The physical health of people living with a mental illness:

A narrative literature review

Russell ROBERTS PhD
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<td>Australian Bureau of Statistics</td>
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Consumer, service user or people with lived experience?

We acknowledge the wide range of terms such as service user, service recipient, consumer, patient, client, and person with lived experience. These terms reflect local contexts, historical moments, political influences and preferences. In alignment with the Equally Well National Consensus Statement, the term ‘people living with mental illness’ has mostly been used throughout this review. However, there are occasions where the term consumer, patient or other terms are used to accurately reflect the precise nature of the population group as defined and described in the particular research study cited. We also acknowledge the critique and limitations of all terms, including people living with mental illness, and that this is a contested area.
Introduction

“The fact that people with serious mental illness die an average of 20 years earlier than the rest of the population, the majority from preventable causes, is one of the biggest health scandals of our time, yet it is very rarely talked about.”

Professor Sue Bailey

Interest and research into the physical health of people living with mental illness are growing exponentially. By 2013 there were more than 20,000 publications on mental disorders and cardiovascular disease. This included studies into premature death, poor health and coexisting mortality-related physical conditions. There is an overwhelming body of evidence demonstrating the poor health outcomes for people living with mental illness.

Figure 1: Number of articles published on mortality and physical health of people living with mental illness

This review builds on and updates a rapid review written for a national consensus building workshop held in November 2015, on the physical health of people living with mental illness. As a narrative review, this document focuses on the research relating to mortality rates, poor health, risk factors for poor health and the effectiveness of various interventions. It aims to provide a bibliographic resource for consumers, carers and health professionals based on a comprehensive review of the literature across each of these areas. The review summarises the research in the following areas:

I. Premature mortality of people living with mental illness*
II. The poor physical health of people living with mental illness
III. The major risk factors of poor health and early death and research into effective interventions
IV. Research on the challenges and effective models of care and support
V. Future directions for research and action.

* Various terms describing the risk of premature death and the gap in life expectancy are used throughout this document, such as ‘years life lost’, ‘risk rate’, ‘lost life years’ and ‘standardised mortality rate’. As these terms usually reflect different calculation methods, to maintain the integrity of their meaning the terms used in this document are taken from the study being cited and discussed.
Premature mortality of people living with mental illness

Studies in Australia, the United States of America (USA) and other developed nations show that life expectancy is shortened by up to 30% for clients of public mental health services compared to the general population (Figure 2).3-7 This equates to a life expectancy of between 50-59 years.4,8 There is evidence that this gap is widening9,10 and is worse for men than women.11 Suicide accounts for some of these premature deaths, but between 80% and 94% of the causes of early death relate to physical illnesses such as cardiovascular disease, respiratory illnesses, diabetes and cancer.9,11-13 The most common causes of premature death for people who accessed mental health-related MBS/PBS treatments are ischaemic heart disease and lung cancer. Intentional self-harm is the fifth most common cause of death for people aged between 15 and 75 years who accessed mental health-related treatments.13

People with a severe mental illness are:

- Six times more likely to die from cardiovascular disease14-16
- Four times more likely to die from respiratory disease14,17-19
- Three to four times more likely to die prematurely20-22
- Two to four times more likely to die from infectious diseases23,24
- Likely to die 20 years earlier than the general population20,21 and account for approximately one-third of all avoidable deaths.1

Figure 2: Risk of premature death13,25,26

Methodological issues
Reporting a headline figure of the life expectancy gap for people living with mental illness and the general population presents a challenge. Reported mortality gaps have varied from 1.3 years20 to 32 years6 of potential life lost. The reported mortality gap can vary for many reasons. It can reflect the different formulas used to calculate premature mortality, different study cohorts (age, diagnosis and severity), different study methods, different outcome measures, and different operationalisations of psychiatric diagnoses. (A fuller discussion of these issues appears in Appendix 1.) The life expectancy gap figures can also vary due to the quality of the health and mental health system in different countries.4,24 Bearing the above in mind, the following text summarises findings from systematic reviews, meta-analyses, pooled analyses and major prospective and retrospective population studies relating to premature death and poor health associated with mental illness.
The gap in life expectancy

Schizophrenia is the mental illness most commonly associated with risk of premature death in research studies.\textsuperscript{26-28} However, more recently research has also focussed on severe mental illness, bipolar disorder, depression, anxiety and other mental health disorders. Cardiovascular disease is the leading cause of death for people with schizophrenia.

Schizophrenia

The research findings on the premature death rates of people living with schizophrenia vary based on the age of the cohort, length of follow-up and the type of study.\textsuperscript{29} McGrath et al.’s concise overview of three systematic reviews identified 37 core studies of mortality of people living with schizophrenia.\textsuperscript{30} The review found a standardised mortality ratio of 2.6 for people living with schizophrenia. The three highest standardised mortality rates were found for infectious diseases, nervous diseases, and respiratory diseases (standardised mortality ratios of 4.3, 4.2 and 3.2 respectively). The analysis found the standardised mortality ratios in developed countries to be 2.8 and in developing countries to be 2.0.\textsuperscript{30} This may reflect the higher standards of general health care in developed countries. As discussed later, it appears sound health systems seem to help the general population much more than they help people living with mental illness.

Saha, Chant and McGrath found the mortality rate had increased during recent decades,\textsuperscript{9} and their analysis of the same data set showed standardised mortality ratios for the 1970s, 1980s and 1990s were 1.8, 3.0 and 3.2 respectively, increasing for every decade of the analysis.\textsuperscript{24} This data is also consistent with the finding that advances in health care have not significantly benefitted people living with mental illness.

Bushe et al.’s review of 101 studies published between 2006 and 2010 found an increased mortality risk in people living with schizophrenia and a substantial (decades) mortality gap.\textsuperscript{29} The major natural causes of death were cardiovascular disease, respiratory disease and cancer. This review revealed the percentage of reported deaths across studies due to cardiovascular disease ranged from 12% to 49%, and death due to cancer ranged from 7% to 21%.

A cohort study of 1.1 million US Medicaid users with schizophrenia, showed 74,003 deaths between 2001 and 2007 and reported 28.5 years of potential life lost for people living with schizophrenia.\textsuperscript{31} The study found the mean potential years life lost from natural causes (deaths that are not suicide, homicide and accidents) to be 27. Cardiovascular disease accounted for a third of all natural deaths and was associated with 27 years life lost. Cancer accounted for one in six natural deaths, with rates higher for men than women, and was associated with 26 years life lost. Chronic obstructive pulmonary disease (COPD), influenza/pneumonia and diabetes mellitus had the highest standardised mortality ratios of 9.9, 7 and 4.2 respectively. Interestingly, the analysis of the data by age (20-34, 35-54, and 55-64 years) showed very different patterns of age-related risk\textsuperscript{31} (Figure 3). For each of the top three major risks for early death, a different age group had the highest risk. This highlights the importance of research providing a detailed analysis to inform clinical care. Overall, this study found non-elderly adults in this cohort died at 3.5 times the rate of the general population.\textsuperscript{31} This is higher than many earlier studies, but consistent with the trend of studies in recent decades. Tran et al.’s study of adult patients with schizophrenia between 1993 and 2005 in France found a similar standardised mortality ratio of 3.6 for men and 4.3 for women.\textsuperscript{32}
The relative risk ratio reported by Walker et al. for people living with psychosis was 2.5. 33 Hayes et al., in their 15-year United Kingdom (UK) cohort study of 22,000 people living with schizophrenia, reported an adjusted hazard ratio for people living with schizophrenia of 2.1. 34 Chesney, Goodman and Fazel’s meta-review found that years lost of life expectancy for people living with schizophrenia ranged from an average of 12 to 18. However, for the subgroups of men and women, the years life lost ranged between 9 and 22. 35 Walker et al. noted that people living with schizophrenia have the same risk of early mortality as heavy smokers. 33

The research findings consistently show increased premature mortality rates and risk ratios for people living with schizophrenia. They also draw attention to:

- The different risk across age groups for certain specific physical illnesses
- The interaction of risk across age group and physical condition (Figure 3)
- The implications of these risk profiles and for policy and practice.

Severe mental illness

Research has consistently highlighted the deleterious effect of severe mental illness on longevity. The Royal Australian and New Zealand College of Psychiatrists’ (RANZCP) report defines severe mental illness as “that which 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 that has resulted in functional impairment which substantially interferes with or limits one or more major life activities”. 14 It then cites studies reporting 30% shorter life expectancy and a 12-year mortality gap for people living with severe mental illness. A review conducted by Rethink mental illness in the UK stated that “people with serious mental illness like schizophrenia die, on average, 20 years earlier than the rest of the population”. 1 Chang et al. found an average of 14 years potential life lost for clients of UK mental health services who were living with serious mental illness (defined as schizophrenia, schizoaffective disorders, and bipolar disorders). 3 The Te Pou review from New Zealand defines serious mental illness as “people who have been severely impacted by mental illness/and or addiction, including those who have been diagnosed with schizophrenia, major depressive disorder, bipolar disorder, schizoaffective disorder and/or addiction”. 25 It finds the life expectancy of this group to be 20-25 years less than the general population; perhaps this higher number may be due to the inclusion of addiction in their diagnostic criteria.
Box 1: The problem of definition and diagnoses across study populations

The definition of severe mental illness varies between studies and it impacts the findings of many reviews. (A discussion of this issue appears in Appendix 1.) In several studies, many of them recent, the terms ‘severe mental illness’ and ‘serious mental illness’ seem to be used interchangeably. In others, they are talking about quite different patient cohorts. This category of research overlaps considerably with research into the poor physical health of people living with schizophrenia. There is a need for the research community to adopt a standardised definition and operationalisation of the term ‘severe mental illness’.

Bipolar disorder

Roshanaei-Moghaddam and Katon, in their review of 17 studies involving 331,000 participants with bipolar disorder, found the increased risk of premature mortality from natural causes ranged from 1.4 to 2 times the risk in the general population. Laursen et al. found that people living with bipolar disorder had about the same increased risk of early death as people living with schizophrenia, unipolar depression and schizoaffective disorder. Hayes et al. in their UK cohort study of 17,000 people living with bipolar disorder, reported an adjusted hazard ratio for people living with bipolar disorder of 1.8. This is very similar to the reported rate of 2.0 in people with any diagnosed mental illness in the meta-analysis conducted by Walker et al.

Chesney, Goodwin and Fazel’s review of mortality studies of people living with bipolar disorder reported that years life lost ranged from between 9 and 20 across different studies and subgroups within studies. Their review also revealed people living with mental illness who are heavy smokers have a 2.6 greater risk of premature death than heavy smokers without mental illness. Heavy smoking multiplies the (already high) risk of premature mortality of people living with severe mental illness.

Overall, it appears the years life lost for people living with bipolar disorder ranges from 9 to 15. Most studies show approximately 2 times increased risk of premature death.

Depression

Depression doubles the risk of cardiovascular disease and increases the risk of early death by 50%. There is an increasing number of studies relating depression with changes in blood chemistry such as ‘sticky platelets’ and increased risk of cardiovascular disease. Studies focussing on the premature mortality of people living with depressive illnesses are relatively sparse. However, two reviews focussing on life expectancy in depression and affective disorders reported years life lost for people living with depression as 7 for women and 10 for men, and years life lost for people living with affective disorders were 12 for women to 16 for men. Lawrence et al. found that the mortality gap for people living with depression was 15 years, and this group had an average life expectancy of 64 years. Walker et al. found in their meta-analysis the relative risk rates for depression and mood disorders were 1.7 and 2.1 respectively.

Saz and Dewey reviewed 21 studies (covering 23 cohorts) of depression and mortality in persons 65 years of age and over, using a pooled analysis methodology. They found that diagnosed depression in community resident older people was associated with an average mortality odds ratio of 1.7. An analysis of the six data sets that examined gender effects showed an increased risk of 2.0 for women and 2.7 for men. Overall, across all studies, Saz and Dewey reported depression led to an increased
mortality risk for older persons of about two-thirds. This result appeared robust to the diagnostic system used and across time.  

**Anxiety**

Lawrence et al.’s results showed people living with affective disorders died 14 years earlier than the general population and had an expected longevity of 65 years. This was much higher than the relative risk of 1.4 for people living with anxiety reported by Walker et al. Lawrence’s analysis indicates people living with anxiety had similar excess mortality risk to people living with depression, and that therefore the global burden of mental illness is underestimated since anxiety is not included in World Health Organization (WHO) burden of disease analysis.

**All mental illness**

Harris and Barraclough’s landmark study is one of the most detailed and itemised reviews of excess mortality associated with mental disorders. Covering 29 different diagnoses, six different treatment settings, and all age groups, the researchers reviewed 152 studies and reanalysed their data to calculate Standardised Mortality Rates. They found that almost all mental disorders had a higher risk of premature death. While depression, schizophrenia, affective disorders and psychosis all carried about 2 times the risk of early death, people living with eating disorders had a 5 times increased risk of early death. Averaged across all diagnoses, populations and treatment settings, they found the all-cause death rate was 2.2 times that expected. Suicide accounted for almost 7% of premature deaths and circulatory diseases accounted for 51% of premature deaths.

Lawrence et al. conducted a 20-year retrospective analysis of the Western Australian Linked Data Base survey of Western Australian mental health patients (private/public, inpatient and community) and reported a 2.5 times higher mortality risk for people living with mental illness than the general population. The analysis also showed a life expectancy gap of 14 years which, over the 20-year period analysed (1985-2005), increased by approximately 2 years from 12 to 14 years. This equates to a life expectancy of between 50-59 years. (The current average life expectancy in Australia is 82 years.)

Colton and Manderscheid’s review of mortality rate data across eight states of the USA found that across all states in the study, public mental health clients died at a much younger age than the general population, losing ‘decades of potential life’. The review reported between 13 years and 30 years of potential life lost across the different states. Further, clients in this study with major mental illness (MMI) died 1 to 10 years younger than mental health clients with a non-MMl diagnosis. The review revealed the major causes of death were the same as the general population: heart disease, cancer and cerebrovascular disease. Across six of the seven states subjected to additional analysis, the average age at the time of death was between 49 and 60 years.

Walker et al.’s meta-analysis of 203 studies of people living with mental illness across 29 countries and six continents revealed a mortality rate 2.2 times higher than the general population. The overall median years of potential life lost as a result of natural causes was approximately 10, and 20 years lost due to suicide and drug overdose caused mortality. They found that the increased mortality gap applied to people living with a variety of mental health disorders and not only...
schizophrenia. Their review of all-cause mortality across the 24 studies included in the analysis found the reduction in life expectancy ranged from 1.4 to 32 years (3 to 26 years for natural causes). Walker et al. conducted one of the few studies that reported mortality across treatment setting. Across the patient populations of inpatient, ‘outpatient and inpatient’, or community only, the relative risk of early death was 2.4, 2.1 and 1.8 respectively. This may represent a proxy measure of the severity of the mental illness.

Erlangsen et al. analysed premature death rates in their 20-year study of a sample of more than six million people, including 589,327 people in Denmark, diagnosed with mental illness. They found an average life years lost of 10.2 for men and 7.3 for women. (This is a smaller difference than in most other studies with similar cohorts. However, the authors note this may be due to a new and different method used for calculating life years lost.) The largest cause-specific differences between the general population and people living with mental illness were for respiratory disease and alcohol misuse. Cancer, heart diseases and respiratory diseases were the major contributors to life years lost. The highest elevated risk ratios for men (in order) were alcohol use, infectious diseases, digestive diseases, respiratory diseases, and diabetes. For women, it was alcohol misuse, respiratory diseases and infectious diseases.

**Suicidality and chronic physical illness**

People with schizophrenia are 10 times more likely to die from cardiovascular disease than suicide. Suicide is the fifth most common cause of death for Australians accessing mental health-related Medicare Benefits Schedule (MBS)/Pharmaceutical Benefits Scheme (PBS) services. Yet, in Australia, for every one person who accessed mental health-related treatments who dies due to suicide, 10 die due to heart, respiratory disease or cancer. Erlangsen et al. noted over their 20-year cohort study that deaths related to medical diseases became more frequent over time, while excess mortality due to suicide decreased. That is, the suicide rates decreased, whereas the premature physical illness mortality risk increased.

**Aboriginal and Torres Strait Islander people**

While the health and life expectancy gap between people living with mental illness and the rest of the population in Australia is disturbing, for Aboriginal and Torres Strait Islander people living with mental illness this gap is even larger. In addition to issues of discrimination and disadvantage, the impact of forced removal, intergenerational trauma, grief and other impacts of colonisation significantly amplify the risk of poor health and premature death for Aboriginal and Torres Strait Islander people. The burden of disease for Aboriginal and Torres Strait Islander people is 2.5 times greater than the general community. Similarly, the level of multi-morbidity for Aboriginal and Torres Strait Islander people is 2.6 times higher than for non-Aboriginal people. A mere 23% of Aboriginal and Torres Strait Islander people with a mental health condition report excellent or very good health. This rate is lower than that for Aboriginal and Torres Strait Islander people with other conditions (35%) and for those with no long-term health condition (58%).

Mental illness and cardiovascular disease are the two leading drivers of the burden of disease for Aboriginal and Torres Strait Islander people, accounting for 19% and 12% of the disease burden. Further, physical illness is the major predictor of psychological distress in Aboriginal populations, and
“the markedly elevated prevalence of high distress in older Aboriginal Australians appears largely attributable to greater physical morbidity and disability”. Fifty-four percent of Aboriginal Australians with severe physical limitation experience high distress. An Aboriginal person with a severe mental illness who smokes has an average life expectancy of 45 years. Aboriginal people living with a mental illness experience a ‘double jeopardy’ of discrimination due to race and mental illness with a compounding impact on their physical health.

**Number of premature deaths versus increased risk**

Two of the main ways of measuring premature death of people living with mental illness are the absolute number of deaths and relative risk. When considering a public health and/or individual clinical approach to care it is useful to distinguish between these measures. When considering the risk of premature death, respiratory disease, prostate cancer, breast cancer, lung cancer and diabetes carry the highest risk and should be prioritised (Figure 4). However, if considering the absolute number of early deaths, then lung cancer, heart disease and respiratory disease would be prioritised (also refer to Figure 8).

Figure 4: Cause of death for people aged 14-74, by mental health-related service use status

Premature death by physical health condition can also be analysed by mental illness diagnosis. If this analysis framework is used the same risk/absolute number considerations should be kept in mind. For instance, the reported relative risk ratios for psychosis are higher than for depression and anxiety. However, anxiety and depression contribute more to the total early mortality in the community, due to their higher base prevalence in the Australian population.33

There is currently a lack of specificity and sophistication in research studies. Premature risk and mortality rates vary considerably across age groups, across mental illness diagnosis and across physical illnesses. Also, variables such as employment, gender and disadvantage (Figure 5) affect
risk. Much more work is needed to provide data and detailed analysis across these dimensions and their interactions to inform mental health policy and clinical practice.

Figure 5: Standardised death rate, by population group\textsuperscript{13}
Overall mortality findings

There is a large gap in life expectancy

In summary, thousands of studies and hundreds of reviews have reported reduced life expectancy for people living with mental illness. This is a consistent finding across time, age groups, diagnoses, countries and continents. Figure 4 indicates this is consistent across the leading causes of death in Australia. These findings were robust despite differences in study design, the population studied and the type and severity of mental illness studied. The variation in methodologies and measures probably contributed to different years life lost estimates across studies, but the risk ratios were remarkably consistent. Lawrence et al.’s review of more than 3,500 papers and scrutiny of 104 research papers concluded “almost all reports of psychiatric and physical comorbidity have found excess mortality associated with mental illness for all psychiatric diagnoses considered, across all settings and at all ages”.

The reported years of life lost range from 10 to 32. Thornicroft estimates the gap for all mental illnesses as 15 years for women and 20 years for men. Colton and Maderscheid report a gap of 13-30 years overall, the Rethink review estimates a 20-year overall gap, and the Te Pou review estimates a 20-25 year gap. As such, a summary headline figure of 20 years seems defensible as a broad, inclusive estimate of the years of potential life lost for people living with mental illness.

As many chronic diseases take decades to manifest in premature death, there is now a need to focus on:

- Specific physical illness risks associated with different mental health diagnoses
- Specific physical illness risks associated with particular age groups
- The interaction between each of these factors.

Figure 6: Death rates (per 100,000 population) of persons who accessed mental health related treatments, by cause of death – all ages

![Graph showing death rates per 100,000 population by cause of death for persons who accessed mental health related treatments.]
The gap is increasing
There is substantial evidence of an increasing standardised mortality rate for people living with mental illness.\textsuperscript{8, 9, 30, 33, 34, 46, 54} Standardised mortality rates represent a differential rate of mortality. Thus, if mortality rates improve at a faster pace in the general population than in people living with mental illness, the standardised mortality rate for people living with mental illness will increase. There is evidence that developed countries have much higher standardised mortality rates for people living with mental illness than the least developed countries,\textsuperscript{9} perhaps reflecting the better standard of general health care in developed countries. Walker et al.\textquotesingle s study revealed that the mortality gap was widening over consecutive decades since 1960 (Figure 7).\textsuperscript{33} A similar finding was identified for people living with schizophrenia and bipolar disorder by Hayes et al., in their cohort study conducted in the UK between 2000-2014.\textsuperscript{34} This trend exists for a variety of mental illnesses, not just schizophrenia.\textsuperscript{46} This may, in part, be due to the benefits of improved health care not being provided to people living with mental illness.\textsuperscript{33, 55, 56} It may also be affected by the emerging adverse health effects of second-generation antipsychotics.\textsuperscript{9} The fact that Hayes et al. found the all-cause mortality rates to be decreasing for people living with schizophrenia or bipolar disorder since 2000, while there has been an increase in the mortality gap since the mid-2000s, supports this hypothesis.\textsuperscript{34}

Figure 7: Mortality risk ratios of people living with mental illness by decade\textsuperscript{33}
Poor physical health of people living with mental illness

Major morbidities by health condition

Figure 8: Annual number of deaths in Australia by leading causes of death – ages 15-74 (prorated and adapted from ABS\textsuperscript{13})

**Respiratory disease**
People with mental illness have higher rates of emphysema, asthma, chronic bronchitis,\textsuperscript{10, 57} pneumonia and chronic obstructive pulmonary disease than those without a diagnosis of mental illness.\textsuperscript{28, 58} People with schizophrenia are only slightly more likely to be diagnosed with a chronic respiratory disease (23% vs 17%)\textsuperscript{59} yet are four times more likely to die from respiratory disease.\textsuperscript{14} Respiratory disease is a major cause of premature mortality and also contributes to poor mental health and suicidal behaviour.\textsuperscript{60, 61} Between August 2011 and September 2012 in Australia, 4,002 of the total 7,002 deaths due to chronic lower respiratory disease were of people who accessed mental health-related treatments.\textsuperscript{13} This represents a six times greater risk of respiratory disease-caused death than the general population.

**Cardiovascular disease**
An Australian national survey found that more than 25% of people with psychotic illness who were in contact with public specialised mental health services had heart or circulatory conditions, which is three times the rate in the general population.\textsuperscript{27} Other studies have reported the rate of cardiovascular disease in people with a serious mental illness is approximately four times that of the general population.\textsuperscript{27, 59, 62} This rate of illness manifests in a premature mortality rate due to cardiovascular disease that is up to six times higher than that in the general population.\textsuperscript{7, 14} It is the major cause of early death for people living with schizophrenia,\textsuperscript{62} accounting for a third of all deaths in this group.\textsuperscript{21} Despite this, people with severe mental illness are 20-30% less likely to receive treatment to lower cholesterol than those without a diagnosis of mental illness.\textsuperscript{62}
After a depressive episode, the risk of a heart attack is four times higher than it is for those with no previous depression\textsuperscript{60, 61, 63} and people living with depression have twice the risk of dying of cardiovascular disease.\textsuperscript{62}

Cancer

Cancers comprise half of the total deaths of people who accessed mental health-related treatment.\textsuperscript{13} Breast cancer, prostate cancer and lung cancer are three of the four leading causes of death for Australians who accessed mental health-related treatments.\textsuperscript{13} People with schizophrenia are:

- 90\% more likely to be diagnosed with bowel cancer\textsuperscript{64, 65}
- 42\% more likely to be diagnosed with breast cancer\textsuperscript{64, 65}

The above figures are likely to indicate severe underestimate, as the premature death rates paint a bleaker picture. In Australia, persons who accessed MBS/PBS mental health-related treatments had high rates of death by cancer.\textsuperscript{13} People who obtained mental health-related treatments had 7 times the risk of premature cancer-caused death than the general population.\textsuperscript{13} Comprising 15\% of the population, persons accessing mental health-related treatments comprised 55\% of total deaths by cancer in the Australian population (Figure 9).

Figure 9: Annual number of cancer-caused deaths in the Australian population – age 15-74 (prorated and adapted from ABS\textsuperscript{13})

<table>
<thead>
<tr>
<th>Underlying cause of death</th>
<th>Mental Illness</th>
<th>Rest of population</th>
<th>Total Population</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>Row %</td>
<td>No.</td>
</tr>
<tr>
<td>Trachea, bronchus and lung cancer</td>
<td>2567</td>
<td>56</td>
<td>2031</td>
</tr>
<tr>
<td>Colon, sigmoid, rectum and anus cancer</td>
<td>1064</td>
<td>51</td>
<td>1018</td>
</tr>
<tr>
<td>Breast cancer</td>
<td>1012</td>
<td>56</td>
<td>785</td>
</tr>
<tr>
<td>Blood and lymph cancer</td>
<td>895</td>
<td>51</td>
<td>876</td>
</tr>
<tr>
<td>Prostate cancer</td>
<td>523</td>
<td>61</td>
<td>332</td>
</tr>
<tr>
<td>Total cancer caused deaths</td>
<td>6,061</td>
<td>55</td>
<td>5,042</td>
</tr>
<tr>
<td>Total number accessing MBS/PBS</td>
<td>2,806,407</td>
<td>12</td>
<td>21,507,719</td>
</tr>
</tbody>
</table>

Tran et al.’s 11-year cohort study of people aged 18-64 years living with schizophrenia, found that cancer was the second most common cause of early mortality and was more frequently the cause of death than cardiovascular disease. During their research study, 14\% of the sample died of cancer. This is 4.4 times the rate of the general population.\textsuperscript{32} Tran et al.’s study of cancers in patients with schizophrenia found that breast cancer (2.8 times increased risk) was the most common localisation for women and lung cancer for men (2.2 times increased risk).\textsuperscript{32} Their regression analysis found that the duration of smoking, number of cigarettes per day and age (>38) were the greatest predictors of death by cancer. The major predictors of lung cancer in men were the duration of smoking and age. The only significant predictor of breast cancer in women was age (>38). The use of antipsychotics was not found to be related to premature death by cancer.\textsuperscript{32}

The prevalence of cancer increases significantly with age. Some reports show the rate of cancer in people living with mental illness to be about the same as the total population\textsuperscript{28, 66} and others show a
much higher rate for people living with mental illness.\textsuperscript{67, 68} While there is some conflicting evidence for prevalence, there is clear evidence of higher death rates.\textsuperscript{13, 69, 70} This suggests under diagnosis and/or lower rates of treatment for the people with a mental illness.\textsuperscript{71} However, it could also be due to people with mental illness dying early as a result of other physical illnesses and before the expected onset of cancer.\textsuperscript{68} The variability in findings may be due to the different average age of the cohorts studied. Regardless of age, screening and early intervention could reduce mortality rates.\textsuperscript{72, 73}

Clifton et al. reported several barriers to cancer screening as perceived by people living with mental illness, mental health professions and cancer care professionals. People living with mental illness reported that cancer screening professionals often lacked an understanding of their situation, mental illness symptoms and the side-effects of medications. Cancer screening professionals reported not having training in mental health. Mental health professionals reported not knowing enough about cancer screening and available cancer services.\textsuperscript{74}

**Diabetes**

International reviews have found the rate of type-2 diabetes in those with a mental illness is two to three times that in the general population.\textsuperscript{58, 75} In Australia 20\% of people with a psychotic illness who are in contact with public specialised mental health services have diabetes. This is three times the rate in the general population.\textsuperscript{27} People with schizophrenia are four to five times more likely to be diagnosed with diabetes.\textsuperscript{28, 59}

Many of the premature deaths of people living with mental illness are due to cardiovascular disease. Antipsychotic medications used to treat severe mental illness contribute to cardiovascular disease by increasing the risk of hypertension, obesity, dyslipidaemia and type-2 diabetes.\textsuperscript{62}

The reported prevalence of diabetes in people with schizophrenia is probably significantly underestimated,\textsuperscript{62, 76, 77} with many unaware that they have this condition.\textsuperscript{78} Despite the existence of national guidelines, up to 70\% of people living with severe mental illness are unscreened and untreated for diabetes.\textsuperscript{62, 78} This can lead to an extended period when the person’s diabetes is not being managed, resulting in prolonged adverse effects on physical and mental health.\textsuperscript{20, 78} Even when the diabetes risk factors are identified, people living with severe mental illness are much less likely to receive treatment and may be undertreated.\textsuperscript{62} Taylor et al. warn that as diabetes interventions are scaled up for the general population the treatment gap is likely to increase for people living with severe mental illness.\textsuperscript{75}
Taylor et al. recently conducted a review of 54 randomised control trials (RCTs) to improve glycaemic control in people living with severe mental illness. The review included a narrative synthesis and, where possible, a pooled analysis. The review found evidence that behavioural interventions, switching antipsychotic medications and the use of metformin led to clinically important improvements. However, the evidence for an effect of pharmacological only interventions was small. Overall, pharmacological and behavioural interventions improved fasting blood glucose but not HbA1c. Behavioural interventions showed a larger difference compared to pharmacological interventions. Antipsychotic switching and metformin showed improvements in HbA1c and fasting blood glucose. Behavioural interventions that included physical exercise were more effective than those that did not, and long-term interventions were more effective than short-term interventions.

Based on a broad-ranging review of the literature, Siddiqi et al. recommended four intervention strategies for improving diabetes outcomes for people living with mental illness: reducing or switching antipsychotic medications, enhancing smoking cessation efforts, sharing medical records, and promoting integrated care.

Obesity
Some medications used to treat serious mental illness are associated with weight gain. People with serious mental illness are more likely to be overweight, with obesity in people with a mental illness described as an ‘epidemic within an epidemic’. Approximately 65% of people living with mental illness and a coexisting physical health condition are overweight or obese. Likewise, two-thirds of those with severe mental illness are overweight. Studies have found that half of males and almost two-thirds of females with psychosis are obese. Obesity can have a profound effect on self-image, self-efficacy and general wellbeing, and it is especially salient in young adults. Significant weight gain often starts immediately on the initiation of antipsychotics and is evident within 12 weeks of beginning a course of antipsychotic medication. It is a serious side effect that is currently not being managed effectively. This failure to screen and treat effectively is harming both the mental health and the physical health of people living with mental illness.
Metabolic syndrome

Metabolic syndrome is characterised by weight gain, high blood pressure, high blood glucose and poor blood lipids.\textsuperscript{67} It is a major physical health problem commonly experienced by people with severe mental illness taking antipsychotic medication and can lead to cardiovascular disease and diabetes.\textsuperscript{90-93} Metabolic syndrome is associated with three times the risk of cardiovascular mortality and a two times increased risk of all-cause mortality.\textsuperscript{94}

People with schizophrenia have been found to have four times the risk of abdominal obesity compared to the general population\textsuperscript{95} and approximately 50% of public mental health service patients taking antipsychotic medication have a metabolic disorder.\textsuperscript{21, 96} For people with bipolar disorder the rate is 67%.\textsuperscript{57} The rate of metabolic syndrome in those with a serious mental illness is two and three times the rate of the general population\textsuperscript{96} and particularly high (33-38%) for those with schizophrenia.\textsuperscript{28, 98} A pooled analysis by Vancampfort et al. found similarly high rates of metabolic syndrome in people living with bipolar disorder (32%) and major depressive disorder (23-31%).\textsuperscript{98} This study found the risk of metabolic syndrome was elevated across all three major mental illness diagnostic categories. The pooled analysis also found that the risk of metabolic syndrome differed significantly across commonly used antipsychotics.\textsuperscript{98} The risk of metabolic syndrome in this study was greatest in young people living with severe mental illness and in those treated with antipsychotics.

Saha, Chant and McGrath noted a relationship between the use of second-generation antipsychotics and metabolic syndrome. They argue that, with the increased use of second-generation antipsychotics, the adverse health outcomes of metabolic syndrome will be manifest in the decades to come and the increased mortality will be alarming.\textsuperscript{5} However, this is not an uncontested view. Many studies have shown decreased mortality associated with the use of second-generation antipsychotics.\textsuperscript{99-101} Still, nothing in this debate weighs against the necessity to manage the side effects of antipsychotics, including metabolic syndrome.

Dental and oral health

Poor dental health is a significant problem.\textsuperscript{102} Poor gum health and tooth decay are widespread in people with a mental illness.\textsuperscript{88, 103} People with severe mental illness are over three times more likely than the general population to have lost all their teeth and six times more likely to have decayed or missing teeth.\textsuperscript{104, 105} Smoking has a proven link with periodontitis\textsuperscript{106} and smoking rates are high in those with a mental illness.\textsuperscript{57}

Comorbidity

People living with mental illness see physical health as connected to wellbeing.\textsuperscript{60, 61, 107} The presence of serious physical illness, such as diabetes, obesity and respiratory disease, adversely affects quality of life and may impede recovery from mental illness.\textsuperscript{28, 53, 69} In fact, evidence suggests that it is not physical health per se but functional disability associated with physical illness that is most deleterious to mental health.\textsuperscript{60} Effectively managing physical illness is an important part of treating mental illness.\textsuperscript{108} Further, from the consumer perspective, physical health includes bodily mobility and functioning, enables them to engage in practical everyday activities, participate socially and to live a contributing life.\textsuperscript{107}
One in nine Australians aged 16-85 has a coexisting mental disorder and physical disorder.\textsuperscript{109} The psychological distress (as measured by the K10) of males with coexisting mental health and physical health conditions is twice that of males with a mental health condition alone.\textsuperscript{109} Comorbidity is common with people living with mental illness “with almost all people (94.1%) with a mental and behavioural condition reporting another coexisting long-term health condition”.\textsuperscript{58} Eighty-one percent of people living with mental illness have two or more coexisting physical health conditions.\textsuperscript{58} However, it needs to be kept in mind not all of these conditions are ‘mortality-related’ and include conditions such as chronic back pain.

The recent Australian Bureau of Statistics (ABS) survey of mental health and coexisting conditions found that 80\% of people living with mental illness have a coexisting, mortality-related physical illness.\textsuperscript{58,110} Similarly, the Australian Institute of Health and Welfare’s report on chronic disease comorbidity indicates that 75\% of people experiencing a chronic health condition also have another long-term health condition, and 55\% have three or more coexisting conditions.\textsuperscript{111} This parallels other research indicating two-thirds of people with a mental illness also have a coexisting medical condition\textsuperscript{112-114} and 50\% have two or more coexisting medical illnesses.\textsuperscript{58,114}

At first diagnosis of schizophrenia, about 50\% of people also have a coexisting physical illness.\textsuperscript{72} For about 20\% of this subgroup, their medical problems go undiagnosed, worsen and have a deleterious effect on their psychiatric condition.\textsuperscript{72,115} Research indicates that this is not unique to people living with schizophrenia, but is the case for many people living with mental illness.\textsuperscript{21} These medical problems may contribute to and worsen their mental illness.\textsuperscript{72,115} Lorem et al.’s research concluded that physical health accounted for 12\% of the total effect on mental illness symptoms.\textsuperscript{61}

The rates of comorbidity for Aboriginal and Torres Strait Islander people is much higher than for the rest of the Australian population. Almost a quarter of Aboriginal and Torres Strait Islander people report having both a mental health condition and one or more other long-term health conditions.\textsuperscript{49} A study of hospital admissions in NSW revealed that the prevalence of multimorbidity in Aboriginal Australians was 2.6 times that for non-Aboriginal people, and the prevalence of mental and physical comorbidity was 2.3 times that for non-Aboriginal people.\textsuperscript{48}

This data underlines the importance of mental health professionals comprehensively screening all clients for coexisting physical illnesses. With an 80\% chance of mental health clients having a mortality-related physical illness, this practice should be a routine part of the initial assessment along with an evaluation of suicide risk.

**Costs**

**Mental illness costs**

Mental illness accounts for 12\% of the total burden of disease and 24\% of the burden of disability in Australia.\textsuperscript{50} This includes the number of years lost to premature death and disability caused by illness and injury. This burden is even greater in rural and remote settings.\textsuperscript{116} Mental illness is the leading cause of health loss for people aged 15 to 44 years in New Zealand.\textsuperscript{117} The Medibank Private study estimated the total direct ($13.8 billion) and indirect ($14.8 billion) costs of mental health care at $28.6 billion per annum. The indirect spend was relatively evenly split between disability support payments and provision of support services.\textsuperscript{118}
Walker et al.’s data on population attributable risk revealed the high global burden of mortality associated with mental illness. In the United Kingdom (UK), it has been estimated that the cost associated with people living with mental illness and coexisting physical health conditions is £11 billion per year.

Comorbidity costs
In Australia, the RANZCP estimated the cost of premature death of persons with comorbid physical health conditions and severe mental illness at $15 billion per annum. When the cost of substance use is included, this increases dramatically to $45 billion. (This economic study did not include people living with high prevalence disorders.) For the 50% of people with a mental illness with an additional two to three coexisting medical illnesses, international research indicates the cost of healthcare increases exponentially. The additional costs of physical health problems in people living with mental illness has been estimated to increase healthcare costs by 70%. The RANZCP report indicates that the cost of care for people living with depression and a coexisting physical health condition is 33% to 169% higher than for depression alone. Frey found that for people living with schizophrenia the direct medical costs were greater for persons aged over 65 years, whereas societal costs were higher for persons less than 35 years. A recent US analysis of the burden of comorbid mental disorders argues that conceptualisations of multi-morbidity should be expanded to take into account societal impacts and costs.

The Medibank Private study estimated the total direct cost of $1.96 billion for comorbid physical and mental health conditions. This is likely to be an underestimate as it only includes those aged between 16–85 years, the 12 main chronic conditions, and does not include paediatric, physician or General Practitioner (GP) services not recorded with a mental health item number. The annual indirect cost of physical comorbidities in people living with a mental illness has been estimated at $2.1 billion or $451 per household. This does not include the cost of mental illness itself or resultant lost productivity. Good quality Australian data already exists, but more work is needed to quantify the significant net economic gains available to society by addressing the physical health of people living with mental illness.

Many people living with mental illness see physical health and mental health as inseparable, and Happell et al. argue that more attention should be given to measuring quality of life, as this would be more congruent with consumer perspectives of health. These findings mesh well with Fässberg et al.’s findings that it is the functional impact of physical illness rather than the illness itself which influences mental health.

Smoking costs
In 2005, the total financial cost (health system costs, productivity, addiction costs) to Australia from higher smoking rates of people with a mental illness was estimated by Access Economics at $3.52 billion per year. When they calculated the cost of premature death and personal suffering, this increased to almost $29.4 billion per year. This included $437 million spent on purchasing cigarettes and $432 million on excess health costs. The cost of buying cigarettes for people living with mental illness who smoke has been estimated at one-fifth of the disability support pension. Providing smoking cessation services to smokers with a mental illness represents one of the most cost-effective health interventions possible.
Major risk factors

Social determinants and individual responsibility

Many people living with mental illness face a variety of lifestyle-related personal risk factors for poor physical health such as smoking, diet, exercise and alcohol use. They may also be affected by social determinants of health such as low socioeconomic status, stigma, social exclusion, and discrimination relating to their mental illness. Individuals may be exposed to a variety of risk factors and respond to these within a social/societal context. These are the realities by which many people living with mental illness live and die.

The reasons for the major discrepancy in health between the general population and those living with a mental illness are many and varied. Socioeconomic, biological and antipsychotic treatment factors must inevitably play a part in the poor health and early death of those living with a mental illness. However, under-diagnosis, low screening rates, unmet medical needs, lack of preventative care and lower quality of care also play a part.

Behavioural factors have been estimated to contribute 40% to the premature deaths of people with severe mental illness. Contrary to popular belief, readiness for lifestyle behaviour change is high in people with psychosis. Small behavioural changes can significantly increase a person’s longevity. Despite this, many health professionals presume those with a mental illness are not willing, ready or able to make lifestyle changes. For many people with a mental illness, this presumption ultimately proves fatal.

Smoking

Smoking kills about one in two long-term smokers and is probably responsible for most of the premature deaths of people with a mental illness. People living with mental illness consume almost half of all tobacco sold. In the US, people living with mental illness comprise more than 200,000 of the 520,000 tobacco-attributed deaths annually. A third of tobacco-attributed deaths are from cardiovascular disease, a third from cancer and a fifth from respiratory disease. Smoking is a major risk factor for many physical illnesses and it contributes to the higher death rate in people with mental illness from heart disease, respiratory disease, cancer and many other conditions. While the overall smoking rates in developed countries have steadily declined, the smoking rate of persons with mental illness has not reduced.

The prevalence of smoking in people with a severe mental illness is particularly high: about three times that in the general population. Approximately 70% of patients in mental health units smoke, and half of these are described as heavy smokers. Up to 90% of people with schizophrenia smoke and most smoke heavily. People living with depression are also more likely to smoke, and smoke more cigarettes per day than the general population.

Smoking is associated with 14 times the risk of dying from lung cancer. Tran et al.’s cohort study in France found that lung cancer was the major cause of early death in men living with schizophrenia. Their regression analysis found the two major predictors of lung cancer in their cohort were the duration of smoking and age (>35). A Danish study of over six million people found that smoking contributed 20% of excess years life lost in women and 8% in men. Also, smoking contributed to excess mortality due to heart disease and cancer. Chesney, Goodwin and Fazel noted that people living with schizophrenia have the same risk of early mortality as heavy smokers. Their review also
revealed people living with mental illness who are heavy smokers have a 2.6 greater risk of premature death than heavy smokers without mental illness. Smoking has also been found to have a direct independent effect on mortality of people living with schizophrenia.

**Smoking cessation**

A Cochrane Review concluded that people living with severe mental illness are currently recipients of untested, unproven advice, undertaken more for the purposes of health professional audits than due to strong evidence of effectiveness. They concluded “this review signals that for people with serious mental illness, the existing plethora of health promotion interventions remain unexamined for their utility, effects and cost effectiveness”. It should be clarified that this review examined advice given to people living with severe mental illness by mental health professionals, not smoking cessation program interventions per se.

**Clinician attitudes**

Research has shown that many mental health clinicians believe that smoking is therapeutic for patients. Many mental health clinicians believe cigarettes should be given as incentives or in response to agitation. It has also been suggested that people with a mental illness are less likely to want to quit. This view can affect the motivation of mental health and primary health professionals to support smoking cessation. Another mixed-method systematic review and meta-analysis of mental health professionals’ attitudes toward smoking found negative attitudes toward smoking cessation and permissive attitudes toward smoking. It found the most commonly held health beliefs were that people living with mental illness were not interested in quitting and that quitting smoking is too much for people living with mental illness to take on. Both the qualitative and quantitative findings were consistent in finding a culture of smoking was the norm and that cigarettes were a useful tool for staff and patients.

**Clinician practice**

A study with 276 mental health professionals in Australia by Sharma et al. indicated that about 80% asked about smoking, 45% advised clients to quit, and about a third provided self-help resources (31%), referred to Quitline (36%), prescribed pharmacotherapy (40%) or delivered cessation assistance (32%). Community mental health professionals and professionals who smoked were less likely to follow-up on smoking cessation attempts or provide smoking cessation support. Most respondents (75%) believed reducing tobacco consumption would substantially reduce the risk of smoking-related diseases. (Cutting down has not been found to improve life expectancy.)

**Motivation to quit**

With the widespread beliefs of clinicians, it is perhaps no surprise that people living with mental illness are less likely to be offered help to quit even though quitlines are an evidenced-based, low-cost treatment. Contrary to popular belief, people with severe mental illness are able to quit smoking, albeit they currently quit at rates lower than the general population. Involvement of peer workers can further improve quit rates. People living with depression have higher motivations to quit and attempt to quit at the same rate as smokers without depression. However, their odds of continued abstinence at one month is 30-50% lower than for smokers without depression.

**Smoking cessation improves mental health**

The ‘self-medication hypothesis’ reflects the widely held belief that smoking has mental health benefits. Tobacco companies have funded research into this hypothesis. The reverse appears to
be true, with studies showing smoking increases the risk of depression, anxiety and schizophrenia and is a gateway to problematic substance abuse.134 Further, smoking increases the metabolism of some antipsychotic medications, lessening their effectiveness, which can then require an increased dosage.134 Contrary to popular belief, numerous studies have shown that quitting smoking improves mental health or at least does not harm mental health.150,152,153 Schroeder argues that smoking cessation should be an essential part of treatment for people living with severe mental illness.154 A systematic review and meta-analysis of 26 smoking cessation interventions with general populations and people with a mental illness showed smoking cessation improved the mental health of both groups155 and was associated with a decrease in anxiety, depression and stress.155

**Summary**

When smoking cessation programs are integrated into mental health programs, individuals are found to be motivated and have good quit rates.149,150,156,157 Mathew et al. in their systematic review argued that smoking cessation interventions for people living with depression ought to be different to those for other conditions and that interventions should be tailored to the needs and characteristics of the cessation group.144

**Antipsychotic medications**

Antipsychotic medications are associated with cardiovascular disease, diabetes, poor oral health90-92,95,158 and a fourfold increase in obesity.95 The weight gain associated with the use of these drugs may account for much of the early death due to other physical causes. Data indicates the use of some second-generation antipsychotics is also associated with increased mortality related risks.9

However, this is a contested view. Despite the side effects, the use of antipsychotics has been shown to have a positive impact, increasing longevity and quality of life.101 Two retrospective cohort studies showed between 2 to 10 times reduced risk of mortality for those who used antipsychotic medication.158,159 Baxter et al.’s review indicated that antipsychotic medications have some protective effect against excess mortality, but these results are equivocal.158 Some systematic reviews have shown no difference in mortality rates between patients taking antipsychotics versus those not on antipsychotics.158,160 Studies since Baxter et al.’s review have indicated that effectiveness is mediated by treatment adherence.100,161

There is evidence of major differences in the weight gain side effects associated with initiating different antipsychotics98 varying from 4.4 kg to 16 kg depending on the antipsychotic used.89 Further, there is good evidence indicating increased mortality risk for patients prescribed two or more antipsychotic drugs.158,160 There are significant opportunities to improve access to pharmacists who can participate in the ongoing care of people living with mental illness. As part of a multidisciplinary team, pharmacists can provide detailed advice on side-effects, polypharmacy and the interaction effects of medications.162

The research findings indicate that while antipsychotic use can improve mental health, functional ability and reduce suicidality (tending to increase longevity), they also have adverse side effects of weight gain, reduced activity and metabolic syndrome (tending to decrease longevity). Thus, the advantages of antipsychotics should be weighed against their side effects. Behavioural factors linked to the side effects can be modified to lessen their impact. Regular review, effective management and consultation are needed to maximise treatment efficacy while limiting adverse side effects.
Physical activity

Exercise and health in people living with mental illness

The amount of research into the relationship between physical exercise and mental health has ballooned during the last five years. The physical activity levels of people with mental illness are significantly lower than those in the general population.\textsuperscript{68, 163-166} Kruisdijk et al.’s data showed hospitalised patients with severe mental illness are very sedentary and physically inactive.\textsuperscript{167} A third of mental health service users report doing no exercise at all\textsuperscript{68} and 72\% of people living with mental illness and coexisting physical health conditions report no or low levels of exercise.\textsuperscript{58} The level of sedentary behaviour in people living with bipolar disorder is high and is double the level observed in the elderly.\textsuperscript{165}

Exercise provides benefits on many levels, improving energy levels, sleep and general health.\textsuperscript{108, 164, 168} Regular physical activity also has a positive effect upon heart rate, blood pressure and many other physiological variables associated with health.\textsuperscript{161} A general population study on the effects of physical exercise in youth found positive changes in neurobiological, psychosocial and behavioural mechanisms related to the improvement in mental health in young people.\textsuperscript{169} Early intervention after the first diagnosis of mental illness has been recommended to maintain healthy levels of physical activity, both to enhance the long-term physical health and reduce the severity of mental illness in young people.\textsuperscript{170} Interventions, when introduced soon after the first episode of psychosis, can be very effective.\textsuperscript{83, 171, 172} Getting from inactivity to healthy levels of exercise involves many steps including change readiness, a supportive environment and identifying a suitable type and intensity of physical activity.\textsuperscript{173}

De Rosa et al.’s critical review of 59 lifestyle intervention studies with people living with severe mental illness grouped their analysis by target population: schizophrenia (seven studies), bipolar disorder (five studies), unipolar depression (three studies) and mixed samples (four studies).\textsuperscript{174} They found that long interventions (one to two years) were more effective, and there is a need to include motivational elements in lifestyle programs. They also found that multidisciplinary teams were more effective than nurses or psychologists alone, with programs including dieticians showing greater improvement on Body Mass Index (BMI) and weight, and programs that included exercise physiologists showed more improvement in exercise outcomes.\textsuperscript{174} Nurse-led interventions can also be effective in reducing waist circumference.\textsuperscript{175}

De Rosa et al. found that not all studies demonstrated effectiveness. While 10 studies showed significant improvements, six did not.\textsuperscript{174} Given the publication bias towards significant results, this points to the need to consider the type and design of lifestyle interventions carefully. The intervention studies reveal a high percentage of participants not completing programs, highlighting the importance of including motivational components to the interventions.\textsuperscript{174} They also recommended including cardiorespiratory fitness as an additional outcome measure.\textsuperscript{174}

Verhaeghe reviewed 14 primary studies and three systematic reviews.\textsuperscript{176} This review found variability in intervention effectiveness in reducing weight (nine of 14 studies) and BMI (eight of 14 studies) and improved quality of life scores.\textsuperscript{176} Again, this points to the need for further research in the design and implementation of lifestyle interventions for people living with mental illness.

The effect of physical exercise on mental state

In systematic reviews, exercise programs have been shown to improve mental health and lessen cardiovascular risk even when not associated with weight loss,\textsuperscript{177, 178} and other reviews recommend that people with mental illness and serious mental illness should participate in moderate physical activity,\textsuperscript{167, 179-181} as it improves their physical health risk profile. In people living with bipolar
disorder, a systematic review found the beneficial role of lifestyle interventions on mood, weight, blood pressure, sedentariness and overall wellbeing.\textsuperscript{182} A recent meta-analysis found that physical activity reduces the symptoms of schizophrenia.\textsuperscript{180} Likewise, a meta-analysis of exercise programs in people living with depression found that exercise significantly improved physical and psychological domains and quality of life.\textsuperscript{183} The authors recommended that exercise could be considered as a standard therapeutic strategy for people living with depression.\textsuperscript{183} Other studies have also shown that physical activity, as part of mental health treatment, has a positive effect on several mental illnesses including depression, schizophrenia and anxiety.\textsuperscript{184} Schuch et al. argue programs should include dedicated clinicians (exercise physiologists/physiotherapists)\textsuperscript{183} and should be included as a routine, essential component of a recovery program.\textsuperscript{188, 171, 177}

**Barriers and enablers**

Difficulty engaging in exercise can be related to medication-related weight gain, sedation and lowered self-esteem.\textsuperscript{114} Perceived external barriers can also hinder participation in exercise and levels of physical activity.\textsuperscript{185} Studies of non-institutionalised people living with mental illness have shown the most significant barriers are cost, geographical distance to the place of exercise and lack of companionship.\textsuperscript{186} They recommend low cost neighbourhood outdoor walking or personal training programs.\textsuperscript{187} Internal barriers have been found to include low motivation and low perceived self-efficacy, associated with poor self-esteem, poor physical health, poor mental health and feelings of helplessness and hopelessness.\textsuperscript{185-187}

Reviews indicate that managing motivation is a key factor in the effectiveness of exercise programs.\textsuperscript{188} Baxter et al.’s meta-review also reported lifestyle interventions can improve the health risk profile, but the challenges in implementing the interventions and maintaining individuals’ motivation need to be overcome.\textsuperscript{158} However, Farholm and Sørensen noted that, while 55 studies applied motivational techniques, only 13 measured motivational constructs, and just one study attempted to measure the effect of motivation interventions on intervention outcomes.\textsuperscript{188}

The use of smartphones and accelerometers seemed to help encourage people living with severe mental illness to be more physically active.\textsuperscript{189} Emerging mobile health technologies and applications offer good promise in this area. Peer support and staff participation in programs further promote engagement with exercise programs.\textsuperscript{171, 190, 191}

There is considerable evidence indicating the effectiveness of individualised and group physical exercise programs.\textsuperscript{192, 193} However, there is also evidence that lifestyle exercise interventions can be ineffective; wasting participants’ and professionals’ time.\textsuperscript{98, 174} In light of the contradictory research findings, clinicians should look to adopt intervention models with a robust evidence base.

Much more research needs to be done in this area, investigating the type of intervention, the types of participants and the types of professionals involved. Further, with the long latency between health behaviours and health consequences, more work is needed in refining the outcome measures as indicators of improved health risk profile.\textsuperscript{158} Some work has begun in the area, for example, with bipolar disorder.\textsuperscript{165, 194}

**Diet**

Nutrition has a powerful impact on mental and physical health.\textsuperscript{89, 195, 196} Good nutrition is important to minimise the risk of cardiovascular diseases (CVD), diabetes and other lifestyle diseases.\textsuperscript{197} It is also important for brain function. There has been some emerging evidence of the influence of the gut biome on mental health and on depression in particular.\textsuperscript{198, 199} However, this research stream is
in its infancy. People with a serious mental illness have been found to have poorer nutrition than the general population, consuming only one or two meals per day.\textsuperscript{89, 148, 197} The diet of people with a serious mental illness typically comprises less fruit and vegetables and is higher in fat and lower in fibre than the general population.\textsuperscript{68, 89, 150, 197, 200}

Weight gain is the key contributor to the poor physical health of people living with severe mental illness.\textsuperscript{89} Teasdale et al.’s review showed weight gain is most significant in the first 12 weeks after antipsychotic dosing, and the weight gain associated with antipsychotic use can vary from 4.4 kg to 16 kg depending on the antipsychotic used.\textsuperscript{89}

A Cochrane Review of interventions found an absence of randomised trials on the effect of dietary interventions for people living with schizophrenia.\textsuperscript{201} On one hand, providing dietary advice has been found effective in increasing the consumption of fruit and vegetables and decreasing the intake of fat.\textsuperscript{201} On the other hand, general dietary advice is frequently offered by mental health professionals to people living with severe mental illness, but this advice is not evidence-based. Unfortunately, this review did not extend to studies that offered exercise, additional dietary interventions, lifestyle or psychosocial interventions.\textsuperscript{201}

Teasdale et al.’s systematic review and meta-analysis found nutritional interventions can lead to significant weight loss, reduction of BMI and lower blood glucose.\textsuperscript{196} They also found that interventions starting at the time of antipsychotic initiation showed greater effects.\textsuperscript{196} Most importantly, their meta-analysis demonstrated that the involvement of dieticians in multidisciplinary teams and delivery of individualised programs increased outcome effectiveness.\textsuperscript{196} Reviews of intervention studies have supported the important role of dieticians in dietary interventions for people living with mental illness.\textsuperscript{192, 202} Dieticians working with people living with severe mental illness are presented with several challenges such as attendance, reduced motivation and higher sedentariness.\textsuperscript{89, 199}

**Drugs and alcohol**

Alcohol has been linked to numerous medical conditions and contributes to 4% of world deaths.\textsuperscript{203} Males with psychosis misuse alcohol at 1.5 times the rate of the general population.\textsuperscript{26} Individuals with coexisting addiction and mental illness have poorer outcomes than those living with mental illness alone.\textsuperscript{96} They also experience additional personal and structural barriers to accessing services.\textsuperscript{204} Most studies of mortality and morbidity associated with mental illness do not include alcohol misuse as a diagnostic group. However, Erlangsen et al.’s study found alcohol misuse to be the condition related to the highest elevated risk of premature death for men (10.7 times risk of premature mortality compared to the general population) and women (8.9 times increased risk).\textsuperscript{46} New Zealand data has shown that users of mental health services with a primary diagnosis of substance misuse had an early death rate 2.5 times that of the general population.\textsuperscript{73}

Despite evidence of the harmful effects of alcohol misuse and that integrated care is important in treating individuals with addiction and psychiatric disorders, such care is uncommon.\textsuperscript{205} Concurrent treatment of both mental illness and substance abuse conditions is crucial.\textsuperscript{205}

**Socioeconomic status**

Studies in Australia and the UK show that people with schizophrenia are one of the most marginalised groups in society.\textsuperscript{57, 68} They are more likely to experience poverty, high unemployment
(around two-thirds of people with schizophrenia), poor housing or homelessness (10 times the general population), isolation,\textsuperscript{80, 200} family instability and social stigma.\textsuperscript{77, 206}

These factors create both cost and social barriers to the use of health care.\textsuperscript{14, 206, 207} They also lead to lower living standards, poor health and earlier death. Focussing on increasing community engagement, gaining meaningful employment and secure housing is critical to improving mental and physical health.\textsuperscript{208} The risk factors of low socioeconomic status and severe mental illness not only expose people to a much higher risk of early mortality and poor physical health, but this double jeopardy also exposes them to much poorer access, screening and care.\textsuperscript{52}

The recent ABS analysis of mortality rates of persons accessing PBS/MBS mental health-related treatments indicated the higher rates of mortality for people who obtained mental health-related treatments regardless of socioeconomic status level (Figure 11). However, the death risk ratios increased with socioeconomic status (SES) from 2.2 times for most disadvantaged to almost 3 times for the highest SES.*\textsuperscript{13} The age standardised death rates for people living with mental illness not in the workforce were 8 times higher than those in full-time employment.\textsuperscript{209} While this probably reflects both the cause and the consequence of poor physical health, it emphasises the importance of community engagement and meaningful participation for mental health.

* This is initially counter-intuitive, and perhaps represents the gap in life expectancy is highest where the available quality of physical health care is highest, i.e. for those of high SES.
Service providers and service systems

When consumers raise important physical health issues, these concerns are frequently dismissed by health providers. Similarly, concerns raised by carers are also often ignored. Physical health treatment rates for people with a mental illness are reported to be around 50% lower than for people with only a physical illness. Studies in the USA, UK and Australia have reported poor diabetes and cancer care for people with a severe mental illness. Medication use for physical conditions is low for people with a mental illness and in Australia only about half of the people living with mental illness with hypertension, high cholesterol and diabetes use appropriate medication. There is a lack of physical health screening and monitoring for people with serious mental illness and 70% of people living with severe mental illness with comorbid diabetes do not have this condition diagnosed. Hospitalisation rates for people living with schizophrenia and cardiovascular disease were 60% that of the general population, and for people living with schizophrenia the revascularisation rate is just 30-35% that of the general population. When people with mental illness also report physical ill-health it is often viewed as part of the mental health problem and thus not investigated or treated. This scenario where healthcare professionals dismiss or ignore the physical health complaints of those with a mental illness is called ‘diagnostic overshadowing’. Overall, treatment gaps have been attributed to consumer, provider and system barriers.

Service access

People with a mental illness experience significant barriers accessing medical care. These barriers include the availability of care, the provision of care and provider training. The majority of those with mental illness are more likely to delay medical treatment due to cost or not being able to obtain appropriate medical care. When people with a mental illness do access health services their physical health needs are often seen as a part of their mental health condition. This ‘diagnostic overshadowing’ leads to physical conditions being undiagnosed and untreated, which can prove fatal. Hayes et al. found that, for people living with schizophrenia, the risk of dying before the age of 50 of heart problems is strikingly elevated, and that cardiovascular disease is infrequently diagnosed before death. People with a mental illness have the highest rate of excess deaths due to heart disease, yet medical procedures to improve blood flow to the heart are undertaken far less frequently for them, particularly for those affected by psychosis. Despite being a high-risk group, these people are less likely to be screened for high cholesterol and to be prescribed evidence-based treatment to lower cholesterol. Further, people with a mental illness are less likely to be hospitalised and then, when hospitalised, were less likely to receive treatment than the general population.
Self-care

Despite the plethora of research into the physical health of people living with mental illness, there is little work on ways people living with mental illness exercise personal agency to manage their physical health. This is a poor reflection of the state of research into mental health and perhaps reflects broader systemic problems and power imbalances in contemporary mental health, where the power and narrative are dominated by service providers, and the perspectives of service recipients and their carers are mostly missing.

People with a mental illness often have a limited opportunity to seek and use health care because of difficulty identifying symptoms, having a smaller social network to provide support and difficulty comprehending health care advice.\(^28,70\) When they do access care, they often experience social stigma and discrimination,\(^41,70,223,224\) which discourages them from seeking help in the future.\(^226\)

Staff often question the capacity of consumers to participate, and consumers view the doctors as experts.\(^225\) Wright-Berryman and Kim found that people living with severe mental illness preferred a shared decision-making approach, although this varied considerably between participants.\(^226\)

People living with mental illness do exercise personal agency despite the disempowering influence inherent in health systems. Ehrlich et al. conducted a series of interviews with people living with severe mental illness to understand the work they do to look after their physical health.\(^227\) They found three specific types of physical health-related work: discovery work to understand the roles of health professionals, sense making work to interpret mental illness and physical health, and embedding work to become engaged in the management of their physical health.\(^227\) They found that some participants, rather than relying on doctors for quick fixes (and interacting with healthcare environments they saw as unhelpful), took responsibility to become ‘self-managing producers of health’.\(^227\) Usually, these actions took the form of increased physical activity.\(^227\)

Blanner Kristiansen et al.’s qualitative study of patient views of physical health care presented an interesting conceptualisation of the issues as perceived by people living with mental illness.\(^228\) Weight, cardiovascular disease and poor physical shape were the specific issues of concern to people living with mental illness. Overall, the issues were conceptualised in three groups: lifestyle, the mental illness, and organisational issues (Figure 13).\(^228\) The study highlighted the impact of good mental health care on physical health from the patients’ perspective: “When you feel most unwell, then you do not even think about gaining weight, what you eat or exercise or anything. You simply feel too bad to even think about it.”\(^228\)

Patients believed the improvements needed were less
fragmentation of services and better cooperation between psychiatric and somatic health care. Mental health staff felt to implement physical health into daily clinical practice they needed more support from management.228

Figure 13: Consumers’ conceptualisation of the causes of physical health problems228

<table>
<thead>
<tr>
<th>Smoking</th>
<th>Lack of surplus energy</th>
<th>Lack of resources in psychiatry</th>
</tr>
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<tbody>
<tr>
<td>Poor nutrition</td>
<td>Lack of motivation</td>
<td>Lack of co-operation</td>
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<tr>
<td>Inactivity</td>
<td>Need of support</td>
<td>Professional incompetence</td>
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<tr>
<td>Substance use</td>
<td>Isolation</td>
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<tr>
<td>Self-medication</td>
<td>Medicine</td>
<td></td>
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<tr>
<td>Lack of daily structure</td>
<td>Chronic disorders</td>
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Lifestyle | The mental illness | Organisational issues

Carers and supporters
Being a long-term carer for someone living with a mental illness can reduce the carer’s self-efficacy and adds worry, anxiety and stress.229–231 This can harm the carer’s own physical and mental health and often leads to depression.90, 230, 232, 233 Carers are at greater risk of experiencing mental health problems, even after controlling for a range of socio-demographic variables.231 Carers’ wellbeing is linked to the competence and the response of services to the consumer and their carers.234 When negotiating the system, carers feel ‘invisible’, both in their ability to provide care and support for the consumer but also due to the lack of acknowledgment of the stress and demands of being a carer of someone living with mental illness.235 When carers experience poor physical health or mental health their ability to provide support to the consumer is seriously handicapped.234 The ability and willingness of services to work cooperatively with carers and supporters not only has a direct impact on the quality of life for people living with mental illness, but also the mental health, the physical health and the quality of life of their carers.234

A 2017 review of the literature on carers, physical health and mental illness revealed a paucity of research into the experience of carers of people living with mental illness.235 Carers see and are intimately aware of the strong link between physical health and mental illness. They are very aware of and concerned with the effects of medication, such as weight gain and tiredness, on the physical health of the consumers.235 The effects of the mental health care are immediately visible to carers. Also, carers are often living with their own physical health and mental health conditions. This limits their ability to provide physical health care and support to the consumer.235

Carers seek to be much more involved in the physical health care of the person they care for.236 This could take the form of helping following up on medication and treatment and generally collaborating with service providers.237 Yet carers confront numerous barriers to accessing care and getting attention paid to physical health for consumers.236

Peer support
Personal beliefs and external factors are significant access barriers for people living with severe mental illness.204 These include personal vulnerabilities such as lowered energy, motivation and social interaction skills.204 It can also include personal feelings of stigma and lack of trust in treatment providers.204 Peer supporters can help overcome some of these barriers.

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Increased commitment to peer support for people living with mental illness has been made in Australia. Various studies have shown the benefits of peer support, but few studies have investigated its effects on the physical health of people living with mental illness.

A systematic review of seven articles on the effectiveness of peer support interventions to improve the physical health of people living with severe mental illness showed inconsistent results. It should be noted that this field of research (and research with carers) is relatively undeveloped and studies were characterised by small sample sizes, a wide array of study designs and a variety of intervention types. Three studies showed some indication that interventions were effective in reducing weight, but few other physical health risk factors were measured in these studies. While most studies showed a trend towards increased attendance at primary care appointments, only two studies found significant improvements. There is still much work to be done in this area to improve research and practice. This includes developing organisational support mechanisms and integrating peer support workers into mental health service systems. In the case of physical health, this includes peer workers being part of multidisciplinary teams alongside nurses, dieticians, physiotherapists and other allied health professionals.

**Specialist mental health services**
Mental health care providers and physical health care providers both report the lack of capacity, ability and support to deal with health problems that have traditionally been in the other’s domain. Specialist mental health care providers tend to focus on mental health to the exclusion of physical health, in part because they do not consider physical health care as their responsibility. A UK study found that more than 50% of psychiatrists think the primary care sector should take responsibility for the physical health monitoring of people with mental illness. The UK National Audit of Schizophrenia revealed that only 29% of people in contact with specialist mental health services had a full check of BMI, smoking, blood pressure, blood glucose and lipids in the previous 12 months.

Gronholm et al. report several barriers experienced by mental health professionals. They include the perception of consumers having low energy and low motivation to actively engage in physical health care interventions. Health professionals also state that many people living with mental illness see themselves as physically healthy and therefore perceive no need to see a GP or have health checks. Other barriers reported by mental health professionals are lack of funding, staff shortages, high caseloads and onerous electronic records processes. In these scenarios physical health falls below other priorities. On the other hand, factors reported to increase the motivation of mental health professionals to provide holistic and physical health care were its ability to enhance the therapeutic relationship and the monitoring of performance in adhering to clinical protocols and guidelines.

The Academy of Medical Royal Colleges recommended a suite of strategies to improve the physical health of people living with mental illness. These included: strategies for disease prevention, improving compliance with national guidelines, and improving the clinical skills and knowledge for those who provide physical health care for people living with severe mental illness.

**Primary health care and GP services**
Primary care is an ideal first and continuing health care contact point for people living with mental illness. GPs will, on average, see two people per day with coexisting mental health and physical
problems.\textsuperscript{245} One Australian study has found that although nearly 87% of people with psychosis visited a GP in the past year, two-thirds of them did not receive a general or cardiovascular health check (despite all the risk factors).\textsuperscript{27, 80} The rates of screening for physical health risk indicators for people living with mental illness are much lower than those for people living with diabetes and chronic kidney disease.\textsuperscript{246} These practices can improve. A primary care audit of an early intervention psychosis program for adolescents and young adults in the UK found an initial low level of clients (20%) with physical health checks conducted by a GP, but this increased to 58% as a result of a quality improvement program.\textsuperscript{247}

**Screening is necessary, but not sufficient**

While comprehensive physical health screening is recommended\textsuperscript{248, 249} and is a necessary part of comprehensive mental health care, it is not sufficient to improve the physical health of people living with mental illness.\textsuperscript{250} There is no substantial evidence that screening alone will reduce excess mortality.\textsuperscript{158, 251-253} It is estimated that only one in five people with a mental illness have a GP mental health treatment plan.\textsuperscript{254, 255}

A review by Bardi and Moorely into the quality of physical health assessments focussed on four areas: the side effects of psychotropic medications, cardiovascular disease and diabetes, risky sexual behaviour, and diet and physical exercise.\textsuperscript{256} The authors concluded that quality physical health assessment can work well, but additional training in physical health care is needed for mental health nurses.\textsuperscript{256} They found the Health Improvement Profile (HIP) was the preferred assessment tool for nurses as it enabled them to carry out 28 physical health risk assessments in collaboration with the people living with severe mental illness and plan care based on the level of risk identified. Nonetheless, these authors also acknowledge that assessment is just a step towards enabling appropriate health care interventions.\textsuperscript{256}

**Integrated care**

In the Australian health care system, there is a separation between primary and secondary care and between mental health and physical health care. This separation often leads to poor communication between health care providers, role ambiguity and reluctance to take on additional functions. Specialist mental health teams often believe responsibility for physical health of consumers belongs to the primary health sector, while primary health providers report that the responsibility for this rests with mental health teams, albeit as part of a coordinated approach.\textsuperscript{257} Improvement in primary care linkage is achievable\textsuperscript{258} and is linked to the improvement of health outcomes.\textsuperscript{158, 258}

Systematic reviews have demonstrated the effectiveness of primary health care for people living with mental illness and the critical enablers of effectiveness.\textsuperscript{259,261} However, extensive evidence of the effectiveness of integrated community care to improve the physical health of people living with mental illness is lacking. This may reflect the lack of sound studies specifically addressing physical health indices. Alternatively, it may be indicative of the need for long-term studies to allow time for the effect of integrated care to manifest in reduced mortality. A pooled analysis of 14 RCTs found a trend to fewer deaths overall associated with integrated care.\textsuperscript{158} However, Baxter et al.’s Cochrane Review found no reliable differences in early all-cause and suicide mortality.\textsuperscript{158} These results are limited, as none of the studies reviewed reported physical health as a variable of interest.\textsuperscript{158}

A systematic review of 15 studies investigating the operation of integrated medical and psychiatric management of people living with severe mental illness found variable results.\textsuperscript{262} Likewise, Baxter et al.’s review\textsuperscript{158} found a lack of evidence of service effectiveness. However, most studies
demonstrated the feasibility, acceptability and potential clinical effectiveness of integrated care.\textsuperscript{262} Both reviews remarked on the lack of variables measuring physical health and physical health risk profile as major methodological problems. Whiteman et al. identified the hurdles to integrated care in their review of intervention studies as operating requirements, implementation time (length) and workforce requirements.\textsuperscript{262}

There have been few published studies of programs to comprehensively address the physical health of those with a mental illness.\textsuperscript{69} Nonetheless, the Academy of Medical Royal Colleges recommended creating links across medicine and healthcare professions and sharing resources, teaching and training.\textsuperscript{244} In Australia, the Early Psychosis Program has been effective in reducing weight gain over 12-weeks for those aged 15 to 25 with first-episode psychosis.\textsuperscript{83, 263} The program involves a multidisciplinary team providing individualised health coaching, dietician support and supervised exercise.\textsuperscript{83, 263} However, this study highlights that more work is needed to conceptualise integrated care/physical health research methods and measures before findings can be generalised.

**Taking a multi-illness (multi-morbidity) approach**

For the individual, living with comorbid chronic mental and physical illnesses increases the complexity of managing mental health recovery and the symptoms of the physical illness. This requires the capacity to monitor symptoms and adhere to medication through self or supported management.\textsuperscript{69, 207, 264}

While multi-morbidity is becoming increasingly recognised, health services tend to focus on the treatment of single conditions.\textsuperscript{205} Collaboration between services is often limited by different treatment approaches.\textsuperscript{205, 216} Despite the presence of physical health treatment guidelines for the management of coexisting physical and mental health conditions,\textsuperscript{265-270} service fragmentation limits the implementation of these guidelines because there is a lack of role clarity, a lack of whole person focus and poor consultation with consumers.\textsuperscript{271} The research and literature on integrative community care do not show a significant impact on excess mortality.\textsuperscript{158}

There are currently some large RCTs underway that focus on integrative community care to improve the physical health of people living with mental illness. These include the Health Improvement Profile (HIP) study,\textsuperscript{253} the IMPACT study\textsuperscript{272} and the Health Outcomes and Measurement Evaluation (HOME) study.\textsuperscript{273} To date these studies have only reported nurse difficulties in undertaking lengthy structured health checks in routine practice\textsuperscript{274} and higher rates of cardiometabolic risk factors.\textsuperscript{275} It is hoped that these studies, along with others, will provide some insights into the effective components of collaborative care to improve the physical health of people living with mental illness.\textsuperscript{145}
Future directions

There is abundant evidence about the health gap of people with severe mental illness and the evidence on how to address this gap is growing. Stewart notes there have been so many research papers published, but so little has changed.\textsuperscript{276} With such compelling evidence, it is difficult to understand the lack of improvement in the physical health of people living with mental illness. Yet this gap has not been bridged or even reduced, indeed there is a good deal of evidence that the gap is increasing. Dickerson noted that although premature mortality has decreased during past decades in both people living with mental illness and the general population, the mortality gap between these groups increased.\textsuperscript{145, 46}

A framework for action

The underlying causes and factors relating to the poor health and early death of people living with mental illness are numerous, complex and inter-related. The World Health Organization has developed a multilevel implementation model to help guide and direct actions across the individual, community and health system domains.\textsuperscript{23} This conceptualisation (Figure 14) serves to help service planners and those seeking to improve the physical health of people living with mental illness identify areas of greatest influence and potential impact. While it does address campaigns to reduce stigma, the model would be enhanced by including actions to assert the rights of people living with mental illness, especially the right to equal access to quality health care, free from discrimination.

Figure 14: Multilevel model of interventions to reduce excess mortality in people living with mental illness (taken from Liu et al.\textsuperscript{23} with permission)
Research directions
This literature review has revealed some gaps and weaknesses in research investigating the physical health of people living with mental illness. The findings have major implications for Australian mental health policy and practice. Generally, there is a need to conduct RCTs on exercise, diet and lifestyle intervention programs. This should include measurement of motivational factors, as early research has shown this to be a key ingredient of treatment effectiveness. Likewise, research is needed into the effectiveness of integrated care in improving the physical health of people living with mental illness. This requires, in all research, agreement and consistency in the measures of key outcomes. With the effects of many chronic illnesses taking decades to emerge, outcome measurement should also include health behaviours and risks known to affect long-term health and quality of life.

Consumer perspectives
There is a lack of consumer voices both in research findings and in the research production. This lack of the ‘services as received’ perspectives may be one of the major reasons why so little progress has been made in addressing the health and mortality gap for people living with mental illness. There is minimal research in understanding the relationship between collaborative decision-making in integrated care and the perceptions of consumers, allied health and primary care doctors. In an area where personal agency and personal decision-making is so important, not understanding the barriers and enablers of good physical health behaviours from a consumer and carer perspective is a serious omission. Having guidelines, standards and service audits are all important, but unless they intersect with the way people living with mental illness navigate the health and human services system, their effectiveness will be limited.

Carer perspectives
The argument related to consumer engagement and perspectives can equally be made for carers. Research in this area is vital, in an environment of limited health resources, the expertise and availability of this willing volunteer workforce are under-recognised, untapped and under-valued. Carers have the unique capacity, ability and expertise to contribute to the care and support of people living with mental illness. Understanding their perceptions, needs and limitations is vital to effectively including them in care provision.

Aboriginal and Torres Strait Islander research and perspectives
Research into the physical health of Aboriginal and Torres Strait Islander people living with mental illness is sparse. Given the high prevalence of poor health, high psychological distress and premature death of Aboriginal and Torres Strait Islander people, it is essential that more research is conducted describing and understanding this issue. Further, the conduct of research should comply with the National Health and Medical Research Council guidelines for research with Aboriginal and Torres Strait Islander people and communities. Respecting the principles of co-production, research in this area should be done with and by Aboriginal and Torres Strait Islander people. This research should also be translated into actions which seek to improve the physical health of Aboriginal and Torres Strait Islander people living with mental illness.
Clarify and standardise outcome and risk measures
Mortality related to the presence of chronic disease may take decades to manifest. This confounds comparison of research findings across studies where participants are recruited at different ages, and at different stages of their mental illness. Work is needed to develop standardised physical health outcome measures that are related to long-term mortality, and short and long-term quality of life and functional disability. Clarifying and agreeing on the components and measurement of a health risk profile would be a good first step in this process.

Health risks associated with depression and anxiety and by age group
There is now sound research illustrating the risk of specific physical illnesses associated with specific mental illness diagnoses. This includes overall risk, changing risk ratios by age groups, and the risk of people living with mental illness suffering from different physical health conditions. Most of this research data relates to people living with schizophrenia. The research published on other disorders is growing and indicates different risk profiles for other diagnoses. This has major implications for prevention and care for particular physical health conditions and specific age sub-groups. More work is needed in high prevalence diagnoses such as depression and anxiety. While the risk ratios may not be as high, interventions targeting these groups have the potential for a greater impact on total community disease burden.

There is emerging evidence to illustrate different age group risk profiles for major physical illnesses for people living with schizophrenia. There is a lack of detailed data for other diagnoses and high prevalence conditions, such as depression and anxiety. Research and analysis which reports the interactions between age, mental health diagnosis and physical health condition are needed to inform policy and clinical practice.

“... the greatest current barrier to increasing the life expectancy of persons with serious mental illness is no longer a knowledge gap, it is an implementation gap.”

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Appendix 1. Estimating the mortality gap: methodological issues

Reported mortality gaps have varied from 1.3 years \(^{20}\) to 32 years \(^{6}\) of potential life lost. The reported gap in life expectancy between people living with mental illness and the general population can vary for many reasons. To some the variation in reported life-years lost reflects the different populations, methods, measures, formulas and the operationalisation of diagnoses employed in research studies.

Various studies concentrate on different population groups. Research can focus on different age cohorts: from birth, young people, 18 years plus, all ages after diagnosis (which self-selects certain age profiles) or older persons. This can have a major impact on reported years of potential life lost (YPLL) estimates as this gap naturally lessens as the study populations get older. For example, at 30 years of age, the years of potential life lost was 15-22 years, but for this same group of people at age 70 this figure is two years.\(^ {45}\) The age of the cohort also has a major effect on the findings. Studies that recruit after the first episode of psychosis show a rate of suicide-related deaths, where studies of cohorts over 40 or 50 years of age show a much higher rate of cancer.\(^ {29}\) In breast cancer, 80% of the incidence occurs in women over the age of 50 years.\(^ {99}\) Studies of younger cohorts will miss this effect. Studies also focus on different segments of the population: those in long-stay inpatient care, those who have ever been admitted to inpatient care, registered community mental health clients, inpatient plus community clients, or the entire population. This can also influence premature mortality estimates.

Research studies can use different methods including retrospective, cross-sectional, longitudinal, cohort and epidemiological designs. This can influence mortality estimates. Likewise, the measures used to report rates of premature death vary. Years of potential life lost (YPLL), odds ratios, standardised mortality rate, life expectancy ratios, (times) life-years lost, age-adjusted death rates, standardised mortality ratios, relative risk ratios and actual age at time of death, are just some of the ways that risk of premature death is reported. The measurement method has a major effect on the reporting of results. Some authors acknowledge this difference and argue for their particular calculation method.\(^ {46}\) Nonetheless, this makes the summarisation and citation of life expectancy, and life expectancy gaps difficult and questionable. For instance, Hannerz et al. found a two-year mortality gap for people living with a mental illness at the age of 75. Whereas the same research also indicates that mortality differences (excess deaths per 1,000 person years) increased exponentially at about age 60.\(^ {45}\) The gap decreased but the risk ratio increased with age. Reported mortality rates can also vary depending on the length of the study and the retrospective data accessed.\(^ {29}\)

Another factor influencing reported mortality rates is the diagnostic groups considered. Many studies report only schizophrenia and/or severe mental illness. Other studies have reported major mental illness, psychosis, bipolar or bipolar spectrum, eating disorders, depression or all mental illnesses. A few studies have reported mortality rates for each mental illness diagnosis, but even here the diagnostic criteria for each mental health condition can vary between studies.

Finally, the definition of severe (or serious) mental illness frequently varies between studies. There are at least 17 different operationalisations of severe mental illness reported in the literature, and the variations between them can be large.\(^ {277}\) Ruggeri et al. found that depending on the definition used, between 9% and 83% of an inpatient population could be classified as living with severe mental illness.\(^ {278}\) While these reviews are now 17 and 27 years old respectively, the current diagnostic confusion continues—a variety of diagnostic definitions continue to be used in recent research and reviews.\(^ {158, 141}\) As such, comparing prevalence and mortality rates across studies of people living with severe mental illness should be approached with caution.
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