerald, 2007	Australia	Estimated the direct and indirect costs associated with schizophrenia	Government / society	Bottom-up, indirect methods using human capital (HC)	Direct and indirect costs	Schizophrenia care and assessment program (SCAP) – a prospective, longitudinal, study of global health outcomes for 347 people with schizophrenia	The average annual societal cost of treatment was \$32 160 (productivity costs=\$14,776) during the first year decreasing to \$29 181 (productivity costs=\$14,453) in the third year. Only 24% (9% full-time and 15% part-time) of men and 11% (2% full-time and 9% part-time) of women were in paid work. Identification of those factors contributing to high costs should provide insights into potential interventions to improve the efficiency of overall service delivery	Good
Schizophrenia	Fitzgerald, 2009	Australia	Quantified the costs and resource utilisation associated with a relapse of schizophrenia or schizoaffective disorder	Health sector	Bottom-up	Direct	A two-year retrospective analysis based on the case notes (inpatient and outpatient medical records plus the hospital's morbidity and clinical costing systems) of 200 patients with schizophrenia or schizoaffective disorder	Hospitalisation due to relapse is associated with an increase in the use of inpatient and outpatient healthcare resources which appears to persist over a 12-month period of time. The average 12-month post-admission healthcare cost accrued was estimated at \$11,246. Future research should intensively examine strategies to enhance adherence, thereby reducing relapse in patients with schizophrenia and related disorders	Good
Schizophrenia	Goeree, 2004	Canada	Estimated the financial burden of schizophrenia in Canada in 2004	Society	Prevalence- based and friction cost approach for productivity – 2004 prices	Direct and indirect costs	Review of the literature, published reports and documents; secondary analysis of administrative datasets	The total cost of schizophrenia in Canada in 2004 was estimated at \$6.85 billion with over two thirds attributed to productivity. Health and non-healthcare costs amounted to \$2.02 billion - acute and non-acute hospital care at 23% and 38% of total health and non-healthcare costs, prescription medications 7% of total health and non-healthcare costs. \$4.83 billion was attributed to schizophrenia productivity losses due to morbidity or premature mortality	Good

Mental disorder	First author, yr published	Country	Aim of study	Perspective	Costing approach	Costs valued	Data collection/methods	Key findings / recommendations	Rating
Schizophrenia	Munro, 2011	UK	Assessed the cost of a schizophrenia relapse admission	Health sector	Bottom-up	Direct costs	Information was obtained from the patients and the trust database	The mean inpatient cost of relapse was £25,852 and varied from $\pounds$ 1,270 to almost £120,000. More than 97% of the costs were attributable to hospital care costs and less than 3% related to pharmacological treatment. Treatment non-adherence was implicated in 76% of relapses. Strategies for improving treatment adherence may reduce the rate of relapse	Good

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