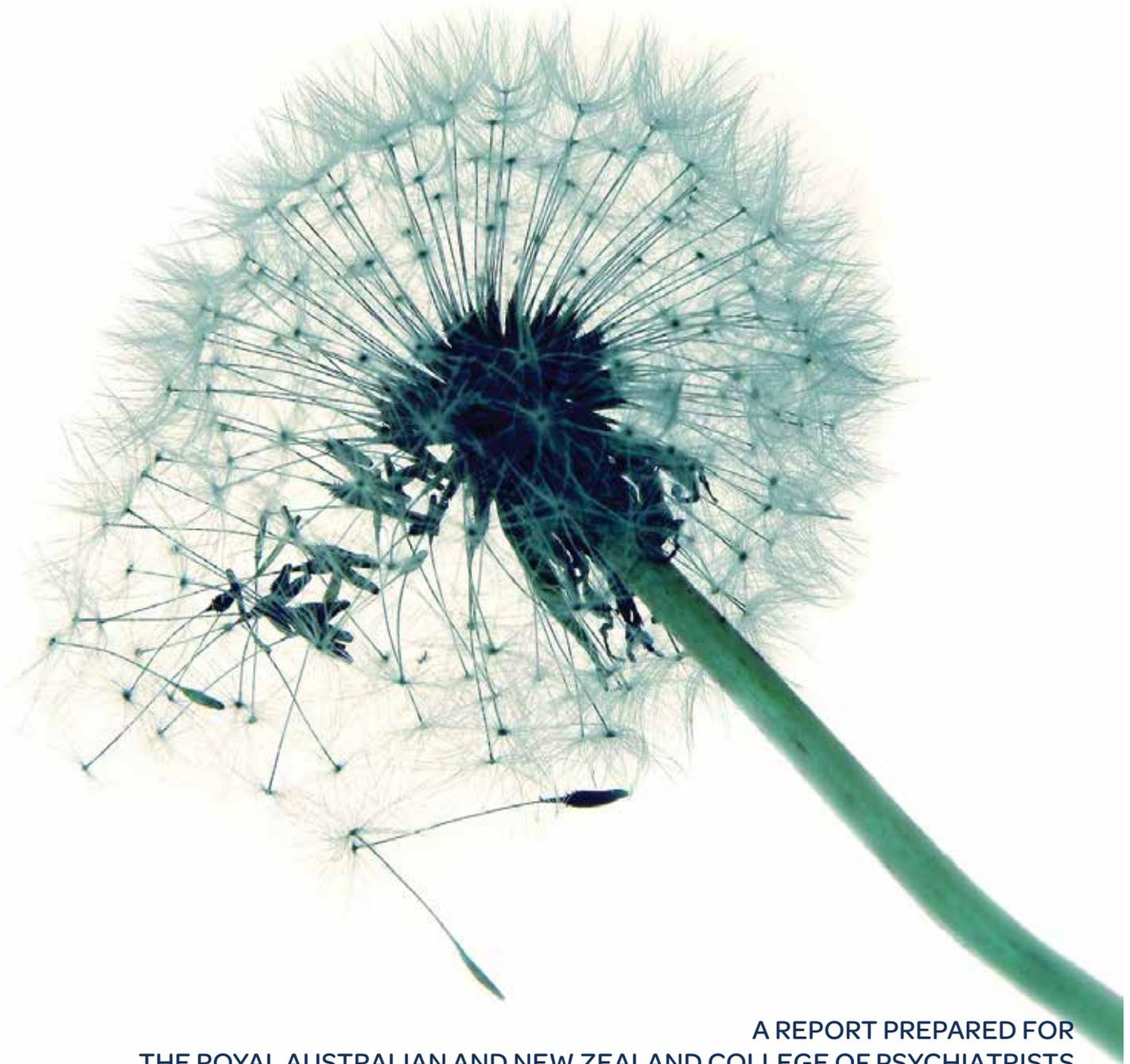




The Royal  
Australian &  
New Zealand  
College of  
Psychiatrists



# The economic cost of serious mental illness and comorbidities in Australia and New Zealand



A REPORT PREPARED FOR  
THE ROYAL AUSTRALIAN AND NEW ZEALAND COLLEGE OF PSYCHIATRISTS  
AND THE AUSTRALIAN HEALTH POLICY COLLABORATION BY  
VICTORIA INSTITUTE OF STRATEGIC ECONOMIC STUDIES

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ABN 68 000 439 047

**About the Royal Australian and New Zealand College of Psychiatrists**

The Royal Australian and New Zealand College of Psychiatrists (RANZCP) is responsible for training, educating and representing psychiatrists in Australia and New Zealand. Psychiatrists are medical doctors who undertake additional training to qualify as specialists in the treatment of mental illness. Founded in 1963, RANZCP has more than 5000 members, including around 3700 fully qualified psychiatrists and almost 1200 trainees. The RANZCP has branches in every Australian state and territory and a head office in Melbourne as well as a national office in Wellington, New Zealand. In both countries, all psychiatrists must be accredited by RANZCP before they can practise. For more information go to [www.ranzcp.org](http://www.ranzcp.org).

# Foreword



The connection between mental and physical illness continues to challenge clinicians and health professionals. There has long been an unspoken awareness that people with serious mental illness live shorter lives, until recently however there was no clear reason why this was so. Now we know the answer. It is a combination of chronic conditions such as cardiovascular and respiratory diseases, cancers and diabetes that claim the majority of the lives of people with mental health conditions, including those of people with schizophrenia, bipolar disorder, psychoses and severe depression and anxiety. Nearly 80% of people with serious mental illness who die before the average life expectancy of 79.5 years for men and 84 years for women do so due to physical health conditions, losing anywhere between 10 and 36 years of expected life.

Beyond the personal and societal cost there is a substantial economic cost paid by both Australian and New Zealand economies in terms of health care, welfare and lost productivity. Analysis in this report commissioned by RANZCP and the Australian Health Policy Collaboration at Victoria University (AHPC) estimates the annual cost of premature death from these comorbid mental and physical health conditions in people with serious mental illness is \$15 billion (AUD) in Australia and \$3.1 billion (NZD) in New Zealand.

Interestingly these figures increase impressively when the burden of substance abuse is included; ballooning to \$45.4 billion and \$6.2 billion respectively. This adds to the idea that substance abuse could be thought of as a 'wraparound' factor for lifetime mental illness as it triggers, accompanies and exacerbates many serious mental health conditions.

Arguments are now being made for an increased investment in mental health care on an economic basis. Investments in both hospital and community care treatment models could potentially help 474,192 Australians and 105,350 New Zealanders recover more quickly and stay well longer, resulting in better use of in-demand hospital beds and secondary savings of funds spent in prisons, disability pensions and in transfers.

Due to the limitations of the data available the findings in this report are skewed to psychoses and people in receipt of public specialist mental health services. This is therefore likely to underestimate the extent of the issue which occurs in both public and private settings. Work from overseas which merged data from mental health services and primary care identified that 72% of premature deaths occurred in people who had only seen their GP for their mental health problem. These deaths therefore would not be captured by a report such as this.

Hence these estimates of the cost of care and lost productivity are inherently conservative, and also highly provocative. Even as this report was commissioned evidence has continued to be published indicating that life expectancy is deteriorating rather than improving for people with serious mental illness. We seek to provoke both meaningful discussion and evidence-based action to bring about change for this long neglected cohort.

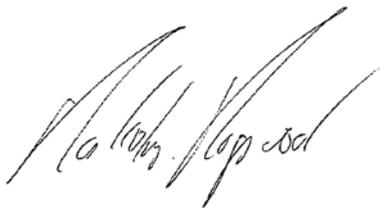
Our colleagues Rosemary Calder AM and Dr Maria Duggan at the AHPC remind us that the economic costs are incurred are not only at a societal level, but also felt individually. People living with depression and a comorbid chronic physical illness incurred average monthly care costs that were between 33% and 169% higher which excluded direct expenditure on mental health services. Moreover, the strong association between poor mental health and increased costs of treatment is broadly consistent across all levels of medical severity and persists even when adjusted for clinical and demographic variables. The affordability of care remains a powerful deterrent for this cohort.

And the impact of cost of care for poor comorbid physical and mental health is not felt solely in mental health services. Figures for the Australian Institute for Health and Welfare indicate that the economic costs of comorbidities are driven up by increased use of a wide range of broader health services including hospital admissions and re-admissions and GP consultations. Disturbingly these costs include sums that could have been prevented had evidence-based interventions and treatment been more widely available. Whilst 60% of the burden of serious mental illness is considered not avertable, researchers have estimated that current treatment could avert a further 13%, optimal treatment at current coverage could avert 20%, and optimal treatment at optimal coverage could reduce the burden by 28%. According to AHPC best practice in health care could reduce the impact of serious mental illness and comorbidities by almost one-third.

It is well recognised that to win a war one must know the enemy. I believe that we can now say confidently that we know we are facing a mixture of 'treatment vexation'; low socio economic status, high risk behaviours, difficult to access treatment, fragmented services, affordability challenges, stigma/discrimination, and poor clinician confidence all exacerbated by a lack of funding. But this picture also gives the health community, and especially psychiatrists who lead mental health treatment, a roadmap to a better place.

Recognising that people with serious mental illness almost always live with comorbid physical illnesses and their risk factors, and improving their care, is a complex challenge and will not be solved easily. But it cannot be more difficult than other issues once thought to be insurmountable: saving lives by changing the road safety culture; reducing deaths from cardiovascular disease and stroke through an increased understanding of societal and health risk factors; and the increase in societal wellbeing and economic progress from the implementation of principles of universal education.

Psychiatrists too often discover that a person's poor physical health has compromised their mental health recovery. This report articulates the economic cost of this outcome and enables us to correlate it with other expenses, as part of understanding the value of health. However, let us not forget that the true cost of these figures is paid not by the economy but by the families and individuals affected. It is for their benefit that we continue to highlight this important issue.

A handwritten signature in black ink, appearing to read 'Malcolm Hopwood', written in a cursive style.

**Professor Malcolm Hopwood**

President

The Royal Australian and New Zealand College of Psychiatrists

# The Royal Australian and New Zealand College of Psychiatrists

## Our Vision

To enhance the mental health of our nations through leadership in high quality psychiatric care.

## Our Values

Collaboration  
Excellence  
Integrity  
Respect

Compassion  
Innovation  
Sustainability

## Our Purposes

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A commitment to advancing the profession of psychiatry by facilitating the provision of high quality psychiatric care through the delivery of training and continuing medical education.

### Improve the mental health of the community

A consultative approach to improving the mental health of the community through collaborative working models to better support mental health services.

### Meet the needs and expectations of the membership

A dedication to meeting the needs and expectations of the membership to ensure the future growth of the College and enhance the collegial spirit.

### Enhance external engagement and relationships

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# The cost of serious mental illness and comorbidities in Australia and New Zealand

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# About psychiatrists

A psychiatrist is a medical doctor who has undergone further specialist training in the assessment and treatment of people with mental health problems. Psychiatrists play key roles in mental health care in Australia and New Zealand. Working in private, public or academic practice they see people in hospitals, their private rooms, clinics and other community settings. They play pivotal roles in the teaching, research and administration of mental health care as well as advocating for and leading improvements in service provision.

Psychiatrists treat all types of mental illness, emotional disturbance and abnormal behaviour, from mild or episodic conditions to those that are severe, persistent and life-threatening. They work with people of all ages and from all ethnicities and backgrounds and their families. At its core, psychiatry involves listening carefully and sensitively to people's most personal thoughts and feelings, understanding their mental state, and working with them to identify and implement appropriate treatments, including psychotherapy, psychotropic medication, social strategies and other interventions.

Psychiatrists often work in collaboration with general practitioners (GPs) and other health professionals to best meet the mental health and emotional needs of consumers. Psychiatrists also work in partnership with consumers and their families and carers, and are attuned to the array of social and cultural factors that impact on the individual patient.

Psychiatrists are the leading experts in the field of mental illness in Australia and New Zealand. Through the Royal Australian and New Zealand College of Psychiatrists (RANZCP), which is an accredited specialist medical training body, they receive rigorous training which enables them to provide optimal patient care, work collaboratively with other health professionals in the interests of patients, act with the highest professional and ethical standards, undertake research to improve mental health care and lead mental health services.

In Australia and New Zealand most psychiatrists are members of the RANZCP. For more information about psychiatrists or psychiatry go to [www.ranzcp.org](http://www.ranzcp.org)

## About this report

The RANZCP is concerned about the high rate of physical illness among people with mental illness in Australia and New Zealand (as well as other developed countries). This 'comorbidity' compounds the disadvantages already experienced by people with mental illness and is associated with a far shorter life expectancy. Some estimates suggest that the lives of both men and women with serious mental illness are up to 30% shorter than those of the general population (Piatt et al., 2010) and Australian research indicates that the gap is increasing rather than diminishing (Lawrence et al., 2013).

Evidence demonstrates that just under 80% of excess deaths of people with serious mental illness are the result of physical health conditions, not their mental illness (Lawrence et al., 2013). These are deaths that are additional to what is experienced by the general population at that same age, and therefore a death that occurs before the average life expectancy for that individual. Evidence shows that these deaths are mostly caused by illnesses commonly treated successfully in the broader community – heart disease, respiratory disease and some cancers are particularly prolific. In many cases it appears that the gains made in the treatment of these conditions in recent decades have not occurred for people with mental illness.

The analysis in this report is limited by the economic information accessible to the authors. It focuses on serious mental illness experienced by adults which is that occurs in a person over the age of 18 years, who has experienced in the past 12 months a diagnosable mental, behavioural or emotional disorder, resulting in functional impairment which substantially interferes with or limits one or more major life activities. These were identified to be schizophrenia and other psychoses, bipolar disorder, severe anxiety and depression.

This should not be understood to mean that children or older people do not experience serious mental illness or other mental illnesses such as eating disorders are not serious, and deserving of further attention. Instead it reflected the economic information available to the authors at the time of publication.

The RANZCP believes that much more needs to be done to address the gap in physical health and life expectancy between those who live with a mental illness and the general population. This will require a collaborative effort from a broad range of stakeholders involved in mental health, including governments, consumers, health-care providers and psychiatrists.

Psychiatrists play a key role in the provision, management and coordination of care of people with mental illnesses. Psychiatrists are also responsible for clinical leadership, teaching and training, researching, and advocating for better psychiatric health in the community. As such, we are committed to working within our profession to drive positive changes that will improve the care of people with mental illnesses in Australia and New Zealand.

This report is one in a series that highlights the importance of this issue and its impact on Australian and New Zealand societies. It was written by Dr Kim Sweeney (PhD) and Dr Hui Shui (PhD) from the Victoria Institute of Strategic Economic Studies with the guidance of Rosemary Calder AM and Dr Maria Duggan (PhD) from the Australian Health Policy Collaboration. Special thanks go to Professor Malcolm Hopwood, Professor Harvey Whiteford and Professor Steve Kisely who advised at key stages of the project.

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# Executive summary

Schizophrenia and the other psychoses, and anxiety and depression in their severe states, are well known to be highly disabling for the individual. What is less well recognised is that people with serious mental illness are at greater risk of premature mortality because they also experience much higher rates of physical ill-health and particularly chronic diseases such as cardiovascular disease, diabetes and respiratory conditions. Serious (or severe) mental illness affects a small proportion of the Australian population, but has a disproportionate impact on both the individuals with serious mental illness, and on the national health system and economy. In particular, the economic and financial cost impact of these comorbidities for this population group is little understood.

This report assesses the cost impact on individuals, and on the national economy, of the comorbidities of chronic physical illness and serious mental illness. It defines serious mental illness on the basis of the severity of the different types of mental illness. Within the literature serious mental illness and severe mental illness are interchangeable terms.

Two alternative methods are used to assess the cost of serious mental illness and associated comorbidities.

The first uses a 'top-down' estimate of the prevalence and overall burden of disease of serious mental illness in Australia and New Zealand based on the findings of the Global Burden of Disease Study for 2010 (IHME 2015a).

It is widely recognised that these data underestimate the burden of disease from premature death due to comorbidities (Charlson et al. 2014) so revised estimates are calculated to account for this based on a number of recent studies. Estimates are presented for schizophrenia, severe anxiety and severe depression. Mental illnesses and substance-use disorders are often considered together, so opioid dependence is included separately in this analysis, as it is a severe substance-use disorder. The difference between the original and revised estimates is then taken as a measure of the burden of disease due to comorbidities.

Using this approach the numbers of people with serious mental illness in Australia and New Zealand are estimated to be 474,192 and 105,350 respectively in 2014, with the inclusion of people with opioid dependence. Omitting this population group, the numbers are 407,938 and 92,047 respectively.

Overall the cost of the burden of disease in Australia and New Zealand in 2014 is estimated to have been A\$98.8 billion (6% of GDP) and NZ\$17.0 billion (7.2% of GDP) with the inclusion of opioid dependence, and A\$56.7 billion (3.5% of GDP) and NZ\$12.0 billion (5.0% of GDP) not including this group.

The cost of comorbidities associated with premature death in those with serious mental illness is estimated to have been A\$45.4 billion (2.8% of GDP) and NZ\$6.2 billion (2.6% of GDP) with the inclusion of opioid dependence, or A\$15.0 billion (0.9% of GDP) and NZ\$3.1 billion (1.3% of GDP) not including this group.

The second approach to estimating cost is a 'bottom-up' approach which relies on surveys of mental illness in Australia and New Zealand to estimate the numbers of people with serious mental illness. It uses a cost-of-illness methodology that calculates the direct and indirect economic cost incurred by individuals, carers, government and others in addressing serious mental illness.

For psychosis the analysis relies heavily on the Second Australian National Survey of Psychosis and associated costing study by Neil et al. (2014a).

Updating the prevalence and cost estimates in this study, the estimated annual costs of psychosis for the Australian population in 2014 were approximately A\$3.9 billion incurred by government and A\$6.2 billion incurred by individuals and non-government organisations, including productivity costs (the societal costs). Those elements of societal cost that can be attributed to comorbidities accounted for around A\$743 million.

As there is no equivalent of the National Survey of Psychosis in New Zealand, estimates of the prevalence and cost are based on those for Australia. On this basis, psychosis is estimated to cost New Zealand's society NZ\$1.3 billion per annum, and the New Zealand government around NZ\$0.8 billion per annum.

If it is assumed that comorbidities comprise the same proportion of cost as is the case in Australia, the cost of comorbidities associated with psychosis in New Zealand in 2014 is estimated to have been NZ\$162 million.

This report has not been able to include the impact of antipsychotics on premature mortality, as the evidence available does not provide enough foundation to estimate how much this contributes to the cost of the burden of disease of psychosis arising from this cause.

The evidence on the contribution of antipsychotics to increased morbidity and risk factors for disease, and particularly cardiovascular disease, is stronger. Estimating its impact on the cost of psychosis requires specific data on the prevalence not only of one disease but the number of people with multiple morbidities.

Overall, this report shows that, for people with mental disorders, physical illness comorbidities and their risk factors are the rule rather than the exception. The evidence indicates these are associated with significantly higher rates of premature mortality in people with serious mental illness. This adds significantly to the health and economic burden of serious mental illness in both Australia and New Zealand.

Using the prevalence rates of serious mental illness from the Global Burden of Disease report, the cost of the burden of serious mental illness, including opioid dependence, in Australia and New Zealand is estimated at 6% of Australian GDP in 2014 (A\$98.8 billion) and 7.2% of NZ GDP (NZ\$17.0 billion). Excluding opioid dependence, the cost is estimated at 3.5% of Australian GDP (A\$56.7 billion) and 5.0% of NZ GDP (NZ\$12.0 billion).

The cost of comorbidities associated with premature death in those with serious mental illness, including those with opioid dependence, is estimated at 2.8% of Australian GDP in 2014 (A\$45.4 billion) and 1.3% of NZ GDP (NZ\$6.2 billion). Excluding those with opioid dependence, estimates are 0.9% of Australian GDP (A\$15.0 billion) and 1.3% of NZ GDP (NZ\$3.1 billion).

Using survey data shows that the prevalence of common physical comorbidities and common risk factors for people with different types of psychosis in Australia is much higher than in the general population, especially for cardiovascular disease and diabetes. There are similarly very high rates of risk factors such as high blood pressure, elevated cholesterol, smoking, obesity and physical inactivity. People with psychosis have high rates of comorbid physical illness, with much higher rates for asthma, diabetes, arthritis, respiratory conditions, hepatitis and epilepsy.

The estimated annual costs of psychosis for the Australian population in 2014 are approximately A\$3.86 billion from a government perspective and A\$6.21 billion from a societal perspective. Compared to 2010, the annual government costs of psychosis have increased by A\$0.34 billion and social costs have risen by nearly A\$1.30 billion. The comorbidity costs arising from excess GP consultations, inpatient admission and productivity losses due to premature mortality together account for about 12.7% of the overall cost from a societal perspective. In addition to these costs, amongst lifestyle and other risk factors there is some evidence of the contribution of antipsychotics to increased morbidity and risk factors particularly related to cardiovascular disease.

This report summarises the available evidence to show that there is a major challenge for health professionals, health agencies and the health system more broadly in addressing the causes of premature mortality and the higher prevalence of chronic physical conditions among people with serious mental illness, and the associated costs to the individual, to society and to the national economies of Australia and New Zealand.

# 1. Introduction

Serious mental illnesses are widely recognised as debilitating conditions that are closely associated with suffering, disability and premature mortality. It is less well understood that these poor outcomes are significantly influenced by the overall poor health of individuals with serious mental illnesses. Increasingly the evidence implicates chronic physical diseases as the major causes of disability and loss of life amongst this group, rather than principally suicide as previously thought.

Serious mental illnesses carry high economic costs to society. These costs are incurred directly by the need for services to treat and manage the symptoms of disease and a range of parallel services including community support services, housing and criminal justice. There are also economic costs arising from disabilities that are a consequence of serious mental illness. These disabilities result in the reduced productivity of people who are able to work, in addition to high unemployment and impoverishment and the requirement for welfare transfers. The costs of treating illnesses are higher when there are comorbidities present. Levels of disability are also greater, requiring a higher level of welfare benefits.

This report has been prepared by the Victoria Institute of Strategic Economic Studies (VISES) on behalf of the Royal Australian and New Zealand College of Psychiatrists and the Australian Health Policy Collaboration. It draws together the evidence on the costs of serious enduring mental illness to the economies of Australia and New Zealand. The focus is primarily on low-prevalence or serious mental disorders such as psychoses and severe anxiety and depression, although it is recognised that comorbidities are also closely associated with high-prevalence or more common mental disorders.

'Prevalence' means the number of people with a specific disease within a defined period of time. This may be a point estimate on a specific date, or over a period such as one month, 12 months or a lifetime. The 'prevalence rate' is the number of people with the disease expressed as a percentage of the relevant population.

For some serious mental illnesses, such as anxiety and depression, there is a higher prevalence among women and the prevalence varies with age. Attention has therefore been given in this report to presenting results by both age and gender, where possible. In addition the report addresses the extent to which the burden of disease and associated cost for people with serious mental illness arises as a consequence of treatment with antipsychotic medications.

The report defines serious mental illness on the basis of the severity of the different types of mental illness. Within the literature, 'serious mental illness' and 'severe mental illness' are essentially interchangeable terms.

This study uses two broad approaches to estimate the prevalence and cost of serious mental illness in Australia and New Zealand and to estimate the cost of the comorbidities that commonly accompany serious mental illness.

Each approach has its strengths and limitations and both provide different insights into the extent and cost of serious mental illness. The limitations in both approaches arise from the sometimes restricted amount of data available to give a complete picture and to make accurate calculations of prevalence and costs.

The first approach is a 'top-down, broad-brush' estimate of the prevalence and overall burden of disease of serious mental illness in Australia and New Zealand, based on the findings of the Global Burden of Disease Study for 2010 (GBD 2010) (IHME 2015a). The categories of mental illness used by GBD 2010 that are relevant to this study are schizophrenia, bipolar affective disorder, anxiety disorders, major depressive disorder and opioid use disorder. A particular limitation of this approach is that the GBD 2010 does not have data on psychoses other than schizophrenia.

It is widely recognised that these data underestimate the burden of disease from premature death due to comorbidities (Charlson et al. 2014) so revised estimates are calculated to account for this based on a number of recent studies. The difference between the original and revised estimates is then taken as a measure of the burden of disease due to comorbidities.

The cost of the burden of disease can be calculated by using values of a life year combined with the burden of disease estimates expressed in terms of disability-adjusted life years (DALY).

The second approach used in this study is a 'bottom-up' more detailed estimate that relies on surveys of mental illness in Australia and New Zealand to estimate the numbers of people with serious mental illness. It uses a cost-of-illness methodology that calculates the direct and indirect economic cost incurred by individuals, carers, government and others in addressing serious mental illness.

For psychosis in Australia, the principal source of information is the Second Australian National Survey of Psychosis conducted in 2010 (Morgan et al. 2011), and for depression, anxiety and other mental illness it is the 2007 Australian Bureau of Statistics (ABS) National Survey of Mental Health and Wellbeing (ABS 2008). For New Zealand, the survey similar to the ABS survey is the Oakley-Browne, Wells and Scott (2006).

Using these and other sources of information, this study presents updated estimates for the prevalence and cost of serious mental illness and comorbidities in Australia and New Zealand in 2014.

The significant limitation of this approach is that it only includes psychosis (including schizophrenia) and bipolar disorder and omits severe anxiety and depression and substance-use disorders. In addition there is only limited data on serious mental illness for New Zealand so this approach has relied on extrapolation using Australian data in some instances.

The report then brings together evidence on the effects of antipsychotic medicines and their impact on mortality and morbidity.

## 2. Defining serious mental illness and its severity

### 2.1 Types of mental disorders

The two principal sources that researchers, statistical organisations and other bodies use in classifying mental disorders are the Diagnostic and Statistical Manual of Mental Disorders from the American Psychiatry Association, the fifth edition of which (DSM-5) was published in 2013 (American Psychiatry Association 2013), and the International Classification of Disease scheme maintained by the World Health Organization (WHO), the latest version being ICD-10 (WHO 2015).

At the detailed level these classifications are similar although they differ in how they group together conditions at the aggregate level.

The mental disorders of interest to this study are classified by the DSM-5 as outlined below.

#### Schizophrenia spectrum and other psychotic disorders

These disorders are characterised by the presence of two or more of the following: delusions, hallucinations, disorganised speech, grossly disorganised or catatonic behaviour, and negative symptoms. The most important disorders relevant to this report are schizophrenia and schizoaffective disorder.

#### Bipolar and related disorders

Bipolar disorders are characterised by the presence of both depression and mania. Bipolar I disorder has both manic and hypomanic episodes as well as depression, while Bipolar II disorder has hypomanic and depressive episodes.

#### Depressive disorders

The main types of depressive disorder are major depressive disorder and persistent depressive disorder (dysthymia):

The common feature of all of these disorders is the presence of sad, empty, or irritable mood, accompanied by somatic and cognitive changes that significantly affect the individual's capacity to function. What differentiates them are issues of duration, timing, or presumed etiology [and severity].

A more chronic form of depression, persistent depressive disorder (dysthymia), can be diagnosed when the mood disturbance continues for at least 2 years in adults or 1 year in children. This diagnosis, new in DSM-5, includes both the DSM-IV diagnostic categories of chronic major depression and dysthymia (American Psychiatry Association 2013, p. 155).

Table 2.1 Disability weights for mental and substance-use disorders, GBD 2010

Disorder	Specific disorders and health states	Disability weight
Depressive disorders	Major depressive disorder – mild episode	0.159
	Major depressive disorder – moderate episode	0.406
	Major depressive disorder – severe episode	0.655
	Dysthymia	0.159
Anxiety disorders	Anxiety – mild	0.030
	Anxiety – moderate	0.149
	Anxiety – severe	0.523
Schizophrenia	Acute state	0.756
	Residual state	0.576
Bipolar disorder	Manic episode	0.480
	Depressive episode	0.406
Alcohol-use disorders	Alcohol use disorder – mild	0.259
	Alcohol use disorder – moderate	0.388
	Alcohol use disorder – severe	0.549
Drug use disorders	Cannabis dependence	0.329
	Opioid dependence	0.641

Source: Whiteford et al. 2013.

## **Anxiety disorders**

There are a number of different types of anxiety including social anxiety disorder, panic disorder, agoraphobia and generalised anxiety disorder.

Anxiety disorders include disorders that share features of excessive fear and anxiety and related behavioural disturbances. Fear is the emotional response to real or perceived imminent threat, whereas anxiety is anticipation of future threat. Obviously, these two states overlap, but they also differ, with fear more often associated with surges of autonomic arousal necessary for fight or flight, thoughts of immediate danger and escape behaviours, and anxiety more often associated with muscle tension and vigilance in preparation for future danger and cautious or avoidant behaviours.

Affective disorder is also known as mood disorder which can also encompass bipolar disorder. Substance-use disorders, such as alcohol, and opioid dependence are often included within the broader definition of mental disorders.

## **2.2 The severity of mental disorders**

While schizophrenia and other psychoses are often regarded as the more serious mental disorders, each disorder can have varying degrees of severity. Here severity refers to the degree of loss in health associated with a condition.

One way of measuring the severity of mental disorders is to use the disability weights, which are used in calculating the burden of disease discussed later in this section. The disability weights in Table 2.1 have been estimated by Whiteford et al. (2013) and are reproduced from Section 6 of their appendix.

The disability weight is a measure reflecting the severity of a condition and the extent to which it reduces quality of life.

The disability weights for the severe states of depression, anxiety, alcohol-use disorder and opioid dependence are of similar magnitude to that of schizophrenia, while bipolar disorder and moderate episodes of depression are also associated with significant levels of disability.

This indicates that a consideration of serious mental illness should include schizophrenia and other psychoses, bipolar disorder and severe depression and anxiety and could encompass severe alcohol-use disorder and opioid dependence. Opioid dependence is therefore included in discussion of serious mental illness and in the tables later in this report. However alcohol-use disorder is omitted because it has not been possible to obtain estimates of the prevalence of this disorder by severity.

# PART ONE

## Global measures of prevalence of serious mental illness and associated premature mortality – a ‘top-down’ approach to estimating costs

### 3. The burden of disease from serious mental illness

#### 3.1 The extent of mental disorders

Over the past 25 years, there has been a growing interest among public health policy makers and managers, researchers and others concerned about public health in efforts to measure the magnitude of health loss due to diseases, injury and risk factors both within individual countries and globally. The international efforts began in 1990 (Murray & Lopez 1996) with the most recent comprehensive study being the GBD 2010 (Murray et al. 2012). This is currently being updated to the year 2013 (Naghavi et al. 2015). To estimate the burden of disease in 2010, evidence was gathered on both mortality and morbidity associated with some 291 diseases and injuries from which estimates were made for each of 187 countries.

Because the intention is to measure the total burden of disease, the approach used by researchers has been to combine estimates of the impact of premature mortality associated with specific diseases with estimates of the on-going health loss due to morbidity, or ill health.

Accounting for premature mortality begins with the most recent estimates of the number of deaths by age and sex by cause for each country. The years of life lost to premature mortality (YLL) associated with these deaths is estimated by calculating the difference between the actual age of death and a standard life expectancy at that age, which for GBD 2010 was set at 86 years at birth (Murray et al. 2012, sup. pp. 13–14).

To calculate the morbidity (or disability) component of the burden of disease, GBD 2010 estimated the point prevalence of different causes of disease by age and sex for each country in 2010. This was then used to estimate the years lived with disability (YLD) by multiplying prevalent cases by a disability weight which reflects the severity of health loss due to the disease. ‘Prevalence’ means the number of people with a specific disease over defined period of time. This can be either a point estimate on a specific date or over a period such as one month, 12 months or a lifetime. The ‘prevalence rate’ is then the number of people with the disease expressed as a percentage of the relevant population.

The estimates of premature mortality (YLL) and morbidity (YLD) are added together to produce an estimate of the overall burden of disease measured as disability-adjusted life years (DALY).

While premature mortality and morbidity contribute equally to the burden of disease from all causes, the predominant contribution in the case of mental and substance-use disorders is from the disability associated with its debilitating effects rather than it being a cause of death directly.

In 2010, mental and substance-use disorders as a group were the leading cause of all non-fatal burden of disease worldwide, accounting for 22.9% of all YLDs. Depressive, anxiety, drug-use and alcohol-use disorders were responsible for 9.7%, 3.5%, 2.1% and 1.8% of all YLDs. Schizophrenia and bipolar disorder contributed a further 1.7% each (Whiteford et al. 2013), with schizophrenia the only psychotic disorder reported in the GBD 2010.

#### 3.2 Estimates of serious mental illness from the GBD 2010 study

Estimates of the extent of serious mental illness in Australia and New Zealand can be made using the country specific GBD 2010 files available from the Institute of Health Metrics and Evaluation (IHME). Prevalence data is not available from the IHME country files but unpublished data has been provided by Dr Alize Ferrari from the School of Public Health, University of Queensland. The School of Public Health is a research centre which has played a major role in estimating the burden of disease from mental and substance-use disorders.

Aside from the prevalence data, the estimates for schizophrenia and opioid dependence are taken directly from the IHME files for Australia and New Zealand. As with schizophrenia, estimates of the prevalence of anxiety and depressive disorders in Australia and New Zealand for 2010 come from the GBD 2010 estimates also provided by Dr Ferrari. To estimate the burden of disease associated with severe bipolar disorder, depression and anxiety using the IHME country files it is necessary to know what proportion of these disorders can be considered severe.

Ferrari et al. (2012) report that, based on a number of studies, they estimate that 23% of bipolar disorder cases would be in a manic state, 27% in a depressive state, and 50% in a residual state. This implies that 50% of bipolar disorder prevalence can be assumed to be severe, taking as severe the manic episode with a disability weight of 0.480 and the depressive episode with a weight of 0.406, giving an average disability weight of 0.440 for severe bipolar disorder.

In their report on the global burden of anxiety disorders in 2010, Baxter et al. (2014) estimated the distribution of anxiety disorders by severity using data from a limited number of surveys. They estimated the proportions of people with asymptomatic, mild, moderate and severe anxiety disorders as 30%, 38%, 19% and 12% respectively. The disability weight given for severe anxiety is 0.523.

The report on the burden of depressive disorders by Ferrari et al. (2012) similarly estimated the proportions of people with asymptomatic, mild, moderate and severe depressive disorders as 13.9%, 58.8%, 16.5% and 10.8% respectively. The disability weight associated with severe depression is 0.655.

The published data from the 2007 ABS National Survey of Mental Health and Wellbeing (ABS 2008) does not report on severity for depression and anxiety disorders. For the New Zealand Mental Health Survey, Oakley-Browne, Wells and Scott (2006) report that 23.8% of cases of anxiety disorders were classified as severe, while the proportion for major depressive disorder was 34.7%. These estimates are around three times that given in the Global Burden of Disease studies, so conservatively we assume that severe cases represent 12.0% of anxiety disorders and 10.8% of depressive disorders in Australia and New Zealand. The large differences in severity proportions may be caused by coding

rules used to classify cases as severe between these two sources. In addition severity splits in GBD studies have been adjusted for disability caused by comorbid diseases.

Applying the assumptions about the proportion of each mental illness that is severe to this data, the prevalence of severe bipolar, anxiety and depressive disorders can be calculated for the two countries. The disability weights are then applied to these prevalence estimates to calculate the corresponding YLDs, which are equivalent in this case to DALYs as the GBD 2010 assumes there is no mortality associated with bipolar disorder, anxiety and depression.

Table A1 in the Appendix presents the estimates of deaths, YLL, YLD, DALYs and prevalence for those serious mental illnesses reported in GBD 2010, namely schizophrenia, severe bipolar affective disorder, severe anxiety, severe depression and opioid dependence. Table 3.1 reports the numbers of people with serious mental illness in Australia and New Zealand (prevalence), based on the data in Table A1.

Based on the GBD 2010 estimates, the numbers of people with serious mental illness, including those with opioid dependence, in Australia and New Zealand in 2010 were 474,192 and 105,350 respectively. Omitting those with opioid dependence the numbers for those with serious mental illness were 407,938 and 92,047.

While the prevalence of schizophrenia is similar among males and females in both countries, females are much more likely to suffer from severe anxiety and depression than males. On the other hand the number of males with opioid dependence is about 2.5 times that of females. There are somewhat more females with bipolar disorder than males in both countries.

**Table 3.1** Numbers of people with serious mental illness in Australia and New Zealand, based on GBD 2010 data

	Australia			New Zealand		
	Males	Females	Persons	Males	Females	Persons
Schizophrenia	48,527	40,932	89,459	9,573	8,439	18,012
Severe bipolar disorder	46,682	53,984	100,666	9,241	11,215	20,456
Severe anxiety	48,417	93,838	142,255	10,164	20,328	30,492
Severe depression	27,860	47,698	75,558	8,326	14,761	23,087
Opioid dependence	48,377	17,877	66,254	9,504	3,799	13,303
SMI with opioid	219,863	254,329	474,192	46,808	58,542	105,350
SMI without opioid	171,486	236,452	407,938	37,304	54,743	92,047

Source: IHME 2015a; Dr A Ferrari, personal communication; study estimates.

## 4. Premature mortality and mental disorders in Australia and New Zealand

### 4.1 The extent of premature mortality associated with serious mental disorders

It has been known for a long time that people with serious mental illness have shorter lives, in part due to a higher rate of suicide. There is now increasing evidence that this premature mortality is associated with much higher death rates from the more common causes of death such as cardiovascular disease, cancer and respiratory disease.

#### International data

An influential study in the USA for the National Association of State Mental Health Program Directors (Parks 2006) reported that people with serious mental illness died on average 25 years earlier than normal and that 60% of the premature mortality was due to common non-communicable diseases, often referred to as chronic disease.

Using data from 37 studies covering 25 countries, McGrath et al. (2008) and Saha, Chant and McGrath (2007) calculated standardised mortality rates (SMR) which compare the mortality rates of people with schizophrenia with those of the general population.

They found that people with schizophrenia have a rate of death 2.6 times that of the average. The median death rates from suicide were 12.9 times the average, while those from other causes of death were typically two to four times higher, as shown in Table 4.1.

*Table 4.1 Standardised mortality rates, schizophrenia*

Causes of death	SMR
All-cause	2.58
Cardiovascular diseases	1.79
Cerebrovascular diseases	0.69
Digestive diseases	2.38
Endocrine diseases	2.63
Infectious diseases	4.29
Genitourinary diseases	3.70
Neoplastic diseases	1.37
Nervous diseases	4.22
Respiratory diseases	3.19
Other diseases	2.00
Accident	1.73
Suicide	12.86

Source: Saha, Chant and McGrath 2007.

Further evidence on mortality in mental disorders is provided by Walker, McGee and Druss (2015) who reviewed 203 articles reporting on mortality in mental disorders compared to the general population or controls. These articles covered 29 countries up to 2014. They found that the relative risk of death was 2.2 times higher in people with mental disorders than the general population. For psychoses, mood disorders, depression, bipolar disorder and anxiety the relative risks were 2.5, 2.1, 1.7, 2.0, and 1.4 respectively. They also discovered rising relative risks over time suggesting a widening life expectancy gap for people with all types of mental disorders not just schizophrenia. They estimate that all mental disorders were responsible for 14.3% of deaths in 2012, with 4.9% due to mood disorders, 4.9% due to anxiety and 0.6% from psychoses.

Laursen (2011) used information from the Danish Civil Registration System between 2000 and 2006 to calculate the life expectancy among persons with schizophrenia and bipolar affective disorder.

Laursen found that the life expectancy of men with schizophrenia was 57.8 years, 18.7 years shorter than the average (76.5 years). For men with bipolar disorder, life expectancy was 13.6 years shorter than the average.

For women with schizophrenia, life expectancy was 64.6 years, 16.3 years shorter than the average (80.9 years). For women with bipolar disorder, life expectancy was 12.1 years shorter than the average.

In a national cohort study of 6,097,834 Swedish adults, including 8,277 with schizophrenia, followed for seven years (2003–2009) for mortality and comorbidities diagnosed in any outpatient or inpatient setting, Crump et al. (2013) found that, on average, men with schizophrenia died 15 years earlier, and women 12 years earlier, than the rest of the population. This was not accounted for by unnatural deaths. The leading causes were ischemic heart disease and cancer.

#### Australian data

In Australia, Lawrence, Hancock and Kisely (2013) have estimated the life expectancy of psychiatric patients in Western Australia using linked mental health information systems and death registration records over the period 1985 to 2005. In 2005, for patients with a primary diagnosis of schizophrenia, life expectancy for males was 57.4 years, 16.4 years shorter than the average (79.1 years). For females with schizophrenia, life expectancy was 71.3 years, 12.5 years shorter than the average. There are similar life expectancy gaps for males and females with affective and other psychoses. Table A3 in the Appendix shows the life expectancy gaps for other mental disorders.

A disturbing finding was that, while the life expectancy of male patients with schizophrenia and other psychoses improved somewhat over the 20-year period, the gap between them and the average male widened. For women the gap stayed about the same for schizophrenia and widened for other psychoses.

This gap in life expectancy widened across all the psychiatric diagnoses considered in the study and was generally larger in men than in women.

Lawrence, Hancock and Kisely (2013) examined the causes of death among people with mental illnesses and calculated the excess numbers of deaths from each cause when compared to what might be expected if they had the same specific death rates as the general population. The relative importance of each cause in these excess deaths is shown in Table A4. Cardiovascular disease, cancer, chronic obstructive pulmonary disease and suicide were the major causes of excess deaths in both males and females.

#### New Zealand data

Cunningham et al. (2014) used a similar procedure to that of Lawrence, Hancock and Kisely (2013) to estimate rates of premature mortality among people using psychiatric services in New Zealand. They linked mental health services databases held by the Ministry of Health with the New Zealand Mortality Data Collection to examine mortality outcomes of 266,093 people aged 18–64 who used mental health services between 2002 and 2010.

As shown in Table 4.2, both men and women using mental health services in New Zealand have more than twice the mortality rate of the total population with an increased risk of death from cancer (1.3 times) and cardiovascular disease (1.7 times), and external causes such as suicide and accidents (3.1 times). People with a diagnosis of a psychotic disorder had three times the overall death rate of the population.

In summarising their review of the premature mortality gap for people with schizophrenia, Saha, Chant, and McGrath (2007) concluded that demographic, clinical, political, and cultural factors mediate pathways and barriers to health care in general (e.g. availability of services, stigma and disease profiles). With respect to schizophrenia, the onset of the illness can result in a cascade of unhealthy lifestyle factors that elevate the risk of various somatic diseases and consequently increase the risk of death. People with schizophrenia are thought to be less inclined to seek health care, to consume less medical care, to engage in high risk behaviours, and to be less compliant with their treatments. However, in addition to factors that operate on the pathway to care, schizophrenia and its associated comorbid somatic conditions may be downstream expressions of common genetic or environmental factors. For example, it is feasible that polymorphisms in genes may increase the susceptibility to both schizophrenia and diabetes or that genetic mutations across many generations could result in an increased risk of schizophrenia and a wide range of

*Table 4.2 Causes of death and standardised mortality ratios for adults using mental health services in New Zealand 2002–10*

	Frequency			SMR		
	Women	Men	Persons	Women	Men	Persons
All natural causes	71.5	58.3	63.6	1.89	1.78	1.83
Cancer	27.5	17.0	21.1	1.26	1.29	1.27
Cardiovascular	13.6	18.2	16.4	1.95	1.59	1.69
Mental health	1.9	1.8	1.9	9.58	5.13	6.33
Other natural causes	28.5	21.3	24.2	0.75	0.65	0.69
All external causes	28.5	41.7	36.4	4.27	2.78	3.11
Intentional self-harm	16.7	24.0	21.1	5.97	3.90	4.37
Other external causes	11.7	17.6	15.3	3.04	2.00	2.23
<b>All causes</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>2.23</b>	<b>2.08</b>	<b>2.14</b>

Source: Cunningham et al. 2014.

adverse health outcomes. Prenatal nutritional disruptions may equally affect brain development and general metabolic functioning... the worsening SMRs associated with schizophrenia noted in recent decades suggest that this already disadvantaged group is not benefiting from the improved health of the community in an equitable fashion. A systematic approach to monitoring and treating the physical health needs of people with schizophrenia is clearly warranted (p 1131).

## 4.2 Revised estimates of the burden of disease

The evidence presented above on premature mortality has added to a widespread recognition that the small contribution of deaths and YLLs to the burden of disease from serious mental illness as calculated in GBD 2010 is misleading given the much higher premature mortality among people with serious mental illness. This is because death estimates in GBD 2010 are coded using the ICD-10 cause of death coding rules which only assign deaths to the direct, rather than underlying, cause of death.

Addressing these concerns, Charlson et al. (2014) have calculated both the cause-specific deaths from mental, neurological and substance-use disorders and the excess deaths due to these causes using data from GBD 2010. Here excess mortality is the mortality rate from all causes in a population with the disorder compared with the mortality rate from all causes in a population without the disorder. As well as schizophrenia, the authors provide results for Alzheimer's disease and other dementias, epilepsy, alcohol, opioid, cocaine and amphetamine use disorders and a residual category of other mental disorders. Unfortunately

they do not provide results separately for bipolar disorder, depression or anxiety. They show that the numbers of excess deaths due to the causes of premature mortality compared to the deaths directly from mental illness clearly demonstrate the high degree of mortality associated with these disorders.

For schizophrenia, there were 19,763 cause-specific deaths in 2010 globally but the 698,993 excess deaths were 35.4 times higher. Similarly the excess deaths due to opioid dependence were about 9.4 times the number of cause-specific deaths.

Applying these factors to the numbers of deaths from schizophrenia and opioid dependence reported from the GBD 2010 (Table A1), new estimates can be made of the burden of disease from serious mental illness, the full details of which are reported in Table A2 in the Appendix. The new estimates of the overall burden of disease expressed as DALYs are given in Table 4.3.

These revised estimates for DALYs due to schizophrenia are about 1.35 times the original estimates in Table A1 on average. Applying this ratio to the original DALYs in Table A1 in the Appendix for severe depression and anxiety gives new estimates of the burden of disease due to these serious mental disorders. These are shown in full in Table A2 and as DALYs in Table 4.3.

The difference between the two estimates of the burden of disease from serious mental illness is due to the impact of premature mortality due to comorbidities. If opioid dependence is included within serious mental illness, the impact of comorbidities ranges from 32% to 53% of the overall revised burden of disease. Without opioid dependence the range is 23% to 30%.

**Table 4.3** Estimates of DALYs for serious mental illness for Australia and New Zealand revised using adjusted GBD 2010 data

	Australia			New Zealand		
	Males	Females	Persons	Males	Females	Persons
Schizophrenia	39,708	35,316	75,024	7,524	6,869	14,393
Severe bipolar disorder	25,461	29,443	54,904	5,040	6,117	11,157
Severe anxiety	34,185	66,254	100,439	7,176	14,353	21,529
Severe depression	24,635	42,177	66,812	7,362	13,052	20,414
Opioid dependence	162,878	58,727	221,605	19,877	8,314	28,191
SMI with opioid	286,867	231,918	518,785	46,980	48,705	95,685
SMI without opioid	123,989	173,190	297,179	27,103	40,391	67,494

Source: Study estimates.

## 5. Estimates of the cost of the burden of disease in Australia and New Zealand

Cost-of-illness studies typically calculate the direct economic cost due to a disease arising from the utilisation of health and other services as well as indirect costs due to lost productivity because people are unable to work. Added to this are the costs incurred by carers and other support organisations. Further information about cost-of-illness studies for serious mental illness is given in Section 8.

A number of these studies (e.g. Deloitte Access Economics 2013) also calculate the cost to society arising from the premature mortality due to the disease and the morbidity associated with the ongoing burden of disease. These studies put an economic value on the burden of disease separately from considerations of the direct cost to the health system and the loss of economic output.

This approach takes the burden of disease expressed in DALYs and combines it with a measure of the value of life. The usual way of expressing the value of a life is through the concept of the value of a statistical life (VSL) which is an estimate of the financial value society places on reducing the average number of deaths by one person (Office of Best Practice Regulation 2014).

For the purposes of estimating the cost of the burden of disease it is necessary to convert the VSL into the value of a statistical life year (VSLY) which estimates the value society places on reducing the risk of premature death by one year. There are a number of different ways of calculating both VSL and VSLY, one of the most common being the Willingness to Pay approach to determine how much a society or individual is willing to pay to reduce the risk of death.

Table 5.1 Estimates of DALYs due to serious mental illness, Australia and New Zealand, 2014

	Australia			New Zealand		
	Males No.	Females No.	Persons No.	Males No.	Females No.	Persons No.
<b>Original</b>						
SMI with opioid	143,097	150,245	293,342	28,736	34,177	62,914
SMI without opioid	96,277	133,038	229,315	20,945	30,993	51,939
<b>Adjusted for comorbidities</b>						
SMI with opioid	299,829	243,078	542,906	48,470	50,459	98,929
SMI without opioid	129,958	181,631	311,589	27,962	41,845	69,807

Source: Study estimates.

Table 5.2 Cost of burden of disease from serious mental illness, Australia and New Zealand, 2014

	Australia			New Zealand		
	Males A\$M	Females A\$M	Persons A\$M	Males NZ\$M	Females NZ\$M	Persons NZ\$M
<b>Original estimates</b>						
SMI with opioid	26,044	27,345	53,388	4,914	5,844	10,758
SMI without opioid	17,522	24,213	41,735	3,582	5,300	8,881
<b>Adjusted estimates</b>						
SMI with opioid	54,569	44,240	98,809	8,288	8,629	16,917
SMI without opioid	23,652	33,057	56,709	4,782	7,156	11,937
<b>Cost of comorbidities</b>						
SMI with opioid	28,525	16,895	45,421	3,374	2,784	6,159
SMI without opioid	6,130	8,844	14,974	1,200	1,856	3,056

Source: Study estimates.

The VSL and VSLY have been estimated for Australia and New Zealand by a number of authors. Using a methodology set out by Abelson (2007), the Australian government through the Office of Best Practice Regulation provides estimates that are regularly updated. Its suggested values for VSL and VSLY are A\$4.2 million and A\$182,000 at 2014 prices.

In New Zealand the Ministry of Transport (2014) similarly provides regular updates for the VSL, with their most recent estimate being NZ\$3.95 million at June 2014 prices. If the ratio of VSLY to VSL is the same as in Australia, this implies a VSLY in New Zealand of NZ\$171,000 at June 2014 prices. The values for New Zealand are somewhat lower than those for Australia reflecting differences in standards of living.

Before calculating the cost of the burden of disease due to serious mental illness, the revised GBD 2010 estimates are updated to 2014 using estimates of the increase in the population by age and gender and assuming prevalence rates remain unchanged (Table 5.1). On average the number of DALYs increases by about 4.5% for Australia and 3.4% for New Zealand.

The cost of the burden of disease due to serious mental illness in 2014 can then be estimated by multiplying the estimates of DALYs in Table 5.1 by the value of a statistical life year in 2014, the results of which are shown in Table 5.2. The results provide an estimated annual cost to society of serious mental illness.

The first set of estimates in Table 5.2 is based on the burden of disease which does not take account of premature mortality, i.e. they are updates of the DALYs given in Table A1. The second set takes premature mortality into account and is based on the DALYs given in Table 5.1. The difference between the two estimates is therefore an estimate of the cost of premature death due to comorbidities.

Overall the cost of the burden of disease in Australia and New Zealand in 2014 is estimated to have been A\$98.8 billion (6% of GDP) and NZ\$17.0 billion (7.2% of GDP) if opioid dependence is included, and A\$56.7 billion (3.5% of GDP) and NZ\$12.0 billion (5.0% of GDP) if this is excluded.

The cost of comorbidities associated with premature death in those with serious mental illness is estimated to have been A\$45.4 billion (2.8% of GDP) and NZ\$6.2 billion (2.6% of GDP) if opioid dependence is included, and A\$15.0 billion (0.9% of GDP) and NZ\$3.1 billion (1.3% of GDP) if this is excluded.

In considering these estimates, no account has been taken of the proportion of the cost due to the burden of serious mental illness that could be averted through increased treatment coverage and the use of evidence-based interventions. Andrews et al. (2004) have estimated that current treatment could avert 13% of the burden, optimal treatment at current coverage could avert 20% of the burden, and optimal treatment at optimal coverage could avert 28% of the burden. On the other hand, 60% of the burden of mental disorders was deemed to be unavertable.

For schizophrenia, however, 78% of the burden of disease was unavertable even with optimal treatment at optimal coverage and the cost per YLD averted was A\$107,482. For bipolar disorder the position was better with 60% of the burden of disease being unavertable even with optimal treatment at optimal coverage and the cost per YLD averted was A\$24,827. Separate data was not given for severe anxiety or depression or opioid dependence.

# PART TWO

## Survey measures of prevalence of serious mental illness and associated premature mortality – the ‘bottom-up’ approach

### 6. The prevalence of severe mental disorders in Australia and New Zealand

#### 6.1 Affective and anxiety disorders in Australia

The use of national survey measures to estimate prevalence and associated premature mortality arising from comorbid physical illness provides an alternate estimate of the national and individual costs of these conditions.

The most recent comprehensive collection of information on the prevalence of affective and anxiety disorders in Australia is the ABS National Survey of Mental Health and Wellbeing of 8,841 people conducted from August to December 2007 (ABS 2008). The survey was based on a widely used international survey instrument, developed by the World Health Organization (WHO) for use by participants in the World Mental Health Survey Initiative. The initiative is a global study aimed at monitoring mental and addictive disorders and has been undertaken in about 28 countries including Australia and New Zealand.

The ABS survey collected information on both lifetime and 12-month prevalence of mental disorders but most of the reporting is done on a 12-month basis. Lifetime and 12-month prevalence for males and females in Australia of anxiety disorders, affective disorders and substance-use disorders are reported in Table A5 for males and females.

Across their lifetime, nearly half (45.5%) of all Australians will suffer from a mental disorder, 26.3% will have an anxiety disorder, 15.0% an affective disorder (mainly depression) and 24.7% a substance-use disorder. In any 12-month period, the prevalence of any mental disorder is 20.0%. This is mainly due to anxiety disorders such as social phobia and post-traumatic stress disorder, although there is a significant prevalence of depression (4.1%), bipolar affective disorder (1.8%) and other affective disorders. Table 6.1 reports the estimates of the 12-month prevalence for males and females aged 16–85 years in Australia for anxiety disorders and depression. The number of people with severe anxiety and depression can be estimated using the severity proportions discussed in Section 2.3. Using this method, there were 276,400 people with severe anxiety and 70,500 people with severe depression in 2007 in Australia.

Table 6.1 Prevalence of mental illness in Australia, 2007

	Males '000	Females '000	Total '000
Anxiety disorders	860.7	1,442.3	2,303.0
Depression	245.0	407.4	652.4
Severe anxiety	103.3	173.1	276.4
Severe depression	26.5	44.0	70.5

Source: ABS 2008.

A limitation in this approach is that, although the ABS survey asked questions about psychosis, the published reports from ABS do not provide any data on schizophrenia or other psychotic disorders separately.

#### 6.2 Psychosis in Australia

The most comprehensive source of information on the prevalence of psychosis in Australia is the 2010 Australian National Survey of Psychosis details of which are reported by Morgan et al. (2011, 2012). The survey was conducted at seven mental health service sites in five Australian states with an estimated resident population representing approximately 10% of the Australian population aged 18–64. A screening process was used to identify people with psychosis in three settings:

1. people in contact with public mental health services in the census month of March 2010
2. people not in contact with these services in the census month but in contact with NGOs supporting people with mental illnesses in that month
3. people not in contact with public mental health services or NGOs in the census month but in contact with public mental health services in the 11 months prior to census.

The survey therefore did not collect any information on people who did not receive mental health services in the previous year nor those that received care from private mental health services.

Table 6.2 Estimated treated prevalence of ICD-10 psychotic disorders, Australia, 2010

	Males		Females		Persons	
	No.	Rate	No.	Rate	No.	Rate
<b>1-month treated prevalence</b>						
Public specialised mental health services	26,600	3.7	17,215	2.4	43,815	3.1
NGOs	4,048	0.6	2,155	0.3	6,204	0.4
<b>Total</b>	<b>30,648</b>	<b>4.3</b>	<b>19,370</b>	<b>2.7</b>	<b>50,019</b>	<b>3.5</b>
<b>12-month treated prevalence</b>						
Public specialized mental health services	38,859	5.4	24,674	3.5	63,533	4.5

Source: Morgan et al. 2012.

Table 6.3 Distribution of ICD-10 psychotic disorders, Australia, 2010

ICD-10 diagnosis	%
Schizophrenia	47.0
Schizoaffective disorder	16.1
Bipolar, mania	17.5
Depressive psychosis	4.4
Delusional and other non-organic psychoses	5.0
Severe depression	8.7
Other	1.4
<b>Total</b>	<b>100.0</b>

Source: Morgan et al. 2012.

Based on the survey results, the one-month prevalence of psychosis in public specialised mental health services is estimated to be 3.1% and the 12-month prevalence is 4.5%. The rate in males were about 1.5 times that in females (Table 6.2). As can be seen from Table 6.3, 47% of the prevalence of psychosis is accounted for by schizophrenia, 17.5% by the mania state of bipolar disorder and 8.7% by severe depression.

### 6.3 Affective and anxiety disorders in New Zealand

The most recent comprehensive evidence of the prevalence of mental disorders in New Zealand is the New Zealand Mental Health Survey conducted by the National Research Bureau for the Ministry of Health in late 2003 and 2004 (Oakley-Browne, Wells & Scott 2006). The survey is similar to the ABS 2007 survey and as mentioned earlier is based on a widely used international survey instrument, developed by the WHO for use by participants in the World Mental Health Survey Initiative.

Table 6.4 Prevalence of mental illness in New Zealand, 2006

	Males '000	Females '000	Persons '000
Anxiety disorders	170.1	315.8	485.9
Depression	66.8	120.6	187.3
Severe anxiety	20.4	37.9	58.3
Severe depression	7.2	13.0	20.2

Source: Oakley-Browne, Wells & Scott 2006.

Closely similar to Australia, the estimated lifetime risk at age 75 for any mental disorder in New Zealand is 46.6%, while the lifetime prevalence estimates for disorder groups are anxiety disorders (24.9%), mood disorders (20.2%), substance-use disorders (12.3%) and eating disorders (1.7%).

The 12-month prevalences in New Zealand of the different types of anxiety, mood and substance-use disorders are set out in Table A6 in the Appendix. The estimated numbers of people with anxiety and depression in New Zealand in 2006 based on the survey and population estimates is shown in Table 6.4. Again using the severity proportions discussed in Section 2.3, there were 58,300 people with severe anxiety and 20,200 people with severe depression in 2006 in New Zealand.

## 6.4 Psychosis in New Zealand

Obtaining an up-to-date picture of psychosis in New Zealand is somewhat harder than it is for Australia, because there is no equivalent to the Australian National Survey of Psychosis.

The Christchurch Psychiatric Epidemiology Study determined the occurrence (over two weeks, one month, six months, 12 months and lifetime) of a number of specific psychiatric diagnoses in the Christchurch urban area. Data were collected on 1498 randomly selected adults, aged between 18 and 64 years from April 1986 to December 1986 (Oakley-Browne et al. 1989).

Because of the size of the sample it was not possible to present detailed information on the prevalence of different types of psychosis. The estimated prevalences for the general group of schizophrenia/schizophreniform disorders and schizophrenia itself are presented in Table 6.5.

The estimated 12-month and lifetime prevalences of schizophrenia were 0.2% and 0.3% respectively. Taking the more general group gives prevalences of 0.2% for 12 months and 0.4% for lifetime.

A more recent analysis of psychosis in New Zealand is the study by Gale et al. (2011) of the New Zealand Mental Health Survey in 2003/2004. In this survey respondents who had mental disorders were asked to participate in a Part II interview in which six questions were asked as a psychosis screener. Based on these answers the authors estimated the lifetime prevalence of any psychosis-like experience among these participants as 7.3%. The most common experiences were visual hallucinations (5.3%) and hearing voices (2.8%).

Table 6.5 Prevalence of schizophrenia, New Zealand, 1986

	Schizophrenia/ schizophreniform disorders '000	Schizophrenia '000
Two weeks	0.1	0.1
One month	0.1	0.1
Six months	0.2	0.2
One year	0.2	0.2
Lifetime	0.4	0.3

Source: Oakley-Browne et al. 1989.

## 7. Comorbidities and mental illness in Australia and New Zealand

### 7.1 Anxiety and affective disorders

The high level of premature deaths in people with mental illness from a range of physical and mental causes discussed in Section 4 is due to a high prevalence of these comorbidities and associated risk factors during their lifetimes.

The 2007 ABS National Survey of Mental Health and Wellbeing (ABS 2008) provides information on the extent of comorbidities among people with anxiety, affective and substance-use disorders.

For people with anxiety, affective disorder is present in 25.4% of cases, while a physical disorder is present 61.8% of the time (Table A7). On the other hand, for those with affective disorder, anxiety is present 58.5% of the time, and physical conditions for 64.4% of the time (Table A8).

Oakley-Browne, Wells and Scott (2006) report similar results on comorbidities and risk factors from the New Zealand Mental Health Survey. People with anxiety and mood disorders, especially males, have higher rates of chronic pain, cardiovascular disease, respiratory conditions, diabetes and cancer compared to people without mental disorders (Table A9). They also have higher rates of smoking, high blood pressure, and excessive alcohol use (Table A10).

These results for Australia and New Zealand are echoed in the results for other countries that have been participants in the World Mental Health Survey Initiative as reported for instance in the contributions to von Korff, Scott and Gureje (2009).

### 7.2 Psychosis

In their report on physical, metabolic and cognitive comorbidity, Morgan et al. (2014) give estimates of the prevalence of common physical comorbidities and common risk factors for people with different types of psychosis in Australia. The rates of all the physical conditions are much higher than in the general population, especially for cardiovascular disease and diabetes (Table 7.1). There are similarly very high rates of risk factors such as high blood pressure, elevated cholesterol, smoking, obesity and physical inactivity (Table A11).

The prevalence rates of physical comorbidities among people with psychosis can be compared to the rates of these physical conditions among the general Australian population. The IHME (2015b) has recently released estimates of the prevalence of these and other conditions for Australia for the year 2013. The prevalence rates can be derived by dividing these prevalences by the estimated Australian population in June 2013 (23,117,353). The results are shown as the last column of Table 7.1. For all conditions rates are higher among people with psychosis, and much higher for asthma, diabetes, arthritis, respiratory conditions, hepatitis and epilepsy.

For people with mental disorders, comorbidities and their risk factors are the rule rather than the exception.

Table 7.1 Prevalence of physical comorbidities in people with psychosis, Australia, 2010

	Schizophrenia %	Schizo-affective disorder %	Bipolar disorder with psychosis %	Depressive psychosis %	Delusional and other nonorganic psychoses %	Any psychosis %	Australian population %
Asthma	28.0	34.1	32.2	43.0	18.3	30.0	11.3
Cardiovascular disease	11.5	15.9	11.1	17.9	7.8	12.2	9.9
Severe headaches/migraines	20.1	29.1	32.4	39.1	17.7	24.8	20.6
Diabetes	21.6	22.9	22.4	16.4	15.9	21.4	6.6
Arthritis	18.9	21.4	26.0	37.1	12.3	21.2	5.7
Respiratory conditions	17.9	20.2	16.1	33.2	8.7	18.2	8.0
Anaemia	9.8	16.8	17.0	29.3	6.2	13.2	11.7
Hepatitis	11.7	12.3	11.4	10.9	16.8	12.0	5.5
Epilepsy	7.9	7.4	6.1	7.8	7.0	7.4	0.3

Source: Morgan et al. 2014, IHME 2015), ABS 2015.

# 8. The costs of psychosis in Australia and New Zealand

## 8.1 The cost of psychosis in Australia in 2010

Cost-of-illness studies attempt to measure the costs to various stakeholders, including government and society as a whole, of the burden of disease arising from particular causes.

Most of these studies estimate a number of different components of cost. Firstly there are the direct health costs arising from the treatment of the illness. Neil et al. (2014a) estimate the cost of consultations with different types of health professionals, ambulatory and community health care including rehabilitation, ambulance, emergency and inpatient care in hospital and the costs of antipsychotic and other psychotropic medicines. Added to this are direct costs such as emergency, institutional and other accommodation, support from voluntary organisations and legal costs associated with offences committed by people with psychosis.

Indirect costs are those due to the loss in economic activity caused by the lower workforce participation of people with psychosis and the increased absenteeism and presenteeism of those people with psychosis who are in the workforce.

### Cost-of-illness studies in Australia and New Zealand

There have been a number of studies that have measured the economic cost of psychosis in Australia. Andrews et al. (1985) and Hall et al. (1985) estimated the costs of schizophrenia in NSW was A\$131–\$139 million in 1975 prices, or around A\$26 per head of population. On the other hand Access Economics (2002) estimated the real financial costs of schizophrenia in Australia as A\$1.85 billion in 2001 (0.3% of GDP) and nearly A\$50,000 per head for more than 37,000 Australians with the illness. Based on estimates of direct health-care costs prospectively studied in a cohort of 347 patients with schizophrenia in Dandenong, Australia, in the period 1997 to 2003, Fitzgerald et al. (2007) calculated that the average annual societal cost was between A\$27,190 and A\$32,160.

Using information from the first Australian National Survey of Psychosis, Carr et al. (2002) undertook a comprehensive analysis of the cost of psychosis and concluded that, based on the one-month prevalence of 4.7 per thousand, the cost to the government and society of psychosis was A\$1.45 billion and A\$2.25 billion respectively in 1999–2000. Based on an estimate of 12-month prevalence, the societal costs were estimated to be A\$2.54 billion or A\$2.62 billion when time-loss costs due to mortality were included.

Deloitte Access Economics has been undertaking studies of a range of diseases for at least 20 years including schizophrenia and mental illness in young people, principally for patient advocacy groups. They typically use a common comprehensive methodology similar to that used by Neil et al. (2014a), which aims to quantify the health system cost of a disease as well as the economic and social cost arising from lost productivity due to premature mortality and morbidity, absenteeism, presenteeism, and carer and other costs.

Other examples of studies quantifying the cost of mental illness in Australia include PricewaterhouseCoopers (PWC 2014), which estimated the return on investment for creating a mentally healthy workplace, and Schofield et al. (2011) who estimated the income loss from those not in the labour force because of depression and other mental conditions.

There are few cost-of-illness studies for New Zealand. The most recent comprehensive one is by Holt (2010) who has estimated the cost of all forms of physical and mental illness in New Zealand. Holt found that indirect costs from reduced participation in work, absenteeism and presenteeism were NZ\$7.483 billion in 2004–05 (4.9% of NZ GDP).

### Cost of psychosis in Australia based on second Australian National Survey of Psychosis

The most recent detailed and comprehensive estimates of the cost of psychosis in Australia are those from the study by Neil et al. (2014a) drawing upon the results of the second Australian National Survey of Psychosis conducted in 2010. The authors present two sets of costs. Government costs are those that are incurred by the government, while societal costs include these (excluding transfer costs and tax foregone) as well as those paid for by individuals and non-government organisations, including productivity losses.

Neil et al. follow a similar approach to that used in past studies, particularly Carr et al. (2002) but they expand it in significant ways. A comparison of the two studies is made in more detail in Neil et al. (2014b). The authors found that:

The average annual costs of psychosis to society are estimated at \$77,297 per affected individual, comprising \$40,941 in lost productivity, \$21,714 in health sector costs, and \$14,642 in other sector costs. Health sector costs are 3.9-times higher than those for the average Australian. Psychosis costs Australian society \$4.91 billion per annum, and the Australian government almost \$3.52 billion per annum. (p.169)

The costs calculated by Neil et al. (2014a) to a certain extent include the cost of the comorbidities that accompany people with psychosis.

In calculating the direct costs of health care from general practitioners, the authors only include the costs of consultations in excess of the population average of five per year. It is assumed therefore that these excess consultations are due to psychosis. From the published data it is not possible to determine how many of these excess consultations are for psychosis and its symptoms and how many are for physical or mental comorbidities. As psychosis is a chronic condition, it might be assumed that consultations specifically for psychosis are typically made with a psychiatrist or other mental health practitioner rather than a GP. In this case most of the excess GP consultations could be regarded as being for comorbidities.

In considering the direct costs of hospital care, Neil et al. separate those inpatient admissions due to physical conditions from those due to mental health or drug and alcohol reasons. As the average number of inpatient admissions is 0.2 per person per year, they take all second and subsequent admissions for physical health reasons as being associated with psychosis. These admissions can therefore be considered as for comorbidities.

For the cost of medication and supplements, Neil et al. only report the cost of medications for the treatment of psychosis-related mental health and drug and alcohol problems. They do not report the cost of other medications for comorbidities.

In calculating the overall cost of psychosis, Neil et al. estimate that productivity losses due to reduced labour force participation account for A\$39.5 billion, or 51.0% of the total cost.

These productivity losses have a number of components. People with psychosis have lower labour force participation rates, higher unemployment rates, higher levels of absenteeism if they have a job, and higher rates of presenteeism or lower productivity while at work. Neil et al. calculate the time-loss cost due to these reasons.

They also estimate the production losses due to mortality, both from suicide and premature mortality due to psychosis. They estimate these costs as A\$64.0 million and A\$570.9 million respectively. The latter cost may be taken as the cost of comorbidities associated with psychosis as was done in Section 5 above. It should be noted that while all the other costs are calculated as costs incurred in 2010, these mortality costs are estimated as the aggregate net present value of expected lifetime earnings forgone and therefore are not strictly comparable with the other costs.

It is clear from Table 8.1 that the comorbidity costs arising from excess GP consultations and inpatient admission are small compared to the overall cost of psychosis, while productivity losses due to premature mortality are more significant. Together these three sources of the cost of comorbidities account for about 12% of the overall cost from a societal perspective.

## 8.2 The cost of psychosis in Australia in 2014

To estimate the cost of psychosis in Australia in 2014, the prevalence in 2014 is calculated based on the prevalences reported by Morgan et al. (2011).

They report the one-month and 12-month prevalence of psychoses for those patients in contact with public mental health services and the one-month prevalence for patients in contact with NGOs supporting people with mental illnesses (Table 6.2).

To estimate the combined 12-month prevalence of patients in these two settings, the ratio of the one-month prevalences of the public and NGO patients was calculated and applied to the 12-month prevalence for public patients to obtain an estimate of the 12-month prevalence for NGO patients. This was then added to the 12-month prevalence of public patients to obtain an estimate of the prevalence for the two types of patients. The resulting estimates are shown in Table A12.

Assuming prevalence rates remain unchanged in the short term it is possible to present updated estimates of the prevalence of psychosis in Australia for 2010 and 2014. Morgan et al. (2011) relied on ABS projections of the estimated resident population in Australia in 2010. In Table A13 the actual population data for 2010 and 2014 are combined with the prevalence estimates to give numbers for people with psychosis in 2010 and 2014 by age and gender.

Using the distribution of the different types of psychosis reported by Morgan et al. (2011) and reproduced in Table 6.3, it is possible to estimate the numbers of people with different types of psychosis for 2010 and 2014 (Table A14).

Using these estimates and updated unit costs for the components of direct and indirect costs, estimates of the cost of psychosis in Australia in 2014 can be calculated. Detailed estimates are given in Table A15 with the original cost in 2010 from Neil et al. (2014a) for comparison and a summary is provided in Table 8.2 of the overall cost and the cost of comorbidities.

The estimated annual costs of psychosis for the Australian population in 2014 are approximately A\$3.86 billion from a government perspective and A\$6.21 billion from a societal perspective. Compared to 2010, the annual government costs of psychosis have increased by A\$0.34 billion and social costs have risen by nearly A\$1.30 billion. The comorbidity costs arising from excess GP consultations, inpatient admission and productivity losses due to premature mortality together account for about 12.7% of the overall cost from a societal perspective.

**Table 8.1** Estimated cost of comorbidities associated with psychosis, 2014

	Government A\$M	Societal A\$M
General practitioners	14.0	14.4
Inpatient – physical health	27.9	27.9
Productivity loss – excess mortality	–	743.1
All costs	3,859.0	6,207.3

Source: Study estimates based on Neil et al. 2014a.

### 8.3 The cost of psychosis in New Zealand in 2014

Providing estimates for the prevalence of psychosis in New Zealand is more difficult than for Australia due to the lack of recent data. One approach is to apply the Australian prevalence rates to estimates of the New Zealand population provided by Statistics New Zealand. Although this is unsatisfactory, the GBD 2010 prevalence rates for schizophrenia in Australia and New Zealand are very close and may be taken as a guide. Using this method the number of people with psychosis in 2010 and 2014 in New Zealand is as shown in Table A16.

As there was no readily available information on unit costs of health service utilisation and service provisions in other sectors in New Zealand, the average cost per person for psychosis of Australia was converted into New Zealand dollars using purchasing power parities available from the OECD (2015). The estimates of unit cost were combined with the estimates of the prevalence of psychosis to give estimates of the economic cost associated with psychosis in New Zealand in 2014 (Table A17). It should be noted that this is only an approximate estimation as it assumes that the health systems and other services for psychosis are similar in Australia and New Zealand.

The average annual societal costs of psychosis in New Zealand are estimated at approximately NZ\$91,269 per affected person in 2014, comprising NZ\$25,183 in health sector costs, NZ\$16,509 in other sectors costs and NZ\$49,577 in lost productivity. Psychosis costs New Zealand's society NZ\$1.28 billion per annum, and the New Zealand government around NZ\$0.8 billion per annum.

If it assumed that comorbidities comprise the same proportion of cost as is the case in Australia, the cost of comorbidities associated with psychosis in New Zealand in 2014 would have been NZ\$162 million.

## 9. Treatment of psychosis and side effects

As noted earlier, the premature mortality of people with psychosis has been attributed to a range of factors, including barriers to access to services, unhealthy life style factors, high risk behaviours, and non-compliance with treatment.

Drawing upon increasing evidence from a number of studies, Saha et al. (2007), Parks et al. (2006) and Lawrence, Hancock and Kisely (2013) also highlight the role that antipsychotic medicines, particularly second-generation (atypical) antipsychotics might play in contributing to premature mortality, through an increased risk of weight gain and metabolic syndrome.

As an example, Ray et al. (2009) calculated the adjusted incidence of sudden cardiac death among current users of antipsychotic drugs in a retrospective cohort study of Medicaid enrollees in Tennessee. The primary analysis included 44,218 and 46,089 baseline users of single typical and atypical drugs, respectively, and 186,600 matched nonusers of antipsychotic drugs.

They found that:

Current users of typical and of atypical antipsychotic drugs had higher rates of sudden cardiac death than did nonusers of antipsychotic drugs, with adjusted incidence rate ratios of 1.99 and 2.26 respectively. The incidence-rate ratio for users of atypical antipsychotic drugs as compared with users of typical antipsychotic drugs was 1.14... For both classes of drugs, the risk for current users increased significantly with an increasing dose. (p. 225)

The link between antipsychotic medicine use and premature mortality has been questioned however by Tiihonen et al. (2009). They used nationwide registers in Finland to compare the cause-specific mortality in 66,881 patients with schizophrenia versus the total population (5.2 million) between 1996 and 2006, and linked these data with the use of antipsychotic drugs. They measured the all-cause mortality of patients with schizophrenia in outpatient care during current and cumulative exposure to any antipsychotic drug versus no use of these drugs, and exposure to the six most frequently used antipsychotic drugs compared with perphenazine use.

They concluded that:

Although the proportional use of second-generation antipsychotic drugs rose from 13% to 64% during follow-up, the gap in life expectancy between patients with schizophrenia and the general population did not widen between 1996 (25 years), and 2006 (22.5 years)... Long-term cumulative exposure (7–11 years) to any antipsychotic treatment was associated with lower mortality than was no drug use... In patients with one or more filled prescription for an antipsychotic drug, an inverse relation between mortality and duration of cumulative use was noted.

Long-term treatment with antipsychotic drugs is associated with lower mortality compared with no antipsychotic use. Second-generation drugs are a highly heterogeneous group, and clozapine seems to be associated with a substantially lower mortality than any other antipsychotics. (p. 620)

Torniainen et al. (2014) identified all individuals in Sweden aged 17–65 years with schizophrenia diagnoses before 2006 (N = 21,492), and those with first-episode schizophrenia during the follow-up 2006–2010 (N = 1230). Patient information was prospectively collected through nationwide registers. Total and cause-specific mortalities were calculated as a function of cumulative antipsychotic exposure from January 2006 to December 2010.

Their conclusions were that:

Compared with age- and gender-matched controls from the general population, the highest overall mortality was observed among patients with no antipsychotic exposure (hazard ratio = 6.3), followed by high exposure group (HR = 5.7), low exposure group (HR = 4.1), and moderate exposure group (HR = 4.0). High exposure (HR = 8.5) and no exposure (HR = 7.6) were associated with higher cardiovascular mortality than either low exposure (HR = 4.7) or moderate exposure (HR = 5.6). The highest excess overall mortality was observed among first episode patients with no antipsychotic use (HR = 9.9).

Among patients with schizophrenia, the cumulative antipsychotic exposure displays a U-shaped curve for overall mortality, revealing the highest risk of death among those patients with no antipsychotic use. These results indicate that both excess overall and cardiovascular mortality in schizophrenia is attributable to other factors than antipsychotic treatment when used in adequate dosages. (p. 1)

Although accepting the central finding of Tiihonen et al., De Hert, Correll and Cohen (2010) have raised questions about the methodology used in this study, citing 'incomplete reporting of data, questionable selection of drug groups and comparisons, important unmeasured risk factors, inadequate control for potentially confounding variables, exclusion of deaths occurring during hospitalization... and survivorship bias due to strong and systematic differences in illness duration across the treatment groups' (p. 68). Nevertheless, they concluded that:

Most of the evidence supports a beneficial effect of antipsychotics (especially clozapine) on suicide risk, but the data also support the view that the use of many though not all atypical antipsychotic drugs can increase cardiovascular morbidity and mortality. (p. 68)

In their review of the influence of antipsychotics on mortality in schizophrenia, Weinmann, Read and Aderhold (2009) found that there is some evidence that long-term exposure to antipsychotics increases mortality in schizophrenia but that more rigorously designed, prospective studies were urgently needed. Of 12 studies they identified in a systematic review assessing the association between antipsychotic exposure and mortality in persons with schizophrenia:

three out of five studies examining antipsychotic dosage and higher mortality showed a significant association for one or more antipsychotics. Two out of four found negative effects of antipsychotic polypharmacy on life expectancy. Some studies found a lower cardiovascular mortality risk with higher treatment intensity or when comparing current versus past or non-use of antipsychotics. Others established a stable correlation between antipsychotic exposure and an increase in cardiovascular mortality. Evidence for differential effects on mortality in favor of second generation (SGA) compared to first generation antipsychotics was inconsistent. (p. 1)

While the evidence on the effect of antipsychotic use on mortality is mixed, it is much stronger on the adverse effects of antipsychotics on metabolic and cardiovascular risk factors, independent of other influences such as smoking, diet, physical inactivity and other lifestyle factors.

De Hert et al. (2012) in their review of the adverse effects of antipsychotic medicines, list the major adverse effects in three categories.

### **Motor symptoms**

- Acute extrapyramidal adverse effects, including dystonic reaction, akinesia, tremor, Parkinsonism, akathisia, and neuroleptic malignant syndrome
- Chronic extrapyramidal adverse effects, such as tardive dyskinesia, dystonia and akathisia

### **Metabolic adverse effects**

- Weight gain, especially abdominal obesity
- Impaired glucose metabolism, including hyperglycemia, type 2 diabetes mellitus, diabetic ketoacidosis and coma
- Dyslipidemia, including hypercholesterolemia, hypertriglyceridemia, and low HDL

### **Cardiovascular adverse events**

- Arterial hypertension
- Disorders of the heart and blood vessels related to atherosclerosis
- Sudden cardiac death

They note that more recent antipsychotics have improved treatment persistence, relapse prevention and reduced motor symptoms and, as these medicines have come to dominate treatment, attention has shifted to their metabolic and cardiovascular adverse effects.

Antipsychotic medicines vary in their adverse effects profiles. For instance, weight gain is strongest for clozapine and olanzapine, intermediate for quetiapine and low for amisulpride, aripiprazole and ziprasidone. For metabolic syndrome, clozapine and olanzapine have the highest risk, quetiapine has moderate risk, risperidone, paliperidone, and amisulpride are associated with mild risk and aripiprazole and ziprasidone have low risk (de Hert et al. 2012).

The evidence concerning the contribution of antipsychotics to risk of type 2 diabetes is mixed with a position statement by the European Psychiatric Association concluding that:

overall, the evidence is clear that the use of antipsychotics is associated with an increased risk of diabetes but this risk is small compared with other traditional diabetic risk factors. (de Hert et al. 2009, p. 416)

The evidence on the impact of antipsychotics on premature mortality is mixed and does not provide enough foundation to estimate how much this impact contributes to the cost of the burden of disease of psychosis arising from this cause. The evidence on the contribution of antipsychotics to increased morbidity and risk factors, particularly related to cardiovascular disease for disease is stronger. Estimating its impact on the cost of psychosis requires having specific data on the prevalence not only of one disease but the numbers of people with multiple morbidities.

## 10. Conclusions

**Providing a detailed, accurate and up-to-date account of serious mental illness in Australian and New Zealand is hampered by the extent and availability of data on key aspects of this illness and its effects on sufferers and the broader community. This is particularly so for New Zealand.**

Nonetheless it is possible to combine a number of different analyses to highlight important features of the extent of serious mental illness, its costs and the comorbidities that accompany it.

Serious mental illness represents a significant health and economic burden in both countries.

Aside from the suffering associated with the disease, people with serious mental illness die much earlier than the general population. For patients with a primary diagnosis of schizophrenia in Western Australia, life expectancy for males was 57.4 years in 2005 or 16.4 years less than the average life expectancy of 79.1 years. For females with schizophrenia, the average life expectancy was 71.3 years or 12.5 years less than the average for women. There are similar life expectancy gaps for males and females with affective and other psychoses.

In their report on physical, metabolic and cognitive comorbidity, Morgan et al. (2014) give estimates of the prevalence of common physical comorbidities and common risk factors for people with different types of psychosis in Australia. The rates of all the physical conditions are much higher than in the general population, especially for cardiovascular disease and diabetes. There are similarly very high rates of risk factors such as high blood pressure, elevated cholesterol, smoking, obesity and physical inactivity.

The prevalence rates of physical comorbidities among people with psychosis can be compared to the rates of these physical conditions among the general Australian population. For all conditions, rates are higher among people with psychosis, and much higher for asthma, diabetes, arthritis, respiratory conditions, hepatitis and epilepsy.

For people with mental disorders therefore comorbidities and their risk factors are the rule rather than the exception.

When measured using the Global Burden of Disease data the cost of the burden of serious mental illness in Australia and New Zealand in 2014 is estimated to have been A\$98.8 billion and NZ\$17.0 billion if opioid dependence is included and A\$56.7 billion and NZ\$12.0 billion if this is excluded.

The cost of comorbidities associated with premature death in those with serious mental illness is estimated to have been A\$45.4 billion and NZ\$6.2 billion, or A\$15.0 billion and NZ\$3.1 billion if opioid dependence is excluded.

There is a major challenge for health professionals, health agencies and the health system more broadly in addressing the causes of the premature mortality and a higher prevalence of chronic conditions among people with serious mental illness through the better diagnosis and treatment not only of mental illness but the physical comorbidities and risk factors that accompany it.

# References

- Abelson, P 2007, *Establishing a Monetary Value for Lives Saved: Issues and Controversies*, Working Papers in Cost Benefit Analysis WP 2008–2, Department of Finance and Deregulation, viewed 14 August 2015, <[https://www.dpmc.gov.au/sites/default/files/publications/Working\\_paper\\_2\\_Peter\\_Abelson.pdf](https://www.dpmc.gov.au/sites/default/files/publications/Working_paper_2_Peter_Abelson.pdf)>.
- ABS – see Australian Bureau of Statistics
- Access Economics 2002, *Schizophrenia: Costs, An Analysis of the Burden of Schizophrenia and Related Suicide in Australia*, SANE Australia, viewed 29 August 2015, <[www.aftercare.com.au/wp-content/uploads/2012/11/Schizophrenia-Costs.pdf](http://www.aftercare.com.au/wp-content/uploads/2012/11/Schizophrenia-Costs.pdf)>.
- American Psychiatry Association 2013, *Diagnostic and Statistical Manual of Mental Disorders*, 5th edn, American Psychiatric Association, Arlington, VA.
- Andrews, G, Hall, W, Goldstein, G, Lapsley, H, Bartles, R & Silove, D 1985, 'The economic costs of schizophrenia: Implications for public policy', *Archives of General Psychiatry*, vol. 42, no. 6, pp. 537–543.
- Andrews, G, Issakidis, C, Sanderson, K, Corry, J & Lapsley, H 2004, 'Utilising survey data to inform public policy: comparison of the cost-effectiveness of treatment of ten mental disorders', *The British Journal of Psychiatry*, 184(6), pp.526–533.
- Australian Bureau of Statistics 2008, *4326.0 – National Survey of Mental Health and Wellbeing: Summary of Results, 2007*, viewed 8 July 2015, <<http://www.abs.gov.au/ausstats/abs@.nsf/mf/4326.0>>.
- Australian Bureau of Statistics 2015, *3010.0 Australian Demographic Statistics, Dec 2014*, viewed 21 July 2015, <<http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3101.0Dec%202014?OpenDocument>>.
- Australian Institute of Health and Welfare 2008, *Australia's Health 2008*, Australian Institute of Health and Welfare, viewed 13 January 2015, <<http://www.aihw.gov.au/publication-detail?id=6442468102>>.
- Baxter AJ, Vos T, Scott, KM, Ferrari, AJ & Whiteford, HA 2014, 'The global burden of anxiety disorders in 2010', *Psychological Medicine*, viewed 8 September 2015, <<http://dx.doi.org/10.1017/S0033291713003243>>.
- Carr, V, Neil, A, Halpin, S, Holmes, S & Low Prevalence Disorders Study Group 2002, 'Costs of psychosis in urban Australia', *National Survey of Mental Health and Wellbeing Bulletin 2*, Commonwealth Department of Health and Ageing, Canberra.
- Charlson, FJ, Baxter, AJ, Dua, T, Degenhardt, L, Whiteford, HA & Vos, T 2014, 'Excess mortality from mental, neurological and substance use disorders in the Global Burden of Disease Study 2010', *Epidemiology and Psychiatric Sciences*, vol. 24, pp. 121–140.
- Crump, C, Winkleby, MA, Sundquist, K & Sundquist, J 2013, 'Comorbidities and mortality in persons with schizophrenia: A Swedish national cohort study', *American Journal of Psychiatry*, vol. 170, pp. 324–333.
- Cunningham, R, Sarfati, D, Peterson, D, Stanley, J, Collings, S 2014, 'Premature mortality in adults using New Zealand psychiatric services', *New Zealand Medical Journal*, 127(1394), pp. 31–41.
- De Hert, M, Dekker, JM, Wood, D, Kahl KG, Holt, RI & Möller, HJ 2009, 'Cardiovascular disease and diabetes in people with severe mental illness position statement from the European Psychiatric Association (EPA), supported by the European Association for the Study of Diabetes (EASD) and the European Society of Cardiology (ESC)', *European Psychiatry*, vol. 24, pp. 412–424.
- De Hert, M, Detraux, J, van Winkel, R, Yu, W & Correll, CU 2012, 'Metabolic and cardiovascular adverse effects associated with antipsychotic drugs', *Nature Reviews Endocrinology*, vol. 8, pp. 114–126.
- De Hert, M, Correll, CU & Cohen, D 2010, 'Do antipsychotic medications reduce or increase mortality in schizophrenia? A critical appraisal of the FIN-11 study', *Schizophrenia Research*, vol. 117, pp. 68–74.
- Deloitte Access Economics 2013, 'The Economic Impact of Stroke in Australia', National Stroke Foundation, viewed 15 August 2015, <<http://strokefoundation.com.au/site/media/Final-Deloitte-Stroke-Report-14-Mar-13.pdf>>.
- Ferrari, AJ, Sukanta S, McGrath. JJ, Norman, R, Baxter, AJ, Vos, T, & Whiteford, HA 2012, 'Health states for schizophrenia and bipolar disorder within the Global Burden of Disease 2010 Study', *Population Health Metrics*, 10:16.
- Fitzgerald, PB, Montgomery, W., de Castella. AR, Folia, KM, Folia, SL, Christova, L, Jackson, D & Kulkarni J 2007, 'Australian Schizophrenia Care and Assessment Programme: Real-world schizophrenia: economics', *Australian and New Zealand Journal of Psychiatry*, vol. 41, pp. 819–829.
- Gale, C, Wells, J, McGee, M & Oakley-Browne, M 2011, 'A latent class analysis of psychosis-like experiences in the New Zealand Mental Health Survey', *Acta Psychiatrica Scandinavica*, vol. 124, pp. 205–213.
- Hall, W, Goldstein, G, Andrews, G, Lapsley, H, Bartels, R & Silove D 1985, 'Estimating the economic costs of schizophrenia', *Schizophrenia Bulletin*, vol. 11, no. 4, pp. 598–611.
- Holt, H 2010, 'The Cost of Ill Health', New Zealand Treasury Working Paper 10/04, viewed 7 June 2015, <<http://www.treasury.govt.nz/publications/research-policy/wp/2010/10-04/twp10-04.pdf>>.
- IHME – see Institute for Health Metrics and Evaluation
- Institute for Health Metrics and Evaluation 2015a, *Global Burden of Disease Study 2010 (GBD 2010) Data Downloads*, Institute for Health Metrics and Evaluation, viewed 6 May 2015, <<http://ghdx.healthdata.org/global-burden-disease-study-2010-gbd-2010-data-downloads>>.
- Institute for Health Metrics and Evaluation 2015b, *Global Burden of Disease Study 2013 (GBD 2013) Incidence, Prevalence, and Years Lived with Disability 1990–2013*, Institute for Health Metrics and Evaluation, viewed 6 May 2015, <<http://ghdx.healthdata.org/record/global-burden-disease-study-2013-gbd-2013-incidence-prevalence-and-years-lived-disability>>.
- Kisely, S, Smith, M, Lawrence, D, Maaten, S (2005). Mortality in individuals who have had psychiatric treatment: population-based study in Nova Scotia. *British Journal of Psychiatry*. 187, pp552–558.
- Laursen, TM 2011, 'Life expectancy among persons with schizophrenia or bipolar affective disorder', *Schizophrenia Research*, vol. 131, pp. 101–104.
- Lawrence, D, Hancock, KJ & Kisely, S 2013, 'The gap in life expectancy from preventable physical illness in psychiatric patients in Western Australia: Retrospective analysis of population based registers', *BMJ*, vol. 346, viewed 26 May 2013, <<http://dx.doi.org/10.1136/bmj.f2539>>.
- McGrath, J, Saha, S, Chant, D & Welham J 2008, 'Schizophrenia: a concise overview of incidence, prevalence, and mortality', *Epidemiologic Reviews*, 1;30(1), pp. 67–76.

- Morgan VA, McGrath JJ, Jablensky A, Badcock JC, Waterreus A, Bush R, Carr V, Castle D, Cohen M, Galletly C, Harvey C, Hocking B, McGorry P, Neil AL, Saw S, Shah S, Stain HJ, Mackinnon A 2014, 'Psychosis prevalence and physical, metabolic and cognitive co-morbidity: Data from the second Australian national survey of psychosis', *Psychological Medicine*, vol. 44, no. 10, pp. 2163–2176.
- Morgan, VA, Waterreus, A, Jablensky, A, Mackinnon, A, McGrath, JJ, Carr, V, Bush, R, Castle, D, Cohen, M, Harvey, C, Galletly, C, Stain, HJ, Neil, AL, McGorry, P, Hocking, B, Shah, S & Saw S 2012, 'People living with psychotic illness in 2010: The second Australian national survey of psychosis', *Australian and New Zealand Journal of Psychiatry*, vol. 46, no. 8, pp. 735–752.
- Morgan, VA, Waterreus, A, Jablensky, A, Mackinnon, A, McGrath, JJ, Vaughan, C, Bush, R, Castle, D, Cohen, M, Harvey, C, Galletly, C, Stain, HJ, Neil, A, McGorry, P, Hocking, B, Shah, S & Saw, S 2011, *People Living with Psychotic Illness 2010: Report on the Second Australian National Survey*, Department of Health and Ageing, viewed 21 May 2015, <[https://www.health.gov.au/internet/main/publishing.nsf/Content/717137A2F9B9FCC2CA257BF0001C118F/\\$File/psych10.pdf](https://www.health.gov.au/internet/main/publishing.nsf/Content/717137A2F9B9FCC2CA257BF0001C118F/$File/psych10.pdf)>.
- Murray, CJL, Ezzati, M, Flaxman, AD, Lim S, Lozano, R, Michaud, C, Naghavi, M, Salomon, JA, Shibuya, K, Vos, T & Wikler, D 2012, 'GBD 2010: Design, definitions, and metrics', *The Lancet*, vol. 380, pp. 2063–2066.
- Murray, CJL & Lopez, AD 1996, *The Global Burden of Disease: A Comprehensive Assessment of Mortality and Disability from Diseases, Injuries, and Risk Factors in 1990 and Projected to 2020*, Harvard University Press on behalf of the World Health Organization and The World Bank, Cambridge, Mass.
- Naghavi, M, Wang, H, Lozano, R, Davis, A, Liang, X, Zhou, M, Vollset, SE, Ozgoren, AA, Abdalla, S, Abd-Allah, F & Aziz, MI 2015, 'Global, regional, and national age–sex specific all-cause and cause-specific mortality for 240 causes of death, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013', *Lancet* 2015; 385: pp. 117–71
- Neil, AL, Carr, VJ, Mihalopoulos, C, Mackinnon, A & Morgan VA 2014a, 'Costs of psychosis in 2010: Findings from the second Australian National Survey of Psychosis', *Australian and New Zealand Journal of Psychiatry*, vol. 48, no. 2, pp. 169–182.
- Neil, AL, Carr, VJ, Mihalopoulos, C, Mackinnon, A, Lewin, TJ & Morgan, VA 2014b, 'What difference a decade? The costs of psychosis in Australia in 2000 and 2010: Comparative results from the first and second Australian national surveys of psychosis', *Australian and New Zealand Journal of Psychiatry*, vol. 48, no. 3, pp. 237–248.
- New Zealand Ministry of Transport 2014, *Social Cost of Road Crashes and Injuries 2014: Update*, New Zealand Ministry of Transport, viewed 21 August 2015, <<http://www.transport.govt.nz/research/roadcrashstatistics/thesocialcostofroadcrashesandinjuries/>>.
- Oakley-Browne, MA, Joyce, PR, Wells, JE, Bushnell JA & Hornblow, AR 1989, 'Christchurch Psychiatric Epidemiology Study, Part II: Six month and other period prevalences of specific psychiatric disorders', *Australian and New Zealand Journal of Psychiatry*, vol. 23, pp. 327–340.
- Oakley-Browne, MA, Wells, JE & Scott, KM (eds). 2006, *Te Rau Hinengaro: The New Zealand Mental Health Survey*, New Zealand Ministry of Health, Wellington.
- OECD – see Organisation for Economic Co-operation and Development
- Organisation for Economic Co-operation and Development 2015, *Purchasing Power Parities (PPPs) Data*, viewed 8 September 2015, <<http://www.oecd.org/std/prices-ppp/purchasingpowerparitiespppsdata.htm>>.
- Office of Best Practice Regulation 2014, *Best Practice Regulation Guidance Note Value of Statistical Life*, Office of Best Practice Regulation, viewed 15 August 2015, <<http://www.dpmc.gov.au/office-best-practice-regulation/publication/best-practice-regulation-guidance-note-value-statistical-life>>.
- Parks, J, Svendsen, D, Singer, P, Foti, M & Mauer, B 2006, *Morbidity and Mortality in People with Serious Mental Illness*, National Association of State Mental Health Program Directors, viewed 27 May 2015, <<http://www.nasmhpd.org/content/morbidity-and-mortality-people-serious-mental-illness>>.
- PWC – see PricewaterhouseCoopers
- PricewaterhouseCoopers 2014, *Creating a Mentally Healthy Workplace Return on Investment Analysis*, PricewaterhouseCoopers.
- Ray, WA, Chung, CP, Murray, KT, Hall K & Stein, CM 2009, 'Atypical antipsychotic drugs and the risk of sudden cardiac death', *New England Journal of Medicine*, vol. 360, no. 3, pp. 225–235.
- Saha S, Chant D & McGrath J 2007, 'A systematic review of mortality in schizophrenia: is the differential mortality gap worsening over time?' *Archives of General Psychiatry*, 1;64(10), pp. 1123–1131.
- Schofield, DJ, Shrestha, RN, Percival, R, Passey, ME, Callander, EJ & Kelly, SJ 2011, 'The personal and national costs of mental health conditions: Impacts on income, taxes, government support payments due to lost labour force participation', *BMC Psychiatry*, vol. 11, pp. 72–79.
- Tiihonen, J, Lönnqvist, J, Wahlbeck, K, Klaukka, T, Niskanen, L, Tanskanen, A & Haukka, J 2009, '11-year follow-up of mortality in patients with schizophrenia: a population-based cohort study (FIN11 study)', *The Lancet*, vol. 374, pp. 620–627.
- Torniainen, M, Mittendorfer-Rutz, E, Tanskanen, A & Haukka, J 2014, 'Antipsychotic treatment and mortality in schizophrenia', *Schizophrenia Bulletin*, doi:10.1093/schbul/sbu164.
- Unützer, J, Schoenbaum, M, Katon, WJ, Fan, MY, Pincus, HA, Hogan, D & Taylor, J 2009, 'Healthcare costs associated with depression in medically ill fee-for-service Medicare participants', *Journal of the American Geriatrics Society*, 57(3), pp. 506–510.
- Von Korff, M, Scott, KM & Gureje, O (eds) 2009, *Global perspectives on mental-physical comorbidity in the WHO World Mental Health Surveys*, Cambridge University Press.
- Walker, ER, McGee, RE & Druss, BG 2015, 'Mortality in Mental Disorders and Global Disease Burden Implications: A systematic Review and Meta-analysis', *JAMA Psychiatry*, Vol. 72, No. 4, pp. 334–341.
- Weinmann, S, Read, J & Aderhold, V 2009, 'Influence of antipsychotics on mortality in schizophrenia: Systematic review', *Schizophrenia Research*, vol. 113, pp. 1–11.
- Whiteford, HA, Degenhardt, L, Rehm, J, Baxter, AJ, Ferrari, AJ, Erskine, HE, Charlson, FJ, Norman, RE, Flaxman, AD, Johns, N & Burstein, R 2013, 'Global burden of disease attributable to mental and substance use disorders: Findings from the Global Burden of Disease Study 2010', *The Lancet*, vol. 382, pp. 1575–1586.
- WHO – see World Health Organization
- World Health Organization 2015, *International Classification of Diseases*, viewed 3 April 2015, <<http://www.who.int/classifications/icd/en/>>.

# Appendix

Table A1 Serious mental illness estimates for Australia and New Zealand, GBD 2010

	Australia			New Zealand		
	Males	Females	Persons	Males	Females	Persons
<b>Schizophrenia</b>						
Deaths	18	26	44	2	3	5
YLL	299	308	607	50	52	102
YLD	29,127	24,418	53,545	5,749	5,032	10,781
DALYs	29,426	24,726	54,152	5,799	5,084	10,883
Prevalence	48,527	40,932	89,459	9,573	8,439	18,012
<b>Bipolar affective disorder</b>						
Deaths	0	0	0	0	0	0
YLL	0	0	0	0	0	0
YLD	18,860	21,809	40,669	3,733	4,531	8,264
DALYs	18,860	21,809	40,669	3,733	4,531	8,264
Prevalence	46,682	53,984	100,666	9,241	11,215	20,456
<b>Severe anxiety</b>						
Deaths	0	0	0	0	0	0
YLL	0	0	0	0	0	0
YLD	25,322	49,077	74,399	5,316	10,632	15,947
DALYs	25,322	49,077	74,399	5,316	10,632	15,947
Prevalence	48,417	93,838	142,255	10,164	20,328	30,492
<b>Severe depression</b>						
Deaths	0	0	0	0	0	0
YLL	0	0	0	0	0	0
YLD	18,248	31,242	49,490	5,454	9,668	15,122
DALYs	18,248	31,242	49,490	5,454	9,668	15,122
Prevalence	27,860	47,698	75,558	8,326	14,761	23,087
<b>Opioid dependence</b>						
Deaths	291	118	409	29	14	43
YLL	14,046	5,034	19,080	1,459	638	2,097
YLD	31,010	11,459	42,469	6,092	2,435	8,527
DALYs	45,055	16,493	61,548	7,551	3,073	10,625
Prevalence	48,377	17,877	66,254	9,504	3,799	13,303
<b>SMI with opioid</b>						
Deaths	309	144	453	31	17	48
YLL	14,345	5,342	19,687	1,509	690	2,199
YLD	122,567	138,006	260,573	26,344	32,298	58,642
DALYs	136,911	143,348	280,259	27,853	32,988	60,842
Prevalence	219,863	254,329	474,192	46,808	58,542	105,350
<b>SMI without opioid</b>						
Deaths	18	26	44	2	3	5
YLL	299	308	607	50	52	102
YLD	91,557	126,547	218,104	20,252	29,863	50,115
DALYs	91,856	126,855	218,711	20,302	29,915	50,217
Prevalence	171,486	236,452	407,938	37,304	54,743	92,047

Source: IHME 2015a; Dr A Ferrari, personal communication; study estimates

Table A2 Revised serious mental illness estimates for Australia and New Zealand, GBD 2010

	Australia			New Zealand		
	Males	Females	Persons	Males	Females	Persons
<b>Schizophrenia</b>						
Deaths	637	920	1,557	71	106	177
YLL	10,581	10,898	21,479	1,775	1,837	3,612
YLD	29,127	24,418	53,545	5,749	5,032	10,781
DALYs	39,708	35,316	75,024	7,524	6,869	14,393
Prevalence	48,527	40,932	89,459	9,573	8,439	18,012
<b>Bipolar affective disorder</b>						
Deaths	0	0	0	0	0	0
YLL	0	0	0	0	0	0
YLD	18,860	21,809	40,669	3,733	4,531	8,264
DALYs	25,461	29,443	54,904	5,040	6,117	11,157
Prevalence	46,682	53,984	100,666	9,241	11,215	20,456
<b>Severe anxiety</b>						
Deaths	0	0	0	0	0	0
YLL	0	0	0	0	0	0
YLD	25,322	49,077	74,399	5,316	10,632	15,948
DALYs	34,185	66,254	100,439	7,176	14,353	21,529
Prevalence	48,417	93,838	142,255	10,164	20,328	30,492
<b>Severe depression</b>						
Deaths	0	0	0	0	0	0
YLL	0	0	0	0	0	0
YLD	18,248	31,242	49,490	5,454	9,668	15,122
DALYs	24,635	42,177	66,812	7,362	13,052	20,414
Prevalence	27,860	47,698	75,558	8,326	14,761	23,087
<b>Opioid dependence</b>						
Deaths	2,732	1,108	3,840	274	129	403
YLL	131,868	47,268	179,136	13,785	5,879	19,664
YLD	31,010	11,459	42,469	6,092	2,435	8,527
DALYs	162,878	58,727	221,605	19,877	8,314	28,191
Prevalence	48,377	17,877	66,254	9,504	3,799	13,303
<b>SMI with opioid</b>						
Deaths	0	0	0	0	0	0
YLL	0	0	0	0	0	0
YLD	122,567	138,006	260,573	26,344	32,298	58,642
DALYs	286,867	231,918	518,785	46,980	48,705	95,685
Prevalence	219,863	254,329	474,192	46,808	58,542	105,350
<b>SMI without opioid</b>						
Deaths	0	0	0	0	0	0
YLL	0	0	0	0	0	0
YLD	91,557	126,547	218,104	20,252	29,863	50,115
DALYs	123,989	173,190	297,179	27,103	40,391	67,494
Prevalence	171,486	236,452	407,938	37,304	54,743	92,047

Source: IHME 2015a; Dr A Ferrari, personal communication; study estimates

Table A3 Life expectancy psychiatric patients, Western Australia, 1985, 1995, 2005

	Life expectancy			Difference		
	1985	1995	2005	1985	1995	2005
<b>Males</b>						
Average life expectancy	73.1	75.4	79.1	–	–	–
Alcohol or drug disorders	52.7	52.5	57.4	20.4	22.9	21.7
Schizophrenia	58.6	60.0	62.7	14.5	15.4	16.4
Affective psychosis	64.0	65.1	64.9	9.1	10.3	14.2
Other psychoses	58.3	53.4	56.3	14.8	22.0	22.8
Neurotic disorders	63.5	68.1	66.7	9.6	7.3	12.4
Stress or adjustment reaction	65.8	65.9	65.9	7.3	9.5	13.2
Depressive disorder	60.7	62.0	63.8	12.4	13.4	15.3
Other mental disorder	62.5	68.8	65.7	10.6	6.6	13.4
All mental disorders	59.6	60.8	63.2	13.5	14.6	15.9
<b>Females</b>						
Average life expectancy	79.3	81.4	83.8	–	–	–
Alcohol or drug disorders	55.4	57.3	63.1	23.9	24.1	20.7
Schizophrenia	66.5	69.5	71.3	12.8	11.9	12.5
Affective psychosis	72.1	73.3	73.9	7.2	8.1	9.9
Other psychoses	65.2	58.9	61.2	14.1	22.5	22.6
Neurotic disorders	71.0	76.7	74.1	8.3	4.7	9.7
Stress or adjustment reaction	79.5	80.4	74.5	-0.2	1.0	9.3
Depressive disorder	69.1	72.7	71.3	10.2	8.7	12.5
Other mental disorder	67.7	70.1	71.7	11.6	11.3	12.1
All mental disorders	68.9	70.9	71.8	10.4	10.5	12.0

Source: Lawrence, Hancock and Kisely 2013.

Table A4 Excess deaths in psychiatric patients by cause of death, Western Australia

	All disorders	Schizophrenia	Affective psychosis	Other psychoses
	%	%	%	%
<b>Males</b>				
Ischaemic heart disease	14.4	16.2	16.0	13.4
Cerebrovascular disease	5.7	6.5	2.2	11.0
Other heart disease	6.1	9.1	3.0	8.1
Malignant neoplasms	13.6	8.9	1.7	17.9
Chronic obstructive pulmonary disease	6.4	5.8	5.8	5.4
Influenza and pneumonia	3.6	4.3	3.3	5.0
Diabetes mellitus	1.9	3.3	3.2	2.7
HIV	0.3	0.3	0.2	0.4
Chronic liver disease or cirrhosis	5.3	1.1	0.0	3.3
Kidney disease	0.9	1.3	0.3	1.5
Dementia	0.5	1.2	0.3	1.6
Alzheimer's disease	0.4	1.9	0.0	1.1
Other causes	15.3	11.8	10.2	17.4
Suicide	16.6	19.8	46.4	5.3
Homicide	0.6	0.4	0.4	0.2
Complications of medical/surgical care	0.2	0.5	0.5	0.1
Other accident or injury	8.1	7.5	6.5	5.4
<b>Females</b>				
Ischaemic heart disease	16.9	18.2	14.4	17.0
Cerebrovascular disease	11.3	18.3	7.3	16.6
Other heart disease	7.1	9.8	4.6	7.0
Malignant neoplasms	13.3	7.1	5.2	16.9
Chronic obstructive pulmonary disease	6.5	5.6	9.1	5.7
Influenza and pneumonia	2.5	3.0	2.6	3.7
Diabetes mellitus	2.7	4.0	1.8	2.9
HIV	0.0	0.0	0.0	0.0
Chronic liver disease or cirrhosis	3.2	0.8	0.0	1.5
Kidney disease	1.8	2.2	1.4	2.6
Dementia	1.0	3.5	0.2	2.0
Alzheimer's disease	0.7	3.3	0.2	1.1
Other causes	15.1	11.0	15.8	15.7
Suicide	10.1	7.1	27.4	2.9
Homicide	0.4	0.2	0.1	0.0
Complications of medical/surgical care	0.3	0.1	0.3	0.2
Other accident or injury	7.0	5.7	9.5	4.0

Source: Lawrence, Hancock and Kisely 2013.

Table A5 Lifetime and 12-month prevalence of mental disorders, Australia, 2007

	Lifetime prevalence			12-month prevalence		
	Males %	Females %	Persons %	Males %	Females %	Persons %
Any mental disorder	48.1	43.0	45.5	17.6	22.3	20.0
<b>Anxiety disorders</b>						
Panic disorder	4.6	5.8	5.2	2.3	2.8	2.6
Agoraphobia	4.1	7.9	6.0	2.1	3.5	2.8
Social phobia	8.4	12.8	10.6	3.8	5.7	4.7
Generalised anxiety disorder	4.4	7.3	5.9	2.0	3.5	2.7
Obsessive-compulsive disorder	2.3	3.2	2.8	1.6	2.2	1.9
Post-traumatic stress disorder	8.6	15.8	12.2	4.6	8.3	6.4
Any anxiety disorder	20.4	32.0	26.3	10.8	17.9	14.4
<b>Affective disorders</b>						
Depressive episode	8.8	14.5	11.6	3.1	5.1	4.1
Dysthymia	1.5	2.4	1.9	1.0	1.5	1.3
Bipolar affective disorder	3.0	2.7	2.9	1.8	1.7	1.8
Any affective disorder	12.2	17.8	15.0	5.3	7.1	6.2
<b>Substance-use disorders</b>						
Alcohol harmful use	28.1	9.8	18.9	3.8	2.1	2.9
Alcohol dependence	5.2	2.4	3.8	2.2	0.7	1.4
Drug-use disorders	10.2	4.8	7.5	2.1	0.8	1.4
Any substance-use disorder	35.4	14.2	24.7	7.0	3.3	5.1

Source: ABS 2008.

Table A6 12-month prevalence of mental disorders, per 100,000 persons, New Zealand, 2004

	16–24	25–44	45–64	65+	Males	Females	Persons
<b>Anxiety disorders</b>							
Panic disorder	2.4	2.1	1.2	0.6	1.3	2.0	1.7
Agoraphobia without panic	0.7	0.8	0.6	0.2	0.4	0.8	0.6
Specific phobia	9.3	8.3	6.9	3.2	4.3	10.1	7.3
Social phobia	7.0	6.3	4.2	1.4	4.5	5.6	5.1
Generalised anxiety disorder	1.6	2.8	1.8	1.0	1.4	2.6	2.0
Post-traumatic stress disorder	2.4	3.5	3.2	1.7	1.6	4.2	3.0
Obsessive–compulsive disorder	1.5	0.8	0.2	0.1	0.7	0.5	0.6
Any anxiety disorder	17.7	18.2	13.2	6.0	10.7	18.6	14.8
<b>Mood disorders</b>							
Major depressive disorder	8.7	6.3	5.2	1.7	4.2	7.1	5.7
Dysthymia	1.5	1.2	1.2	0.4	1.0	1.3	1.1
Bipolar disorder	3.9	2.8	1.4	0.2	2.1	2.3	2.2
Any mood disorder	12.7	9.2	6.8	2.0	6.3	9.5	8.0
<b>Substance-use disorders</b>							
Alcohol abuse	7.1	3.2	0.8	<0.1	3.7	1.6	2.6
Alcohol dependence	3.0	1.7	0.4	<0.1	1.7	0.9	1.3
Drug abuse	3.8	1.2	0.2	<0.1	1.6	0.8	1.2
Drug dependence	2.1	0.9	0.1	<0.1	1.1	0.4	0.7
Marijuana abuse	3.2	0.9	0.2	<0.1	1.3	0.6	0.9
Marijuana dependence	1.5	0.6	<0.1	<0.1	0.8	0.2	0.5
Any substance-use disorder	9.6	4.2	1.2	<0.1	5.0	2.2	3.5
<b>Eating disorders</b>							
Any eating disorder	0.6	0.7	0.3	0.1	0.3	0.6	0.5
Any disorder	28.6	25.1	17.4	7.1	17.1	24.0	20.7

Source: Oakley-Browne, Wells and Scott 2006.

Table A7 Comorbidities, anxiety disorders, Australia, 2007

	Numbers			Proportions		
	Males '000	Females '000	Persons '000	Males %	Females %	Persons %
Anxiety only	252.0	345.5	597.4	29.3	24.0	25.9
Anxiety and affective only	78.7	98.1	176.8	9.1	6.8	7.7
Anxiety and substance use only	50.7	16.7	67.4	5.9	1.2	2.9
Anxiety, affective and substance use only	23.2	15.8	39.0	2.7	1.1	1.7
Anxiety and physical only	284.1	673.3	957.5	33.0	46.7	41.6
Anxiety, affective and physical only	79.0	217.3	296.3	9.2	15.1	12.9
Anxiety, substance use and physical only	49.6	46.4	96.0	5.8	3.2	4.2
Anxiety, affective, substance use and physical	43.4	29.2	72.6	5.0	2.0	3.2
<b>All with anxiety</b>	<b>860.7</b>	<b>1,442.3</b>	<b>2,303.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
Anxiety with any affective disorder	224.3	360.4	584.7	26.1	25.0	25.4
Anxiety with physical	456.1	966.2	1,422.4	53.0	67.0	61.8

Source: ABS 2008.

Table A8 Comorbidities, affective disorders, Australia, 2007

	Numbers			Proportions		
	Males '000	Females '000	Persons '000	Males %	Females %	Persons %
Affective only	62.4	68.4	130.8	14.8	11.9	13.1
Anxiety and affective only	78.7	98.1	176.8	18.7	17.0	17.7
Affective and substance use only	8.7	0.0	8.7	2.1	0.0	0.9
Anxiety, affective and substance use only	23.2	15.8	39.0	5.5	2.7	3.9
Affective and physical only	87.5	131.7	219.2	20.7	22.8	21.9
Anxiety, affective and physical only	79.0	217.3	296.3	18.7	37.7	29.7
Affective, substance use and physical only	38.8	16.6	55.5	9.2	2.9	5.6
Anxiety, affective, substance use and physical	43.4	29.2	72.6	10.3	5.1	7.3
<b>All with affective</b>	<b>421.7</b>	<b>577.1</b>	<b>998.9</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
Anxiety with any affective disorder	224.3	360.4	584.7	53.2	62.5	58.5
Anxiety with physical	248.7	394.8	643.6	59.0	68.4	64.4

Source: ABS 2008.

Table A9 Comorbidities, mental disorders, New Zealand, 2004

	Chronic pain	Cardiovascular disease	Respiratory conditions	Diabetes	Cancer
	'000	'000	'000	'000	'000
<b>Any anxiety disorder</b>					
Males	51.7	12.7	23.4	7.2	6.5
Females	55.6	9.8	23.5	4.0	7.1
<b>Total</b>	<b>53.0</b>	<b>10.8</b>	<b>22.9</b>	<b>5.3</b>	<b>6.6</b>
<b>Any mood disorder</b>					
Males	47.5	6.3	22.1	3.4	6.7
Females	57.5	11.8	27.7	6.1	6.5
<b>Total</b>	<b>52.7</b>	<b>10.1</b>	<b>25.1</b>	<b>5.4</b>	<b>6.3</b>
<b>Any mental disorder</b>					
Males	49.1	10.7	20.6	5.9	5.1
Females	55.1	9.9	25.2	4.4	6.5
<b>Total</b>	<b>51.9</b>	<b>10.2</b>	<b>23.0</b>	<b>5.1</b>	<b>5.8</b>
<b>No mental disorder</b>					
Males	30.0	7.8	14.8	4.7	4.8
Females	39.8	7.3	18.3	3.3	6.6
<b>Total</b>	<b>35.1</b>	<b>7.5</b>	<b>16.7</b>	<b>4.0</b>	<b>5.8</b>

Source: Oakley-Browne, Wells and Scott 2006.

Table A10 Comorbidities, risk factors, New Zealand, 2004

	Smoking	Overweight	High blood pressure	Alcohol
	'000	'000	'000	'000
<b>Any anxiety disorder</b>				
Males	28.7	58.9	16.2	37.0
Females	30.6	52.4	15.6	17.7
<b>Total</b>	<b>30.4</b>	<b>56.5</b>	<b>15.7</b>	<b>27.4</b>
<b>Any mood disorder</b>				
Males	34.9	54.6	12.2	39.5
Females	32.9	47.8	15.7	21.5
<b>Total</b>	<b>34.0</b>	<b>51.7</b>	<b>14.4</b>	<b>30.7</b>
<b>Any mental disorder</b>				
Males	32.8	58.4	14.3	46.6
Females	31.4	51.2	15.5	19.5
<b>Total</b>	<b>32.3</b>	<b>55.2</b>	<b>15.0</b>	<b>32.5</b>
<b>No mental disorder</b>				
Males	22.4	59.1	12.3	24.0
Females	19.1	43.4	12.6	9.3
<b>Total</b>	<b>20.7</b>	<b>50.9</b>	<b>12.5</b>	<b>16.5</b>

Source: Oakley-Browne, Wells and Scott 2006.

Table A11 Risk factors for cardiovascular disease and diabetes in people with psychosis, Australia, 2010

	Schizophrenia	Schizo-affective disorder	Bipolar disorder with psychosis	Depressive psychosis	Delusional and other nonorganic psychoses	Any psychosis
	%	%	%	%	%	%
Metabolic syndrome	58.3	63.3	67.4	52.4	62.2	60.8
Reduced high density lipoprotein levels	58.0	59.4	58.1	48.4	64.9	58.1
Elevated triglyceride levels	56.0	54.9	56.0	50.3	55.9	55.5
Elevated glucose levels	35.7	37.4	35.6	31.6	28.2	35.3
Elevated blood pressure	51.7	53.5	59.6	52.4	64.4	54.4
Current smoking	67.0	70.3	59.3	55.8	73.8	65.9
Overweight/obese	75.0	78.1	79.1	77.8	74.8	76.4
Low/very low level of physical activity	96.0	95.1	96.1	98.0	96.2	96.0

Source: Morgan et al. 2014.

Table A12 Combined 12-month prevalence of psychosis, per 1,000 persons, Australia

		1 month			12 month	
		Public	NGO	Combined	Public	Combined
Males	18–24	2.5	0.3	2.8	4.0	4.5
	25–34	5.2	0.5	5.7	7.4	8.1
	35–44	4.7	0.7	5.4	7.1	8.2
	45–54	3.7	0.8	4.5	5.2	6.3
	55–64	1.8	0.5	2.3	2.6	3.3
	18–64	3.7	0.6	4.3	5.4	6.3
Females	18–24	1.6	0.1	1.7	2.3	2.4
	25–34	2.6	0.2	2.8	3.8	4.1
	35–44	2.8	0.4	3.2	3.9	4.5
	45–54	2.7	0.5	3.2	3.8	4.5
	55–64	2.2	0.2	2.4	3.2	3.5
	18–64	2.4	0.3	2.7	3.5	3.9
Persons	18–24	2.0	0.2	2.2	3.1	3.4
	25–34	3.9	0.4	4.3	5.6	6.2
	35–44	3.8	0.5	4.3	5.6	6.3
	45–54	3.2	0.6	3.8	4.5	5.3
	55–64	2.0	0.4	2.4	2.9	3.5
	18–64	3.1	0.4	3.5	4.5	5.1

Source: Morgan et al. 2011.

Table A13 Estimates of 12-month prevalence of psychosis, 2010 and 2014, Australia

		Prevalence	Population		No. of people affected	
		per 1,000	2010	2014	2010	2014
Males	18–24	4.5	1,131,093	1,160,843	5,067	5,201
	25–34	8.1	1,575,945	1,743,161	12,783	14,140
	35–44	8.2	1,557,161	1,605,221	12,702	13,095
	45–54	6.3	1,494,321	1,535,403	9,451	9,710
	55–64	3.3	1,245,815	1,327,173	4,139	4,409
	18–64	6.3	7,004,335	7,371,801	43,957	46,263
Females	18–24	2.4	1,073,363	1,102,964	2,623	2,695
	25–34	4.1	1,549,508	1,720,280	6,341	7,040
	35–44	4.5	1,580,487	1,622,871	7,044	7,233
	45–54	4.5	1,521,066	1,567,567	6,850	7,060
	55–64	3.5	1,256,972	1,362,616	4,388	4,757
	18–64	3.9	6,981,396	7,376,298	27,489	29,044
Persons	18–24	3.4	2,204,456	2,263,807	7,517	7,720
	25–34	6.2	3,125,453	3,463,441	19,298	21,385
	35–44	6.3	3,137,648	3,228,092	19,883	20,456
	45–54	5.3	3,015,387	3,102,970	16,113	16,581
	55–64	3.5	2,502,787	2,689,789	8,710	9,360
	18–64	5.1	13,985,731	14,748,099	71,057	74,930

Source: Morgan et al. 2011, study estimates.

Table A14 Estimates of prevalence of ICD-10 psychotic disorders, Australia, 2010

ICD-10 diagnosis	Distribution %	2010	2014
Schizophrenia	47.0	33,397	35,217
Schizoaffective disorder	16.1	11,440	12,064
Bipolar, mania	17.5	12,435	13,113
Depressive psychosis	4.4	3,126	3,297
Delusional and other non-organic psychoses	5.0	3,553	3,746
Severe depression	8.7	6,182	6,519
Other	1.4	924	974
<b>All psychotic disorders</b>	<b>100.0</b>	<b>71,057</b>	<b>74,930</b>

Source: Morgan et al. 2011, study estimates.

Table A15 Annual costs of psychosis in Australia, 2010 and 2014

	Government		Societal		Government		Societal	
	Average cost 2010	Total cost 2010	Average cost 2010	Total cost 2010	Average cost 2014	Total cost 2014	Average cost 2014	Total cost 2014
<b>Professionals</b>	265	16,837	329	20,874	346	23,178	418	28,014
Mental health Ambulatory	8,758	556,467	8,767	557,014	9,490	635,813	9,499	636,404
Other hospital	9,883	610,495	10,266	634,613	14,228	926,774	14,582	950,544
Pharmaceuticals	2,214	140,694	2,352	149,412	1,107	74,181	1,180	79,048
<b>Subtotal</b>	<b>21,121</b>	<b>1,341,915</b>	<b>21,714</b>	<b>1,379,532</b>	<b>25,172</b>	<b>1,659,946</b>	<b>25,671</b>	<b>1,694,010</b>
<b>Other sectors</b>	1,818	115,476	3,084	195,921	2,009	134,608	3,409	228,381
NGOs								
Other supports	8,635	548,609	11,198	711,433	9,990	669,295	13,006	871,319
Legal costs	361	22,918	361	22,918	415	27,787	415	27,787
<b>Subtotal</b>	<b>10,813</b>	<b>687,003</b>	<b>14,642</b>	<b>930,272</b>	<b>12,414</b>	<b>831,690</b>	<b>16,829</b>	<b>1,127,487</b>
<b>Time loss costs</b>								
Transfer payments	14,798	940,179	n.a.	n.a.	10,240	686,016	n.a.	n.a.
Tax foregone	8,670	550,837	n.a.	n.a.	10,171	681,387	n.a.	n.a.
Productivity losses	n.a.	n.a.	40,941	2,601,107	n.a.	n.a.	50,538	3,385,813
<b>Subtotal</b>	<b>23,468</b>	<b>1,491,016</b>	<b>40,941</b>	<b>2,601,107</b>	<b>20,410</b>	<b>1,367,404</b>	<b>50,538</b>	<b>3,385,813</b>
<b>Total</b>	<b>55,403</b>	<b>3,519,934</b>	<b>77,297</b>	<b>4,910,911</b>	<b>57,996</b>	<b>3,859,040</b>	<b>93,038</b>	<b>6,207,310</b>

Source: Neil et al. 2014a, study estimates.

Table A16 Combined 12-month prevalence of psychosis, per 100,000 persons, NZ

		Prevalence	Population		Prevalence	
			2010	2014	2010	2014
Males	18–24	4.5	215,630	232,620	966	1,042
	25–34	8.1	262,360	276,850	2,128	2,246
	35–44	8.2	294,880	278,810	2,405	2,274
	45–54	6.3	299,400	302,880	1,894	1,916
	55–64	3.3	237,570	255,340	789	848
	18–64	6.3	1,309,840	1,346,500	8,220	8,450
Females	18–24	2.4	213,200	221,270	521	541
	25–34	4.1	280,450	292,030	1,148	1,195
	35–44	4.5	324,390	307,840	1,446	1,372
	45–54	4.5	316,830	325,840	1,427	1,467
	55–64	3.5	246,310	269,420	860	941
	18–64	3.9	1,381,180	1,416,400	5,438	5,577
Persons	18–24	3.4	428,830	453,890	1,462	1,548
	25–34	6.2	542,810	568,880	3,352	3,512
	35–44	6.3	619,270	586,650	3,924	3,718
	45–54	5.3	616,230	628,720	3,293	3,360
	55–64	3.5	483,880	524,760	1,684	1,826
	18–64	5.1	2,691,020	2,762,900	13,672	14,037

Source: Study estimates.

Table A17 Annual costs of psychosis in New Zealand, 2010 and 2014

	Government		Societal		Government		Societal	
	Average cost 2010	Total cost 2010	Average cost 2010	Total cost 2010	Average cost 2014	Total cost 2014	Average cost 2014	Total cost 2014
<b>Professionals</b>	259	3,536	321	4,384	339	4,764	410	5,758
Mental health Ambulatory	8,548	116,865	8,556	116,979	9,310	130,683	9,319	130,805
Other hospital	9,645	131,870	10,019	136,976	13,958	195,922	14,305	200,796
Pharmaceuticals	2,161	29,547	2,295	31,378	1,086	15,247	1,157	16,247
<b>Subtotal</b>	<b>20,613</b>	<b>281,818</b>	<b>21,191</b>	<b>289,718</b>	<b>24,693</b>	<b>346,616</b>	<b>25,183</b>	<b>353,606</b>
<b>Other sectors</b>								
NGOs	1,774	24,251	3,009	41,146	1,971	27,667	3,344	46,941
Other supports	8,427	115,214	10,928	149,409	9,800	137,565	12,758	179,088
Legal costs	352	4,813	352	4,813	407	5,711	407	5,711
<b>Subtotal</b>	<b>10,553</b>	<b>144,278</b>	<b>14,290</b>	<b>195,368</b>	<b>12,178</b>	<b>170,943</b>	<b>16,509</b>	<b>231,740</b>
<b>Time loss costs</b>								
Transfer payments	14,442	197,448	n.a.	n.a.	10,045	141,002	n.a.	n.a.
Tax foregone	8,461	115,682	n.a.	n.a.	9,977	140,051	n.a.	n.a.
Productivity losses	n.a.	n.a.	39,955	546,262	n.a.	n.a.	49,577	695,909
<b>Subtotal</b>	<b>22,903</b>	<b>313,131</b>	<b>39,955</b>	<b>546,262</b>	<b>20,022</b>	<b>281,053</b>	<b>49,577</b>	<b>695,909</b>
<b>Total</b>	<b>54,068</b>	<b>739,227</b>	<b>75,435</b>	<b>1,031,348</b>	<b>56,893</b>	<b>798,612</b>	<b>91,269</b>	<b>1,281,255</b>

Source: Neil et al. 2014a, study estimates.





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