EQUALLYWELL

Quality of Life - Equality in Life

The physical health of people living with a mental illness:

A narrative literature review

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Contents

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Table of Figures

Abbreviations

ABS	Australian Bureau of Statistics
BMI	Body mass index
COPD	Chronic obstructive pulmonary disease
CVD	Cardiovascular disease
GP	General Practitioner
MBS	Medical Benefits Schedule
PBS	Pharmaceutical Benefits Scheme
RCT	Randomised controlled trial
SES	Socioeconomic status
WHO	World Health Organization

Consumer, service user or people with lived experience?

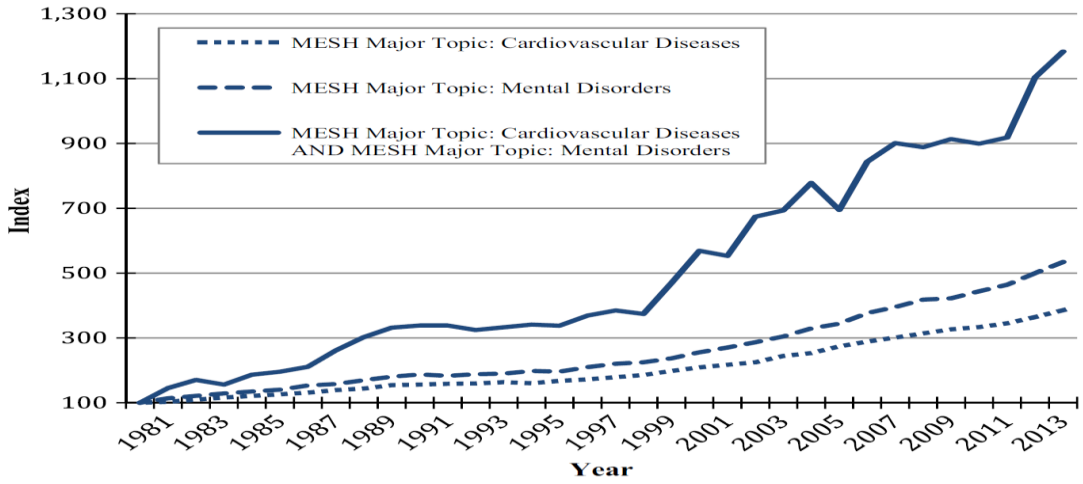
We acknowledge the wide range of terms such as service user, service recipient, consumer, patient, client, and person with lived experience. These terms reflect local contexts, historical moments, political influences and preferences. In alignment with the Equally Well National Consensus Statement, the 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."[1]
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.[2] 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[2]



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 focusses 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.*

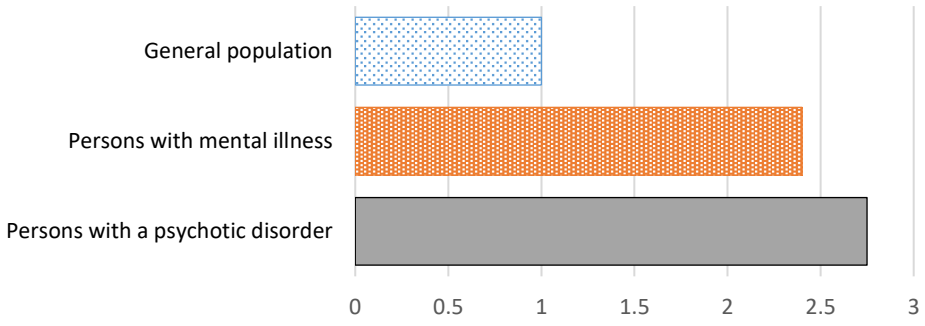
Premature mortality of people living with mental illness

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 widening[9, 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 disease[14-16]
- Four times more likely to die from respiratory disease[14, 17-19]
- Three to four times more likely to die prematurely[20-22]
- Two to four times more likely to die from infectious diseases[23, 24]
- Likely to die 20 years earlier than the general population[20, 21] and account for approximately one-third of all avoidable deaths.[1]

Figure 2: Risk of premature death[13,25,26]



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 years[20] to 32 years[6] 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.[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

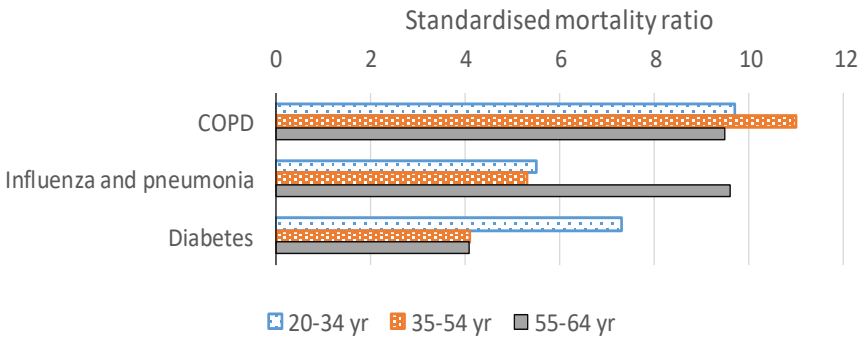
The research findings on the premature death rates of people living with schizophrenia vary based on the age of the cohort, length of follow-up and the type of study.[29] McGrath et al.'s concise overview of three systematic reviews identified 37 core studies of mortality of people living with schizophrenia.[30] 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.[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,[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.[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.[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.[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[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.[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.[32]

Figure 3: Mortality ratios for people with schizophrenia, by cause of death and age group[31]



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.[36] 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.[37] 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.[34] 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.[33]

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.[35] 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.[35] Heavy smoking multiplies the (already high) risk of premature mortality of people living with severe mental illness.[35]

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%.[26-28] There is an increasing number of studies relating depression with changes in blood chemistry such as 'sticky platelets' and increased risk of cardiovascular disease.[38, 39] 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,[3] and years life lost for people living with affective disorders were 12 for women to 16 for men.[15] 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.[8] Walker et al. found in their meta-analysis the relative risk rates for depression and mood disorders were 1.7 and 2.1 respectively.[33]

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.[40] 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.[40]

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.[8] This was much higher than the relative risk of 1.4 for people living with anxiety reported by Walker et al.[33] 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.[41]

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.[42] 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.[42]

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.[8] This equates to a life expectancy of between 50-59 years.[43] (The current average life expectancy in Australia is 82 years.[44]) Hannerz, Borgå and Borritz found a significant life expectancy gap across almost all psychiatric diagnoses, ranging from 1 to 22 years depending on diagnosis and age at time of survey.[45]

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'.[4] 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-MMI 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.[4]

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.[33] 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.[33] 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.[46] (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.[46]

Suicidality and chronic physical illness

People with schizophrenia are 10 times more likely to die from cardiovascular disease than suicide.[16] 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.[13] 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.[46] 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.[47] Similarly, the level of multi-morbidity for Aboriginal and Torres Strait Islander people is 2.6 times higher than for non-Aboriginal people.[48] 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%).[49]

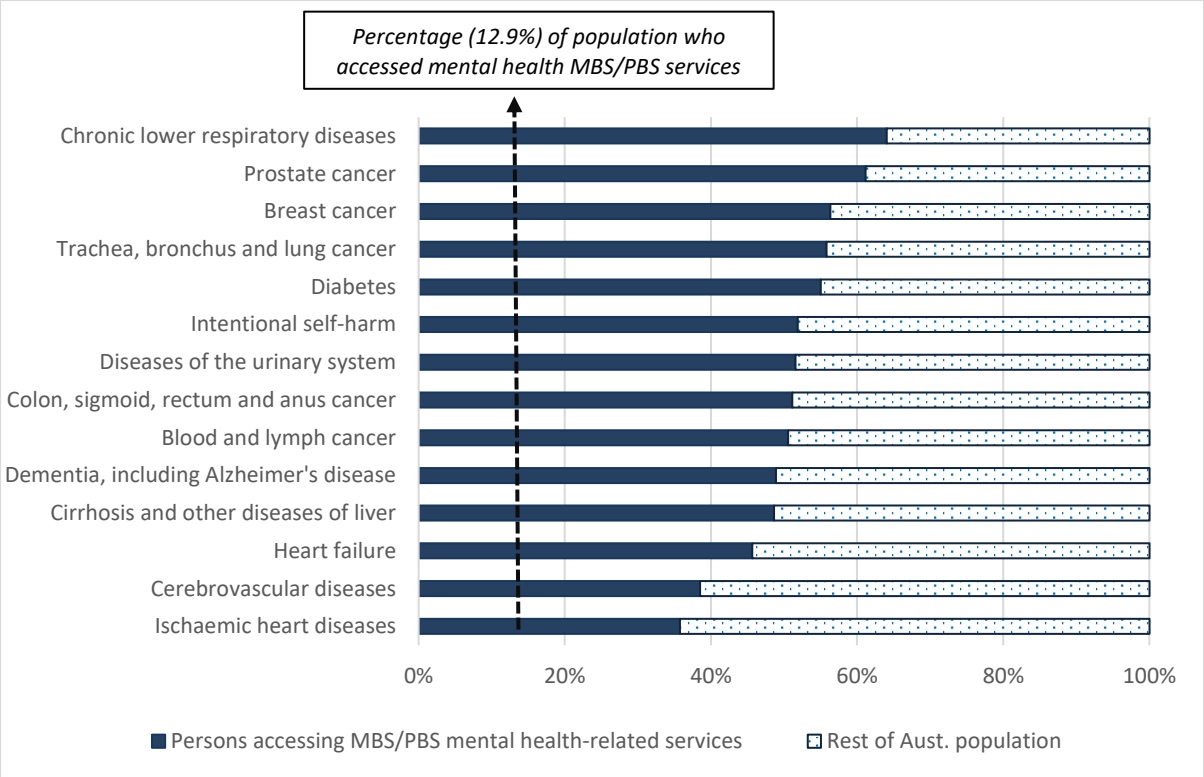
Mental illness and cardiovascular disease are the two leading drivers of the burden of disease for Aboriginal and Torres Strait Islander people, accounting for 19% and 12% of the disease burden.[50] Further, physical illness is the major predictor of psychological distress in Aboriginal populations, and

"the markedly elevated prevalence of high distress in older Aboriginal Australians appears largely attributable to greater physical morbidity and disability".[51] Forty-four percent of Aboriginal Australians with severe physical limitation experience high distress.[51] 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[52] 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[13]



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[13]

Overall mortality findings

There is a large gap in life expectancy

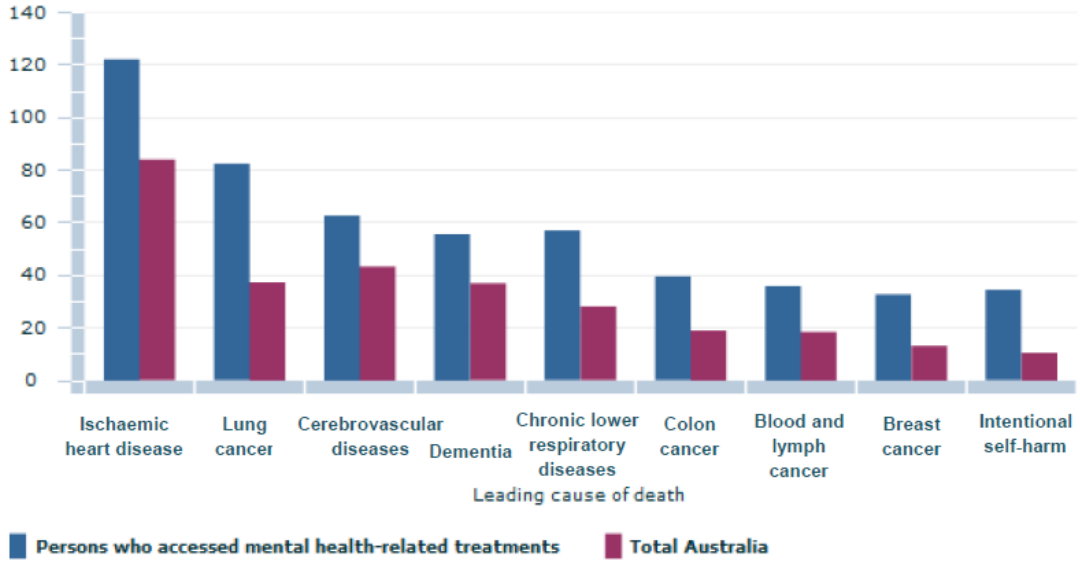
In summary, thousands of studies and hundreds of reviews have reported reduced life expectancy for people living with mental illness. This is a consistent finding across time, age groups, diagnoses, countries and continents. Figure 4 indicates this is consistent across the leading causes of death in 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".[53]

The reported years of life lost range from 10 to 32.[33] Thornicroft estimates the gap for all mental illnesses as 15 years for women and 20 years for men,[5, 54] Colton and Maderscheid report a gap of 13-30 years overall,[4] the Rethink review estimates a 20-year overall gap,[1] and the Te Pou review estimates a 20-25 year gap.[25] 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.

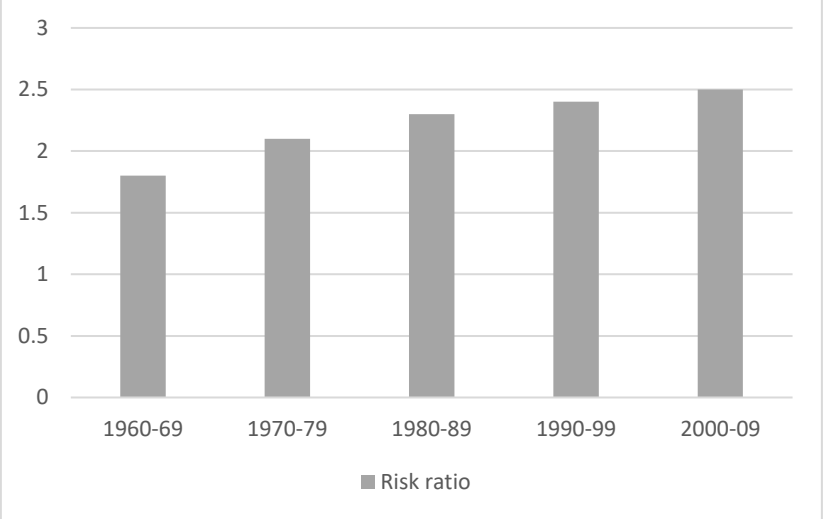
Figure 6: Death rates (per 100,000 population) of persons who accessed mental health related treatments, by cause of death – all ages[13]



The gap is increasing

There is substantial evidence of an increasing standardised mortality rate for people living with mental illness.[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,[9] perhaps reflecting the better standard of general health care in developed countries. Walker et al.'s study revealed that the mortality gap was widening over consecutive decades since 1960 (Figure 7).[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.[34] This trend exists for a variety of mental illnesses, not just schizophrenia.[46] This may, in part, be due to the benefits of improved health care not being provided to people living with mental illness.[33, 55, 56] It may also be affected by the emerging adverse health effects of second-generation antipsychotics.[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.[34]

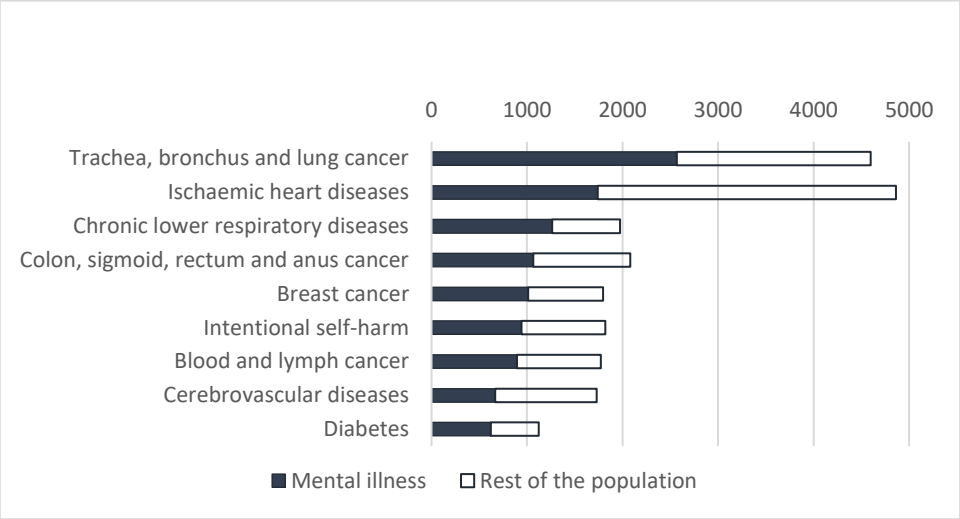
Figure 7: Mortality risk ratios of people living with mental illness by decade[33]



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[13])



Respiratory disease

People with mental illness have higher rates of emphysema, asthma, chronic bronchitis,[10, 57] pneumonia and chronic obstructive pulmonary disease than those without a diagnosis of mental illness.[28, 58] People with schizophrenia are only slightly more likely to be diagnosed with a chronic respiratory disease (23% vs 17%)[59] yet are four times more likely to die from respiratory disease.[14] Respiratory disease is a major cause of premature mortality and also contributes to poor mental health and suicidal behaviour.[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.[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.[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.[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.[7, 14] It is the major cause of early death for people living with schizophrenia,[62] accounting for a third of all deaths in this group.[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.[62]

After a depressive episode, the risk of a heart attack is four times higher than it is for those with no previous depression[60, 61, 63] and people living with depression have twice the risk of dying of cardiovascular disease.[62]

Cancer

Cancers comprise half of the total deaths of people who accessed mental health-related treatment.[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.[13] People with schizophrenia are:

- 90% more likely to be diagnosed with bowel cancer[64, 65]
- 42% more likely to be diagnosed with breast cancer.[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.[13] People who obtained mental health-related treatments had 7 times the risk of premature cancer-caused death than the general population.[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[13])

Underlying cause of death	Mental Illness		Rest of population		Total Population	
	No.	Row %	No.	Row %	No.	Row %
Trachea, bronchus and lung cancer	2567	56	2031	44	4598	100
Colon, sigmoid, rectum and anus cancer	1064	51	1018	49	2082	100
Breast cancer	1012	56	785	44	1797	100
Blood and lymph cancer	895	51	876	49	1771	100
Prostate cancer	523	61	332	39	856	100
Total cancer caused deaths	**6,061**	**55**	**5,042**	**45**	**11,103**	**100**
					0	0
Total number accessing MBS/PBS	**2,806,407**	**12**	**21,507,719**	**88**	**24,314,126**	**100**

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.[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).[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.[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[28, 66] and others show a

much higher rate for people living with mental illness.[67, 68] While there is some conflicting evidence for prevalence, there is clear evidence of higher death rates.[13, 69, 70] This suggests under diagnosis and/or lower rates of treatment for the people with a mental illness.[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.[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.[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.[74]

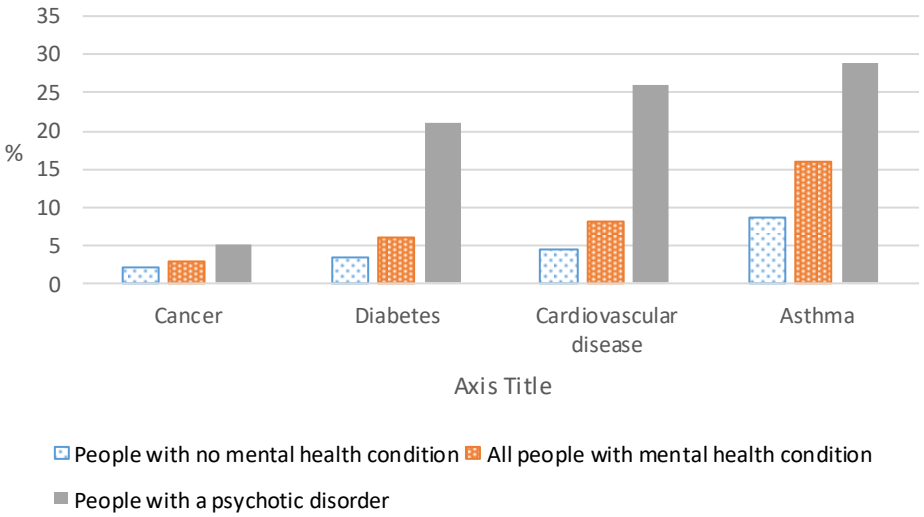
Diabetes

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.[68, 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.[27] People with schizophrenia are four to five times more likely to be diagnosed with diabetes.[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.[62]

The reported prevalence of diabetes in people with schizophrenia is probably significantly underestimated,[62, 76, 77] with many unaware that they have this condition.[78] Despite the existence of national guidelines, up to 70% of people living with severe mental illness are unscreened and untreated for diabetes.[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.[20, 79] 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.[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.[75]

Figure 10: Percentage of people experiencing a long-term physical illness[80, 81]



Taylor et al. recently conducted a review of 54 randomised control trials (RCTs) to improve glycaemic control in people living with severe mental illness.[75] The review included a narrative synthesis and, where possible, a pooled analysis.[76] The review found evidence that behavioural interventions, switching antipsychotic medications and the use of metformin led to clinically important improvements.[82] However, the evidence for an effect of pharmacological only interventions was small. Overall, pharmacological and behavioural interventions improved fasting blood glucose but not HbA_{1c}.[75] Behavioural interventions showed a larger difference compared to pharmacological interventions. Antipsychotic switching and metformin showed improvements in HbA_{1c} 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.[75]

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.[76]

Obesity

Some medications used to treat serious mental illness are associated with weight gain.[83] People with serious mental illness are more likely to be overweight,[66] with obesity in people with a mental illness described as an 'epidemic within an epidemic'.[84, 85] Approximately 65% of people living with mental illness and a coexisting physical health condition are overweight or obese.[58] Likewise, two-thirds of those with severe mental illness are overweight.[8] Studies have found that half of males and almost two-thirds of females with psychosis are obese.[27, 80] Obesity can have a profound effect on self-image, self-efficacy and general wellbeing, and it is especially salient in young adults.[86] Significant weight gain often starts immediately on the initiation of antipsychotics and is evident within 12 weeks[87-89] 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.[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.[90-93] Metabolic syndrome is associated with three times the risk of cardiovascular mortality and a two times increased risk of all-cause mortality.[94]

People with schizophrenia have been found to have four times the risk of abdominal obesity compared to the general population[95] and approximately 50% of public mental health service patients taking antipsychotic medication have a metabolic disorder.[21, 96] For people with bipolar disorder the rate is 67%.[97] The rate of metabolic syndrome in those with a serious mental illness is two and three times the rate of the general population[68] and particularly high (33-38%) for those with schizophrenia.[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%).[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.[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.[9] However, this is not an uncontested view. Many studies have shown decreased mortality associated with the use of second-generation antipsychotics.[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.[102] Poor gum health and tooth decay are widespread in people with a mental illness.[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.[104, 105] Smoking has a proven link with periodontitis[106] and smoking rates are high in those with a mental illness.[67]

Comorbidity

People living with mental illness see physical health as connected to wellbeing.[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.[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.[60] Effectively managing physical illness is an important part of treating mental illness.[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.[107]

One in nine Australians aged 16-85 has a coexisting mental disorder and physical disorder.[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.[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".[58] Eighty-one percent of people living with mental illness have two or more coexisting physical health conditions.[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.[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.[111] This parallels other research indicating two-thirds of people with a mental illness also have a coexisting medical condition[112-114] and 50% have two or more coexisting medical illnesses.[58, 114]

At first diagnosis of schizophrenia, about 50% of people also have a coexisting physical illness.[72] For about 20% of this subgroup, their medical problems go undiagnosed, worsen and have a deleterious effect on their psychiatric condition.[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.[21] These medical problems may contribute to and worsen their mental illness.[72, 115] Lorem et al.'s research concluded that physical health accounted for 12% of the total effect on mental illness symptoms.[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.[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.[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.[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.[116] Mental illness is the leading cause of health loss for people aged 15 to 44 years in New Zealand.[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.[118]

Walker et al.'s data on population attributable risk revealed the high global burden of mortality associated with mental illness.[33] 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.[119]

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.[120] (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[109, 112] international research indicates the cost of healthcare increases exponentially.[121] The additional costs of physical health problems in people living with mental illness has been estimated to increase healthcare costs by 70%.[7] 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.[120] 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.[122] 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.[123]

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.[118] 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.[118] 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.[124]

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.[107] 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.[60]

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.[125] This included $437 million spent on purchasing cigarettes and $432 million on excess health costs.[125] The cost of buying cigarettes for people living with mental illness who smoke has been estimated at one-fifth of the disability support pension.[125] Providing smoking cessation services to smokers with a mental illness represents one of the most cost-effective health interventions possible.[1]

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.[57] 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.[57, 126]

Behavioural factors have been estimated to contribute 40% to the premature deaths of people with severe mental illness.[127] Contrary to popular belief, readiness for lifestyle behaviour change is high in people with psychosis.[128] Small behavioural changes can significantly increase a person's longevity.[127] Despite this, many health professionals presume those with a mental illness are not willing, ready or able to make lifestyle changes.[128] For many people with a mental illness, this presumption ultimately proves fatal.

Smoking

Smoking kills about one in two long-term smokers[129] and is probably responsible for most of the premature deaths of people with a mental illness.[130-132] People living with mental illness consume almost half of all tobacco sold.[1, 125, 133] In the US, people living with mental illness comprise more than 200,000 of the 520,000 tobacco-attributed deaths annually.[134] A third of tobacco-attributed deaths are from cardiovascular disease, a third from cancer and a fifth from respiratory disease.[129] 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.[135, 136]

The prevalence of smoking in people with a severe mental illness is particularly high: about three times that in the general population.[67, 137] Approximately 70% of patients in mental health units smoke, and half of these are described as heavy smokers.[67, 138, 139] Up to 90% of people with schizophrenia smoke[140-142] and most smoke heavily.[143] People living with depression are also more likely to smoke, and smoke more cigarettes per day than the general population.[144]

Smoking is associated with 14 times the risk of dying from lung cancer.[143] 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).[32] A Danish study of over six million people found that smoking contributed 20% of excess years life lost in women and 8% in men.[46] Also, smoking contributed to excess mortality due to heart disease and cancer.[145] 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.[35] Smoking has also been found to have a direct independent effect on mortality of people living with schizophrenia.[137]

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.[143] 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.[134] Many mental health clinicians believe cigarettes should be given as incentives or in response to agitation.[134] 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.[139, 144] 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.[139] 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.[139]

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%).[146] Community mental health professionals and professionals who smoked were less likely to follow-up on smoking cessation attempts or provide smoking cessation support.[146] 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.[147])

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.[134] 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.[148] Involvement of peer workers can further improve quit rates.[149, 150] 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.[144]

Smoking cessation improves mental health

The 'self-medication hypothesis' reflects the widely held belief that smoking has mental health benefits.[134] Tobacco companies have funded research into this hypothesis.[151] 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 groups[155]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 health[90-92, 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 antipsychotics[98] 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.[68, 163-166] Kruisdijk et al.'s data showed hospitalised patients with severe mental illness are very sedentary and physically inactive.[167] A third of mental health service users report doing no exercise at all[68] and 72% of people living with mental illness and coexisting physical health conditions report no or low levels of exercise.[58] The level of sedentary behaviour in people living with bipolar disorder is high and is double the level observed in the elderly.[165]

Exercise provides benefits on many levels, improving energy levels, sleep and general health.[108, 164, 168] Regular physical activity also has a positive effect upon heart rate, blood pressure and many other physiological variables associated with health.[163] 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.[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.[170] Interventions, when introduced soon after the first episode of psychosis, can be very effective.[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.[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).[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.[174] Nurse-led interventions can also be effective in reducing waist circumference.[175]

De Rosa et al. found that not all studies demonstrated effectiveness. While 10 studies showed significant improvements, six did not.[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.[174] They also recommended including cardiorespiratory fitness as an additional outcome measure.[174]

Verhaeghe reviewed 14 primary studies and three systematic reviews.[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.[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,[177, 178] and other reviews recommend that people with mental illness and serious mental illness should participate in moderate physical activity,[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.[182] A recent meta-analysis found that physical activity reduces the symptoms of schizophrenia.[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.[183] The authors recommended that exercise could be considered as a standard therapeutic strategy for people living with depression.[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.[184] Schuch et al. argue programs should include dedicated clinicians (exercise physiologists/physiotherapists)[183] and should be included as a routine, essential component of a recovery program.[88, 171, 177]

Barriers and enablers

Difficulty engaging in exercise can be related to medication-related weight gain, sedation and lowered self-esteem.[114] Perceived external barriers can also hinder participation in exercise and levels of physical activity.[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.[186] They recommend low cost neighbourhood outdoor walking or personal training programs.[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.[185-187]

Reviews indicate that managing motivation is a key factor in the effectiveness of exercise programs.[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.[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.[188]

The use of smartphones and accelerometers seemed to help encourage people living with severe mental illness to be more physically active.[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.[171, 190, 191]

There is considerable evidence indicating the effectiveness of individualised and group physical exercise programs.[192, 193] However, there is also evidence that lifestyle exercise interventions can be *ineffective*; wasting participants' and professionals' time.[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.[158] Some work has begun in the area, for example, with bipolar disorder.[165, 194]

Diet

Nutrition has a powerful impact on mental and physical health.[89, 195, 196] Good nutrition is important to minimise the risk of cardiovascular diseases (CVD), diabetes and other lifestyle diseases.[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.[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.[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.[68, 89, 150, 197, 200]

Weight gain is the key contributor to the poor physical health of people living with severe mental illness.[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.[89]

A Cochrane Review of interventions found an absence of randomised trials on the effect of dietary interventions for people living with schizophrenia.[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.[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.[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.[196] They also found that interventions starting at the time of antipsychotic initiation showed greater effects.[196] Most importantly, their meta-analysis demonstrated that the involvement of dieticians in multidisciplinary teams and delivery of individualised programs increased outcome effectiveness.[196] Reviews of intervention studies have supported the important role of dieticians in dietary interventions for people living with mental illness.[192, 202] Dieticians working with people living with severe mental illness are presented with several challenges such as attendance, reduced motivation and higher sedentariness.[89, 199]

Drugs and alcohol

Alcohol has been linked to numerous medical conditions and contributes to 4% of world deaths.[203] Males with psychosis misuse alcohol at 1.5 times the rate of the general population.[26] Individuals with coexisting addiction and mental illness have poorer outcomes than those living with mental illness alone.[96] They also experience additional personal and structural barriers to accessing services.[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).[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.[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.[205] Concurrent treatment of both mental illness and substance abuse conditions is crucial.[205]

Socioeconomic status

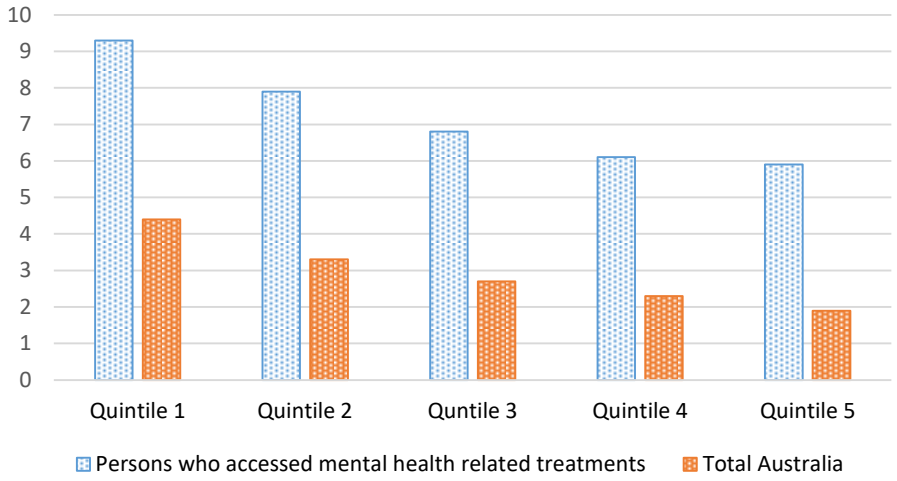
Studies in Australia and the UK show that people with schizophrenia are one of the most marginalised groups in society.[57, 68] They are more likely to experience poverty, high unemployment

(around two-thirds of people with schizophrenia), poor housing or homelessness (10 times the general population), isolation,[80, 200] family instability and social stigma.[77, 206]

These factors create both cost and social barriers to the use of health care.[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.[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.[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.* [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.[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.

Figure 11: Death rates (per 1,000 population) of persons aged 15-74 who accessed mental health related treatments by SES[13]



* *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, ie for those of high SES.*

Service providers and service systems

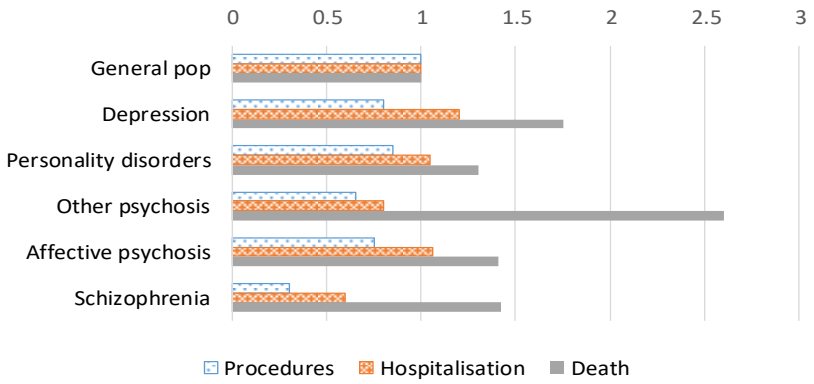
When consumers raise important physical health issues, these concerns are frequently dismissed by health providers.[210] Similarly, concerns raised by carers are also often ignored.[211] Physical health treatment rates for people with a mental illness are reported to be around 50% lower than for people with only a physical Illness.[14, 212] Studies in the USA, UK and Australia have reported poor diabetes and cancer care for people with a severe mental illness.[213-215] Medication use for physical conditions is low for people with a mental illness[126] and in Australia only about half of the people living with mental illness with hypertension, high cholesterol and diabetes use appropriate medication.[92] 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.[21, 28, 216] 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.[217] 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.[65, 204] This scenario where healthcare professionals dismiss or ignore the physical health complaints of those with a mental illness is called 'diagnostic overshadowing'.[1, 163] Overall, treatment gaps have been attributed to consumer, provider and system barriers.[7, 14]

Service access

People with a mental illness experience significant barriers accessing medical care.[7, 185, 204] These barriers include the availability of care, the provision of care and provider training.[204] 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.[215] 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.[34]

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.[148, 215, 218, 219] 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.[34, 43, 65, 220] 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.[43, 148, 217, 218, 221, 222]

Figure 12: Procedures, hospitalisations and death rates for cardiovascular disease by diagnosis[43]



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,[43, 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 problems[228]

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.

Increased commitment to peer support for people living with mental illness has been made in Australia.[238] Various studies have shown the benefits of peer support[190, 239-241] 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.[190] 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.[190] While most studies showed a trend towards increased attendance at primary care appointments, only two studies found significant improvements.[190] 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.[14] 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.[14, 57, 242] 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.[243] 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.[195]

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.[242] 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.[242] Other barriers reported by mental health professionals are lack of funding, staff shortages, high caseloads and onerous electronic records processes.[242] 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.[242]

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.[244]

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.[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).[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.[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.[247]

Screening is necessary, but not sufficient

While comprehensive physical health screening is recommended[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.[250] There is no substantial evidence that screening alone will reduce excess mortality.[158, 251-253] It is estimated that only one in five people with a mental illness have a GP mental health treatment plan.[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.[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.[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.[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.[257] Improvement in primary care linkage is achievable[258] and is linked to the improvement of health outcomes.[158, 258]

Systematic reviews have demonstrated the effectiveness of primary health care for people living with mental illness and the critical enablers of effectiveness.[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.[158] However, Baxter et al.'s Cochrane Review found no reliable differences in early all-cause and suicide mortality.[158] These results are limited, as none of the studies reviewed reported physical health as a variable of interest.[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.[262] Likewise, Baxter et al.'s review[158] found a lack of evidence of service effectiveness. However, most studies

demonstrated the feasibility, acceptability and potential clinical effectiveness of integrated care.[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.[262]

There have been few published studies of programs to comprehensively address the physical health of those with a mental illness.[69] Nonetheless, the Academy of Medical Royal Colleges recommended creating links across medicine and healthcare professions and sharing resources, teaching and training.[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.[83, 263] The program involves a multidisciplinary team providing individualised health coaching, dietician support and supervised exercise.[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.[69, 207, 264]

While multi-morbidity is becoming increasingly recognised, health services tend to focus on the treatment of single conditions.[205] Collaboration between services is often limited by different treatment approaches.[205, 216] Despite the presence of physical health treatment guidelines for the management of coexisting physical and mental health conditions,[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.[271] The research and literature on integrative community care do not show a significant impact on excess mortality.[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,[253] the IMPACT study[272] and the Health Outcomes and Measurement Evaluation (HOME) study.[273] To date these studies have only reported nurse difficulties in undertaking lengthy structured health checks in routine practice[274] and higher rates of cardiometabolic risk factors.[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.[145]

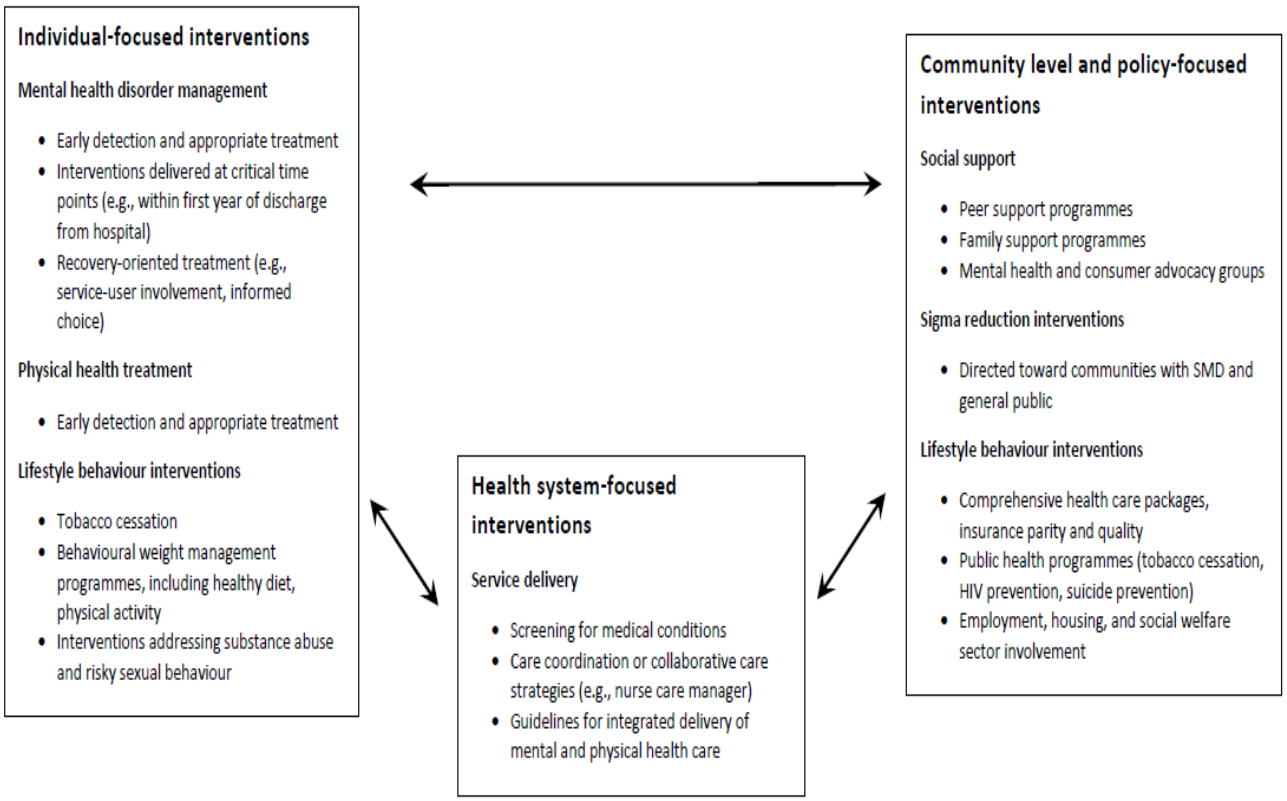
Future directions

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.[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.[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.[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.[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.[225] 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.[55] 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."[88]

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, 143] As such, comparing prevalence and mortality rates across studies of people living with severe mental illness should be approached with caution.

References

1. Rethink. Lethal Discrimination. Why people are dying needlessly and what needs to change. London: Rethink mental illness; 2013.
2. Blanner Kristiansen C, Høstrup Vestergaard C. Secular trends in the interest of physical health in patients with mental illness. Acta Psychiatrica Scandinavica. 2015;132(5): 408-410.
3. Chang C-K, Hayes RD, Perera G, Broadbent MTM, Fernandes AC, Lee WE, et al. Life Expectancy at Birth for People with Serious Mental Illness and Other Major Disorders from a Secondary Mental Health Care Case Register in London (Mental Disorder and Life Expectancy). PLoS ONE. 2011;6(5): e19590.
4. Colton CW, Manderscheid RW. Congruencies in Increased Mortality Rates, Years of Potential Life Lost, and Causes of Death Among Public Mental Health Clients in Eight States. Preventing Chronic Disease. 2006;3(2).
5. Thornicroft G. Premature death among people with mental illness: At best a failure to act on evidence at worst a form of lethal discrimination. BMJ: British Medical Journal. 2013;346:f2969
6. World Health Organisation. Mental health action plan 2013-2020. Geneva: World Health Organisation; 2013.
7. The mental and physical health platform. Mental health and physical health charter. London: The mental and physical health platform; 2013.
8. Lawrence D, Hancock K, Kisely S. The gap in life expectancy from preventable physical illness in psychiatric patients in Western Australia: retrospective analysis of population based registers. BMJ: British Medical Journal. 2013;346(7909).
9. Saha S, Chant D, McGrath J. Is mortality risk in schizophrenia rising? A systematic review. Schizophr Bull. 2007;33(2): 245-246.
10. Scott D, Happell B. The High Prevalence of Poor Physical Health and Unhealthy Lifestyle Behaviours in Individuals with Severe Mental Illness. Issues in Mental Health Nursing. 2011;32(9): 589-597.
11. Lawrence D, Hancock KJ, Kisely S. The gap in life expectancy from preventable physical illness in psychiatric patients in Western Australia: retrospective analysis of population based registers. BMJ: British Medical Journal. 2013;346(7909).
12. Depression in the workplace is associated with high indirect costs related to absenteeism and impaired performance. Drugs & Therapy Perspectives. 2008;24(6): 23-26.
13. Australian Bureau of Statistics. Mortality of people using mental health services and prescription medications. Analysis of 2011 data. Canberra: ABS; 2017.
14. Royal Australian and New Zealand College of Psychiatrists. Keeping mind and body together. Melbourne: RANZCP; 2015.
15. Nordentoft M, Wahlbeck K, Hällgren J, Westman J, Ösby U, Alinaghizadeh H, et al. Excess mortality, causes of death and life expectancy in 270,770 patients with recent onset of mental disorders in Denmark, Finland and Sweden. PloS one. 2013;8(1): e55176.
16. Lambert T, Newcomer JW. Are the cardiometabolic complications of schizophrenia still neglected? Barriers to care. Medical Journal of Australia. 2009;190(4): S39-S42.
17. Cuijpers P, Vogelzangs N, Twisk J, Kleiboer A, Li J, Penninx BW. Comprehensive meta-analysis of excess mortality in depression in the general community versus patients with specific illnesses. American journal of psychiatry. 2014;171(4): 453-462.
18. Crump C, Winkleby MA, Sundquist K, Sundquist J. Comorbidities and mortality in persons with schizophrenia: a Swedish national cohort study. American Journal of Psychiatry. 2013;170(3): 324-333.
19. Crump C, Sundquist K, Winkleby MA, Sundquist J. Comorbidities and mortality in bipolar disorder: a Swedish national cohort study. JAMA psychiatry. 2013;70(9): 931-939.
20. Brown S, Kim M, Mitchell C, Inskip H. Twenty-five year mortality of a community cohort with schizophrenia. The British journal of psychiatry: the journal of mental science. 2010;196(2): 116.
21. Holt RIG, Peveler RC. Diabetes and cardiovascular risk in severe mental illness: A missed opportunity and challenge for the future. Practical Diabetes International. 2010;27(2): 79-84.
22. Brown S. Excess mortality of schizophrenia. A meta-analysis. British Journal of Psychiatry. 1997;171: 502-508.
23. Liu N, Daumit G, Dua T, Aquila R, Charlson F, Cuijpers P, et al. Excess mortality in persons with severe mental disorders: a multilevel intervention framework and priorities for clinical practice, policy and research agendas. World Psychiatry. 2017;16(1): 30-40.
24. Saha S, Chant D, McGrath J. A systematic review of mortality in schizophrenia: is the differential mortality gap worsening over time? Archives of general psychiatry. 2007;64(10): 1123-1131.
25. Te Pou. The physical health of people with a serious mental illness and/or addiction. An evidence review. Auckland: Te Pou; 2014.
26. Cunningham R, Peterson D, Sarfati D, Stanley J, Collings S. Premature mortality in adults using New Zealand psychiatric services. N Z Med J. 2014;127(1394): 31-41.
27. Morgan VA, Waterreus A, Jablensky AV, Mackinnon A, McGrath J, Carr V, et al. People living with psychotic illness 2010. Report on the second Australian national survey. Canberra: Commonwealth of Australia, 2011 Contract No.: D0556.

28. De Hert M, Correll CU, Bobes J, Cetkovich-Bakmas M, Cohen D, Asai I, et al. Physical illness in patients with severe mental disorders. I. Prevalence, impact of medications and disparities in health care. World psychiatry: official journal of the World Psychiatric Association (WPA). 2011;10(1): 52.
29. Bushe C, Taylor M, Haukka J. Mortality in schizophrenia: a measurable clinical endpoint. Journal of psychopharmacology. 2010;24(4_suppl): 17-25.
30. McGrath J, Saha S, Chant D, Welham J. Schizophrenia: a concise overview of incidence, prevalence, and mortality. Epidemiologic reviews. 2008;30(1): 67-76.
31. Olfson M, Gerhard T, Huang C, Crystal S, Stroup T. Premature mortality among adults with schizophrenia in the United States. JAMA psychiatry. 2015;72(12): 1172-1181.
32. Tran E, Rouillon F, Loze JY, Casadebaig F, Philippe A, Vitry F, et al. Cancer mortality in patients with schizophrenia. Cancer. 2009;115(15): 3555-3562.
33. Walker E, McGee R, Druss B. Mortality in mental disorders and global disease burden implications: A systematic review and meta-analysis. JAMA Psychiatry. 2015;72(4): 334-341.
34. Hayes J, Marston L, Walters K, King M, Osborn D. Mortality gap for people with bipolar disorder and schizophrenia: UK-based cohort study 2000–2014. The British Journal of Psychiatry. 2017;211(3): 175-181.
35. Chesney E, Goodwin GM, Fazel S. Risks of all-cause and suicide mortality in mental disorders: a meta-review. World Psychiatry. 2014;13(2): 153-160.
36. Roshanaei-Moghaddam B, Katon W. Premature mortality from general medical illnesses among persons with bipolar disorder: a review. Psychiatric Services. 2009;60(2): 147-156.
37. Laursen TM, Musliner KL, Benros ME, Vestergaard M, Munk-Olsen T. Mortality and life expectancy in persons with severe unipolar depression. Journal of affective disorders. 2016;193: 203-207.
38. do Carmo MBO, Mendes-Ribeiro AC, Matsuura C, Pinto VL, Mury WV, Pinto NO, et al. Major depression induces oxidative stress and platelet hyperaggregability. Journal of psychiatric research. 2015;61: 19-24.
39. Granville Smith I, Parker G, Rourke P, Cvejic E, Vollmer-Conna U. Acute coronary syndrome and depression: A review of shared pathophysiological pathways. Australian & New Zealand Journal of Psychiatry. 2015;49(11): 994-1005.
40. Saz P, Dewey ME. Depression, depressive symptoms and mortality in persons aged 65 and over living in the community: a systematic review of the literature. International journal of geriatric psychiatry. 2001;16(6): 622-630.
41. Lawrence D. Excess mortality, mental illness and global burden of disease. Epidemiology and psychiatric sciences. 2015;24(2): 141.
42. Harris E, Barraclough B. Excess mortality of mental disorder. The British Journal of Psychiatry. 1998;173(1): 11-53.
43. Lawrence D, Coghlan R. Health inequalities and the health needs of people with mental illness. New South Wales Public Health Bulletin. 2002;13(7): 155-158.
44. Australian Institute of Health and Welfare. Health-adjusted life expectancy in Australia: expected years lived in full health 2011 Canberra: AIHW, 2017.
45. Hannerz H, Borgå P, Borritz M. Life expectancies for individuals with psychiatric diagnoses. Public health. 2001;115(5): 328-337.
46. Erlangsen A, Andersen PK, Toender A, Laursen TM, Nordentoft M, Canudas-Romo V. Cause-specific life-years lost in people with mental disorders: a nationwide, register-based cohort study. The Lancet Psychiatry. 2017;4(12).
47. Vos T, Barker B, Begg S, Stanley L, Lopez AD. Burden of disease and injury in Aboriginal and Torres Strait Islander Peoples: the Indigenous health gap. International Journal of Epidemiology. 2009;38(2): 470-477.
48. Randall DA, Lujic S, Havard A, Eades SJ, Jorm L. Multimorbidity among Aboriginal people in New South Wales contributes significantly to their higher mortality. Med J Aust. 2018;209(1): 19-23.
49. Australian Bureau of Statistics. 4714.0.–National Aboriginal and Torres Strait Islander Social Survey, 2014–15 Canberra: ABS; 2016 [cited 2018 21 August]. Available from: http://www.abs.gov.au/ausstats/abs@.nsf/mf/4714.0.
50. Australian Institute of Health and Welfare. Australian Burden of Disease Study: Impact and causes of illness and death in Australia 2011. Series, Canberra: AIHW, 2016.
51. McNamara BJ, Banks E, Gubhaju L, Joshy G, Williamson A, Raphael B, et al. Factors relating to high psychological distress in Indigenous Australians and their contribution to Indigenous–non-Indigenous disparities. Australian and New Zealand Journal of Public Health. 2018;42(2): 145-152.
52. Das-Munshi J, Stewart R, Morgan C, Nazroo J, Thornicroft G, Prince M. Reviving the 'double jeopardy' hypothesis: physical health inequalities, ethnicity and severe mental illness. 2016; 183.
53. Lawrence D, Kisely S, Pais J. The Epidemiology of Excess Mortality in People with Mental Illness. The Canadian Journal of Psychiatry. 2010;55(12): 752-760.
54. Thornicroft G. Physical health disparities and mental illness: the scandal of premature mortality. The British journal of psychiatry: the journal of mental science. 2011;199(6): 441.
55. Roberts R. The health of older people in Australia: 85 is the new 65. Australian Journal of Rural Health. 2017;25(4): 198-199.
56. Australian Bureau of Statistics. Australian Demographic Statistics, Dec 2016. Canberra: ABS; 2017.
57. Robson D, Gray R. Serious mental illness and physical health problems: A discussion paper. International Journal of Nursing Studies. 2007;44(3): 457-466.
58. Australian Bureau of Statistics. National Health Survey: Mental Health and co-existing physical health conditions, Australia, 2014-15 Canberra: ABS; 2016.

59. Hippisley-Cox J. A comparison of survival rates for pople with mental health problems and the remaining population without specific conditions. Disability Research Council, 2006.
60. Fässberg MM, Cheung G, Canetto SS, Erlangsen A, Lapierre S, Lindner R, et al. A systematic review of physical illness, functional disability, and suicidal behaviour among older adults. Ageing and mental health. 2016;20:166-94.
61. Lorem GF, Schirmer H, Wang CE, Emaus N. Ageing and mental health: changes in self-reported health due to physical illness and mental health status with consecutive cross-sectional analyses. BMJ open. 2017;7(1): e013629.
62. Mangurian C, Newcomer J, Modlin C, Schillinger D. Diabetes and cardiovascular care among people with severe mental illness: a literature review. Journal of general internal medicine. 2016;31(9): 1083-1091.
63. Turner J, Kelly B. Emotional dimensions of chronic disease. Western Journal of Medicine. 2000;172(2): 124-128.
64. Hippisley-Cox J, Vinogradova Y, Coupland C, Parker C. Risk of malignancy in patients with schizophrenia or bipolar disorder: Nested case-control study. Archives of General Psychiatry. 2007;64(12): 1368-1376.
65. Merrick J, Merrick E. Equal treatment: closing the gap. A formal investigation into physical health inequalities experienced by people with learning disabilities and/or mental health problems. Journal of Policy and Practice in Intellectual Disabilities. 2007;4(1): 73-73.
66. Oakley-Browne M, Wells JE, Scott KM. Te Rau Hinengaro: The New Zealand Mental Health Survey: Summary: Ministry of Health; 2006.
67. Wheeler AJ, McKenna B, Madell D. Stereotypes do not always apply: Findings from a survey of the health behaviours of mental health consumers compared with the general population in New Zealand. New Zealand Medical Journal. 2013;126(1385): 35-46.
68. Scott D, Happell B. The High Prevalence of Poor Physical Health and Unhealthy Lifestyle Behaviours in Individuals with Severe Mental Illness. Issues in Mental Health Nursing. 2011;32(9): 589-597.
69. Kisely S, Simon G. An international study comparing the effect of medically explained and unexplained somatic symptoms on psychosocial outcome. Journal of psychosomatic research. 2006;60(2): 125.
70. Lawrence D, Kisely S. Review: Inequalities in healthcare provision for people with severe mental illness. Journal of Psychopharmacology. 2010;24: 61-68.
71. Oakley Browne MA, Wells JE, Scott KM, McGee MA. The Kessler Psychological Distress Scale in Te Rau Hinengaro: the New Zealand Mental Health Survey. Australian and New Zealand Journal of Psychiatry. 2010;44(4): 314-322.
72. Lawrence D, D'Arcy C, Holman J, Jablensky AV, Threfall TJ, Fuller SA. Excess cancer mortality in Western Australian psychiatric patients due to higher case fatality rates. Acta Psychiatrica Scandinavica. 2000;101(5): 382-388.
73. Goodman D. Cancer-Related Mortality in People With Mental Illness. JAMA. 2013;309(14): 1440.
74. Clifton A, Burgess C, Clement S, Ohlsen R, Ramluggun P, Sturt J, et al. Influences on uptake of cancer screening in mental health service users: a qualitative study. Psycho-Oncol. 2016;16:257
75. Taylor J, Stubbs B, Hewitt C, Ajjan R, Alderson S, Gilbody S, et al. The Effectiveness of Pharmacological and Non-Pharmacological Interventions for Improving Glycaemic Control in Adults with Severe Mental Illness: A Systematic Review and Meta-Analysis. PloS one. 2017;12(1): e0168549.
76. Siddiqi N, Lewis H, Taylor J, Mahmoodi N, Wright J, McDermid K. A systematic review of pharmacological and non-pharmacological interventions for improving diabetes outcomes in people with serious mental illness. PROSPERO International prospective register of systematic reviews. 2015.
77. International Council of Nurses. Mental Health; Tackling the challenges. In: ICN, editor. Geneva, Switzerland: ICN; 2001.
78. Lawn S. 'The Needs of Strangers': Understanding Social Determinants of Mental Illness. Social Alternatives. 2008;27(4): 36-41.
79. Holt RIG, Abdelrahman T, Hirsch M, Dhesi Z, George T, Blincoe T, et al. The prevalence of undiagnosed metabolic abnormalities in people with serious mental illness. (Report). Journal of Psychopharmacology. 2010;24(6): 867-873.
80. Morgan VA, Waterreus A, Jablensky A, Mackinnon A, McGrath J, Carr V, et al. People living with psychotic illness in 2010: The second Australian national survey of psychosis. Australian & New Zealand Journal of Psychiatry. 2012;46(8): 735-752.
81. Australian Bureau of Statistics. National health survey, 2007-08. Canberra: ABS, 2009.
82. Taylor J, Mahmoodi N, Stubbs B, Lewis H, Hosali P, Hewitt C, et al. P15 Improving diabetes outcomes in severe mental illness: A systematic review and meta-analysis of pharmacological and non-pharmacological interventions. BMJ Publishing Group Ltd; 2016.
83. Curtis J, Watkins A, Rosenbaum S, Teasdale S, Kalucy M, Samaras K, et al. Evaluating an individualized lifestyle and life skills intervention to prevent antipsychotic-induced weight gain in first-episode psychosis. Early Intervention in Psychiatry. 2016;10(3): 267-276.
84. L MS. Obesity in patients with severe mental illness: Overview and management. Journal of Clinical Psychiatry. 2009;70(3): 12-21.
85. Bailey S, Gerada C, Lester H, Shiers D. The cardiovascular health of young people with severe mental illness: Addressing an epidemic within an epidemic. Psychiatrist. 2012;36(10): 375-378.
86. Foley DL, Morley KI. Systematic review of early cardiometabolic outcomes of the first treated episode of psychosis. Archives of general psychiatry. 2011;68(6): 609-616.
87. Pérez-Iglesias R, Martínez-García O, Pardo-Garcia G, Amado JA, Garcia-Unzueta MT, Tabares-Seisdedos R, et al. Course of weight gain and metabolic abnormalities in first treated episode of psychosis: the first year is a critical period

for development of cardiovascular risk factors. International Journal of Neuropsychopharmacology. 2014;17(1): 41-51.
88. Bartels SJ, Pratt SI, Aschbrenner KA, Barre LK, Naslund JA, Wolfe R, et al. Pragmatic replication trial of health promotion coaching for obesity in serious mental illness and maintenance of outcomes. The American journal of psychiatry. 2015;172(4): 344.
89. Teasdale S, Samaras K, Wade T, Jarman R, Ward PB. A review of the nutritional challenges experienced by people living with severe mental illness: a role for dietitians in addressing physical health gaps. 2017: 545-553.
90. Collins E, Tranter S, Irvine F. The physical health of the seriously mentally ill: an overview of the literature. Journal of Psychiatric and Mental Health Nursing. 2012;19(7): 638-646.
91. Organ B, Nicholson E, Castle D. Implementing a physical health strategy in a mental health service. Australasian Psychiatry. 2010;18(5): 456-459.
92. Galletly CA, Foley DL, Waterreus A, Watts GF, Castle DJ, McGrath JJ, et al. Cardiometabolic risk factors in people with psychotic disorders: The second Australian national survey of psychosis. Australian & New Zealand Journal of Psychiatry. 2012;46(8): 753-761.
93. Kaur J. A comprehensive review on metabolic syndrome.(Disease/Disorder overview). Cardiology Research and Practice. 2014.
94. Lakka H-M, Laaksonen DE, Lakka TA, Niskanen LK, Kumpusalo E, Tuomilehto J, et al. The metabolic syndrome and total and cardiovascular disease mortality in middle-aged men. Jama. 2002;288(21): 2709-2716.
95. Vancampfort D, Wampers M, Mitchell AJ, Correll CU, Herdt A, Probst M, et al. A meta-analysis of cardio-metabolic abnormalities in drug naïve, first-episode and multi-episode patients with schizophrenia versus general population controls. World Psychiatry. 2013;12(3): 240-250.
96. Suvisaari J, Saarni S, Perala J, Lonqvist J. Metabolic syndrome among persons with psychotic disorders in a general population survey. The journal of clinical psychiatry. 2007;7:1045-1055.
97. John AP, Koloth R, Dragovic M, Lim SC. Prevalence of metabolic syndrome among Australians with severe mental illness. Med J Aust. 2009;190(4): 176-179.
98. Vancampfort D, Stubbs B, Mitchell AJ, De Hert M, Wampers M, Ward PB, et al. Risk of metabolic syndrome and its components in people with schizophrenia and related psychotic disorders, bipolar disorder and major depressive disorder: a systematic review and meta-analysis. World Psychiatry. 2015;14(3): 339-347.
99. Bushe CJ, Bradley AJ, Wildgust HJ, Hodgson RE. Schizophrenia and breast cancer incidence: a systematic review of clinical studies. Schizophrenia research. 2009;114(1): 6-16.
100. Tiihonen J, Lönnqvist J, Wahlbeck K, Klaukka T, Niskanen L, Tanskanen A, et al. 11-year follow-up of mortality in patients with schizophrenia: a population-based cohort study (FIN11 study). The Lancet. 2009;374(9690): 620-627.
101. Tiihonen J, Haukka J, Taylor M, Haddad PM, Patel MX, Korhonen P. A nationwide cohort study of oral and depot antipsychotics after first hospitalization for schizophrenia. American Journal of Psychiatry. 2011;168(6): 603-609.
102. Happell B, Platania-Phung C, Scott D, Hanley C. Access to dental care and dental ill-health of people with serious mental illness: views of nurses working in mental health settings in Australia. Australian journal of primary health. 2015;21(1): 32-37.
103. McCreadie R, Stevens H, Henderson J, Hall D, McCaul R, Filik R, et al. The dental health of people with schizophrenia. Acta Psychiatrica Scandinavica. 2004;110(4): 306-310.
104. Kisely S, Quek LH, Pais J, Lalloo R, Johnson N, Lawrence D. Advanced dental disease in people with severe mental illness: systematic review and meta-analysis. Br J Psychiatry. 2011: 187-193.
105. Kisely S, Baghaie H, Lalloo R, Siskind D, Johnson NW. A systematic review and meta-analysis of the association between poor oral health and severe mental illness. Psychosomatic medicine. 2015;77(1): 83-92.
106. Zeng J, Williams SM, Fletcher DJ, Cameron CM, Broadbent JM, Shearer DM, et al. Reexamining the association between smoking and periodontitis in the dunedin study with an enhanced analytical approach. Journal of periodontology. 2014;85(10): 1390.
107. Happell B, Ewart S, Platania-Phung C, Bocking J, Scholz B, Stanton R. What Physical Health Means to Me: Perspectives of People with Mental Illness. Issues in mental health nursing. 2016;37(12): 934-941.
108. De Hert M, Cohen D, Bobes J, Cetkovich-Bakmas M, Leucht S, Ndetei DM, et al. Physical illness in patients with severe mental disorders. II. Barriers to care, monitoring and treatment guidelines, plus recommendations at the system and individual level. World psychiatry. 2011;10(2): 138-151.
109. Australian Institute of Health and Welfare. Comorbidity of mental disorders and physical conditions 2007. Canberra: AIHW; 2012.
110. Roberts R. Integrating rural health care. Australian Journal of Rural Health. 2017;25(1): 4-5.
111. Australian Institute of Health and Welfare. Chronic Disease Comorbidity. Canberra: AIHW, 2017.
112. Deborah JS, Emily JC, Rupendra NS, Megan EP, Richard P, Simon JK. Multiple chronic health conditions and their link with labour force participation and economic status. PLoS ONE.8(11): e79108.
113. Scott, K., et al. "Obesity and mental disorders in the general population: results from the world mental health surveys." International Journal of Obesity. 2007;32(1): 192-200.

114. Jones DR, Macias C, Barreira PJ, Fisher WH, Hargreaves WA, Harding CM. Prevalence, severity, and co-occurance of chronic physical health problems of persons with serious mental illness. Psychiatric Services. 2004;55(11): 1250-1257.
115. de la Salud Mental FM. Mental Health and chronic physical illnesses–the need for continued and integrated care, 2010. Woodbridge: WORLD Federation for Mental Health. 2010;7(3): 127.
116. Greig J. The Australian rural and remote mental health and social wellbeing: Economic insights and policy innovations Eigth Australian Rural and Remote Mental Health Symposium; Oct, 2015; Victoria: ANZMHA; 2015.
117. Tobias M, Turley M. Health Loss in New Zealand: A Report from the New Zealand Burden of Diseases, Injuries and Risk Factors Study, 2006-2016: Ministry of Health; 2013.
118. Medibank Private. The case for mental health reform in Australia: A review of expenditure and system design. Melbourne: 2013.
119. Naylor C, Das P, Ross S, Honeyman M, Thompson J, Gilburt H. Bringing together physical and mental health. A new frontier for integrated care London: The Kings Fund. 2016.
120. Royal Australian and New Zealand College of Psychiatrists. The economic cost of serious mental illness and comorbidities in Australia and New Zealand. Melbourne: RANZCP; 2016.
121. Unützer J, Schoenbaum M, Katon WJ, Fan MY, Pincus HA, Hogan D, et al. Healthcare Costs Associated with Depression in Medically Ill Fee-for-Service Medicare Participants. Journal of the American Geriatrics Society. 2009;57(3): 506-510.
122. Frey S. The economic burden of schizophrenia in Germany: a population-based retrospective cohort study using genetic matching. European Psychiatry. 2014;29(8): 479-489.
123. Walker ER, Druss BG. Cumulative burden of comorbid mental disorders, substance use disorders, chronic medical conditions, and poverty on health among adults in the U.S.A. Psychology, Health & Medicine. 2017;22(6): 727-735.
124. Doran CM. The evidence on the costs and impacts on the economy and productivity due to mental ill health: a rapid review. Mental Health Commission, NSW. 2013.
125. Access Economics. Smoking and Mental Illness: Costs. Report. Canberra: SANE Australia, 2007.
126. Mitchell A, Lord O, Malone D. Differences in the prescribing of medication for physical disorders in individuals with v. without mental illness: meta-analysis. Br J Psychiatry. 2012: 435-443.
127. Linde-Feucht S. Defining wellness: key principles, elements and barriers. National Wellness Summit for People with Mental Illness. 2007.
128. Archie S, Goldberg J, Akhtar-Danesh N, Landeen J, McColl L, McNiven J. Psychotic Disorders, Eating Habits, and Physical Activity: Who Is Ready for Lifestyle Changes? Psychiatric Services. 2007;58(2): 233-239.
129. U.S. Department of Health and Human Services. The Health Consequences of Smoking: 50 Years of Progress. A Report of the Surgeon General. Atlanta: DHHS, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health; 2014.
130. Her Majesty's Government DoH. No health withous mental health: A cross-government mental health outcomes strategy for people of all ages. In: HMG/DH, editor. London: HMG/DH; 2011.
131. Royal College of Physicians and Royal College of Psychiatrists. Smoking and mental health. London: RCP; 2013.
132. Lawn S. In it together: physical health and well-being for people with mental illness. Australian & New Zealand Journal of Psychiatry. 2012;46(1): 14-17.
133. McManus S, Meltzer H, Campion J. Cigarette smoking and mental health in England. Data from the Adult Psychiatric Morbidity Survey National Centre for Social Research. 2010.
134. Prochaska JJ, Das S, Young-Wolff KC. Smoking, Mental Illness, and Public Health. Annual Review of Public Health. 2017;38(1): 165-185.
135. Szatkowski L, McNeill A. Diverging trends in smoking behaviors according to mental health status. Nicotine & Tobacco Research. 2014;17(3): 356-360.
136. Lê Cook B, Wayne GF, Kafali EN, Liu Z, Shu C, Flores M. Trends in smoking among adults with mental illness and association between mental health treatment and smoking cessation. Jama. 2014;311(2): 172-182.
137. Dickerson F, Origoni A, Schroeder J, Schweinfurth LA, Stallings C, Savage CL, et al. Mortality in schizophrenia and bipolar disorder: clinical and serological predictors. Schizophrenia research. 2016;170(1): 177-183.
138. Jochelson K. Clearing the air: debating smoke-free policies in psychiatric units: King's Fund; 2006.
139. Sheals K, Tombor I, McNeill A, Shahab L. A mixed-method systematic review and meta-analysis of mental health professionals' attitudes toward smoking and smoking cessation among people with mental illnesses. Addiction. 2016;111(9): 1536-1553.
140. Australian Bureau of Statistics. National survey of mental health and wellbeing: Summary of results, 2007. Canberra: ABS, 2008. Contract No.: Cat no. 4326.0.
141. Volkow ND. Comorbidity: Addiction and other mental illnesses. New York: National Institute on Drug Abuse, 2010.
142. Ziedonis D, Williams JM, Smelson D. Serious mental illness and tobacco addiction: a model program to address this common but neglected issue. The American journal of the medical sciences. 2003;326(4): 223-230.
143. Khanna P, Clifton AV, Banks D, Tosh GE. Smoking cessation advice for people with serious mental illness. 2016.
144. Mathew AR, Hogarth L, Leventhal AM, Cook JW, Hitsman B. Cigarette smoking and depression comorbidity: systematic review and proposed theoretical model. Addiction. 2017;112(3): 401-412.
145. Dickerson F. Long way to go to close the mortality gap. The Lancet Psychiatry. 2017.

146. Sharma R, Meurk C, Bell S, Ford P, Gartner C. Australian mental health care practitioners' practices and attitudes for encouraging smoking cessation and tobacco harm reduction in smokers with severe mental illness. International Journal of Mental Health Nursing. 2017.
147. Godtfredsen NS, Holst C, Prescott E, Vestbo J, Osler M. Smoking reduction, smoking cessation, and mortality: a 16-year follow-up of 19,732 men and women from The Copenhagen Centre for Prospective Population Studies. American journal of epidemiology. 2002;156(11): 994-1001.
148. Coghlan R, Lawrence D, Holman D, Jablensky A. Duty to care: physical illness in people with mental illness. 2001. Perth: Dept of Public Health and Dept of Psychiatry and Behavioural Science, University of Western Australia.
149. Ashton M, Miller CL, Bowden JA, Bertossa S. People with mental illness can tackle tobacco. Australian and New Zealand Journal of Psychiatry. 2010;44(11): 1021-1028.
150. McFall M, Saxon AJ, Malte CA, Chow B, Bailey S, Baker DG, et al. Integrating Tobacco Cessation Into Mental Health Care for Posttraumatic Stress Disorder: A Randomized Controlled Trial. JAMA. 2010;304(22): 2485-2493.
151. Prochaska JJ, Hall SM, Bero LA. Tobacco use among individuals with schizophrenia: what role has the tobacco industry played? Schizophrenia bulletin. 2007;34(3): 555-567.
152. Kahler CW, Spillane NS, Busch AM, Leventhal AM. Time-varying smoking abstinence predicts lower depressive symptoms following smoking cessation treatment. Nicotine & Tobacco Research. 2010;13(2): 146-150.
153. Banham L, Gilbody S. Smoking cessation in severe mental illness: what works? Oxford, UK2010: 1176-1189.
154. Schroeder SA. Smoking cessation should be an integral part of serious mental illness treatment. World Psychiatry. 2016;15(2): 175-176.
155. Taylor G, McNeill A, Girling A, Farley A, Lindson-Hawley N, Aveyard P. Change in mental health after smoking cessation: systematic review and meta-analysis. BMJ: British Medical Journal. 2014;348(feb13 1).
156. Tsoi DT, Porwal M, Webster AC. Interventions for smoking cessation and reduction in individuals with schizophrenia. The Cochrane Library. 2013.
157. Gilbody S, Peckham E, Man M-S, Mitchell N, Li J, Becque T, et al. Bespoke smoking cessation for people with severe mental ill health (SCIMITAR): a pilot randomised controlled trial. The Lancet Psychiatry. 2015;2(5): 395-402.
158. Baxter A, Harris MG, Khatib Y, Brugha T, Bien H, Bhui K. Reducing excess mortality due to chronic disease in people with severe mental illness: meta-review of health interventions. British Journal of Psychiatry. 2016;208: 322-329.
159. Haukka J, Tiihonen J, Härkänen T, Lönnqvist J. Association between medication and risk of suicide, attempted suicide and death in nationwide cohort of suicidal patients with schizophrenia. Pharmacoepidemiology and drug safety. 2008;17(7): 686-696.
160. Weinmann S, Read J, Aderhold V. Influence of antipsychotics on mortality in schizophrenia: systematic review. Schizophrenia research. 2009;113(1): 1-11.
161. De Hert M, Correll CU, Cohen D. Do antipsychotic medications reduce or increase mortality in schizophrenia? A critical appraisal of the FIN-11 study. Schizophrenia research. 2010;117(1): 68-74.
162. O' Reilly CL. Closing the gap in physical health care for people with severe mental illness – opportunities for pharmacists? Journal of Pharmacy Practice and Research. 2016;46(2): 105-106.
163. O'Sullivan J, Gilbert J, Ward W. Addressing the Health and Lifestyle Issues of People with a Mental Illness: The Healthy Living Programme. Australasian Psychiatry. 2006;14(2): 150-155.
164. Stubbs B, Williams J, Gaughran F, Craig T. How sedentary are people with psychosis? A systematic review and meta-analysis. Schizophrenia research. 2016;171(1): 103-109.
165. Vancampfort D, Firth J, Schuch F, Rosenbaum S, De Hert M, Mugisha J, et al. Physical activity and sedentary behavior in people with bipolar disorder: A systematic review and meta-analysis. Journal of Affective Disorders. 2016;201(Supplement C): 145-152.
166. Soundy A, Wampers M, Probst M, De Hert M, Stubbs B, Vancampfort D, et al. Physical activity and sedentary behaviour in outpatients with schizophrenia: A systematic review and meta-analysis. International Journal of Therapy & Rehabilitation. 2013;20(12).
167. Kruisdijk F, Deenik J, Tenback D, Tak E, Beekman A-J, van Harten P, et al. Accelerometer-measured sedentary behaviour and physical activity of inpatients with severe mental illness. Psychiatry Research. 2017;254: 67-74.
168. Vancampfort D, Stubbs B, Ward PB, Teasdale S, Rosenbaum S. Why moving more should be promoted for severe mental illness. The Lancet Psychiatry. 2015;2(4): 295.
169. Lubans D, Richards J, Hillman C, Faulkner G, Beauchamp M, Nilsson M, et al. Physical Activity for Cognitive and Mental Health in Youth: A Systematic Review of Mechanisms. Pediatrics. 2016;138(3).
170. Physical Health Policy Writing Group. Physical challenge: wider health impacts for young people with mental illness. Melbourne: Orygen, 2016.
171. Roberts S, Bailey J. Incentives and barriers to lifestyle interventions for people with severe mental illness: a narrative synthesis of quantitative, qualitative and mixed methods studies. J Adv Nurs. 2011: 690-708.
172. Verhaeghe N, De Smedt D, De Maeseneer J, Maes L, Van Heeringen C, Annemans L. Cost-effectiveness of health promotion targeting physical activity and healthy eating in mental health care. BMC public health. 2014;14(1): 856.
173. Hargreaves J, Lucock M, Rodriguez A. From inactivity to becoming physically active: The experiences of behaviour change in people with serious mental illness. Mental Health and Physical Activity. 2017.

174. De Rosa C, Sampogna G, Luciano M, Del Vecchio V, Pocai B, Borriello G, et al. Improving physical health of patients with severe mental disorders: a critical review of lifestyle psychosocial interventions. Expert Review of Neurotherapeutics. 2017;17(7): 667-681.
175. Fraser SJ, Brown WJ, Whiteford HA, Burton NW. Impact of nurse-led behavioural counselling to improve metabolic health and physical activity among adults with mental illness. International journal of mental health nursing. 2017.
176. Verhaeghe N, De Maeseneer J, Maes L, Van Heeringen C, Annemans L. Effectiveness and cost-effectiveness of lifestyle interventions on physical activity and eating habits in persons with severe mental disorders: a systematic review. International journal of behavioral nutrition and physical activity. 2011;8(1): 28.
177. Vancampfort D, Stubbs B, Ward P, Teasdale S, Rosenbaum S. Integrating physical activity as medicine in the care of people with severe mental illness. Australian and New Zealand Journal of Psychiatry. 2015;49(8): 681-682.
178. Purnomo KI, Doewes M, Giri MKW, Setiawan KH, Wibowo IPA. Exercise prevents mental illness. 2017. InIOP Conference Series:Materials Science and Engineering. 2017; 180(1):12167.
179. Gorczynski P, Faulkner G. Exercise Therapy for Schizophrenia. Schizophrenia Bulletin. 2010;36(4): 665-666.
180. Rosenbaum S, Tiedemann A, Sherrington C, Curtis J, Ward PB. Physical activity interventions for people with mental illness: A systematic review and meta-analysis. 2014: e150-e.
181. Rosenbaum S, Teasdale S, Czosnek L, Byron A, Schuldt V. Adressing the physical health of people with mental illness: integrating dietitians and exercise physiologists into the multidisciplinary mental health team. Aust N Z J Psych. 2017;51(s1): 112-113.
182. Bauer IE, Gálvez JF, Hamilton JE, Balanzá-Martínez V, Zunta-Soares GB, Soares JC, et al. Lifestyle interventions targeting dietary habits and exercise in bipolar disorder: A systematic review. Journal of Psychiatric Research. 2016;74: 1-7.
183. Schuch FB, Vancampfort D, Rosenbaum S, Richards J, Ward PB, Stubbs B. Exercise improves physical and psychological quality of life in people with depression: A meta-analysis including the evaluation of control group response. Psychiatry Research. 2016;241: 47-54.
184. Rosenbaum S, Tiedemann A, Stanton R, Parker A, Waterreus A, Curtis J, et al. Implementing evidence-based physical activity interventions for people with mental illness: an Australian perspective. Australasian Psychiatry. 2016;24(1): 49-54.
185. P. M, Chong E, Mak W, Wong S, Lau J. Physical Activity in People With Mental Illness in Hong Kong: Application of the Health Belief Model. Journal of sport & exercise psychology. 2016;38(2): 203-208.
186. Shor R, Shalev A. Barriers to involvement in physical activities of persons with mental illness. Health Promotion International. 2016;31(1): 116-123.
187. Chapman JJ, Fraser SJ, Brown WJ, Burton NW. Physical activity preferences, motivators, barriers and attitudes of adults with mental illness. Journal of Mental Health. 2016;25(5): 448-454.
188. Farholm A, Sørensen M. Motivation for physical activity and exercise in severe mental illness: A systematic review of cross-sectional studies. International Journal of Mental Health Nursing. 2016;25(2): 116-126.
189. Naslund JA, Aschbrenner KA, Bartels SJ. Wearable devices and smartphones for activity tracking among people with serious mental illness. Mental Health and Physical Activity. 2016;10: 10-17.
190. Stubbs B, Williams J, Shannon J, Gaughran F, Craig T. Peer support interventions seeking to improve physical health and lifestyle behaviours among people with serious mental illness: A systematic review. International Journal of Mental Health Nursing. 2016;25(6): 484-495.
191. Bruins J, Jörg F, Bruggeman R, Slooff C, Corpeleijn E, Pijnenborg M. The effects of lifestyle interventions on (long-term) weight management, cardiometabolic risk and depressive symptoms in people with psychotic disorders: a meta-analysis. PloS one. 2014;9(12): e112276.
192. Daumit GL, Dickerson FB, Wang N-Y, Dalcin A, Jerome GJ, Anderson CAM, et al. A Behavioral Weight-Loss Intervention in Persons with Serious Mental Illness. The New England Journal of Medicine. 2013;368(17): 1594-1602.
193. Green CA, Yarborough BJH, Leo MC, Yarborough MT, Stumbo SP, Janoff SL, et al. The STRIDE weight loss and lifestyle intervention for individuals taking antipsychotic medications: a randomized trial. The American journal of psychiatry. 2015;172(1): 71.
194. Kay-Lambkin FJ, Thornton L, Lappin JM, Hanstock T, Sylvia L, Jacka F, et al. Study protocol for a systematic review of evidence for lifestyle interventions targeting smoking, sleep, alcohol/other drug use, physical activity, and healthy diet in people with bipolar disorder. Systematic reviews. 2016;5(1): 106.
195. World Federation for Mental Health. Mental health and chronic physical illnesses: The need for continued and integrated care. Woodbridge: WFMH; 2010.
196. Teasdale S, Ward PB, Rosenbaum S, Samaras K, Stubbs B. Solving a weighty problem: systematic review and meta-analysis of nutrition interventions in severe mental illness. The British Journal of Psychiatry. 2016:bjp. bp. 115.177139.
197. Dipasquale S, Pariante CM, Dazzan P, Aguglia E, McGuire P, Mondelli V. The dietary pattern of patients with schizophrenia: a systematic review. Journal of psychiatric research. 2013;47(2): 197-207.
198. Dinan TG, Cryan JF. Melancholic microbes: a link between gut microbiota and depression? Neurogastroenterology & Motility. 2013;25(9): 713-719.
199. MacQueen G, Surette M, Moayyedi P. The gut microbiota and psychiatric illness. Journal of psychiatry & neuroscience: JPN. 2017;42(2): 75.

200. McCreadie RG. Diet, smoking and cardiovascular risk in people with schizophrenia: descriptive study. The British journal of psychiatry: the journal of mental science. 2003;183(6): 534.
201. Pearsall R, Praveen KT, Pelosi A, Geddes J. Dietary advice for people with schizophrenia. The Cochrane Library. 2016.
202. Teasdale S, Rosenbaum S, Watkins A, Curtis J, Kalucy M, Samaras K, et al. Preventing antipsychotic-induced weight gain in first-episode psychosis: transitioning dietitians into routine care. Nutrition & Dietetics. 2016;73(3): 303-304.
203. Jones L, Bates G, Bellis M, Beynon C, Duffy P, Evans–Brown M, et al. A summary of the health harms of drugs. Technical document Department of Health. 2011.
204. Priester M, Browne T, Iachini A, Clone S, DeHart D, Seay K. Treatment Access Barriers and Disparities Among Individuals with Co-Occurring Mental Health and Substance Use Disorders: An Integrative Literature Review. Journal of Substance Abuse Treatment. 2016;61(Supplement C): 47-59.
205. Kuehn BM. Integrated Care Key for Patients With Both Addiction and Mental Illness. JAMA. 2010;303(19): 1905-1907.
206. Ewart SB, Happell B, Bocking J, Platania-Phung C, Stanton R, Scholz B. Social and material aspects of life and their impact on the physical health of people diagnosed with mental illness. Health Expectations. 2017;20(5): 984-991.
207. Mental Illness Fellowship of Australia. Literature review: The physical health of people living with mental illness. Adelaide: MIFA; 2011.
208. Parker R. A framework for funding culturally appropriate recovery for people affected by severe mental illness: a world view. Sri Lanka Journal of Psychiatry. 2012;2(2).
209. Roberts R. Equally Well. Physical health and mental illness. Australian Journal of Rural Health. 2017;25(6): 324-325.
210. Happell B, Ewart SB. 'Please believe me, my life depends on it': Physical health concerns of people diagnosed with mental illness. Australian nursing & midwifery journal. 2016;23(11): 47.
211. Thornicroft G, Rose D, Kassam A. Discrimination in health care against people with mental illness. International Review of Psychiatry. 2007;19(2): 113-122.
212. Vahia IV, Diwan S, Bankole AO, Kehn M, Nurhussein M, Ramirez P, et al. Adequacy of medical treatment among older persons with schizophrenia. Psychiatric services (Washington, DC). 2008;59(8): 853.
213. Desai MM, Rosenheck RA, Druss BG, Perlin JB. Mental disorders and quality of diabetes care in the veterans health administration. American Journal of Psychiatry. 2002;159(9): 1584-1590.
214. Mateen FJ, Jatoi A, Lineberry TW, Aranguren D, Creagan ET, Croghan GA, et al. Do patients with schizophrenia receive state-of-the-art lung cancer therapy? A brief report. Psycho-Oncology. 2008;17(7): 721-725.
215. Mitchell A, Malone D, Doebbeling C. Quality of medical care for people with and without comorbid mental illness and substance misuse: systematic review of comparative studies. Br J Psychiatry. 2009: 491-499.
216. Taylor D, Young C, Mohamed R, Paton C, Walwyn R. 200503. Journal of Psychopharmacology. 2005;19(2): 182-186.
217. Kisely S, Campbell LA, Wang Y. Treatment of ischaemic heart disease and stroke in individuals with psychosis under universal healthcare. The British journal of psychiatry. 2009;195(6): 545-550.
218. Lawrence D, Holman CDA, Jablensky A, Hobbs M. Death rate from ischaemic heart disease in Western Australian psychiatric patients 1980-1998. The British journal of psychiatry: the journal of mental science. 2003;182: 31.
219. Druss BG, Bradford DW, Rosenheck RA, Radford MJ, Krumholz HM. Mental disorders and use of cardiovascular procedures after myocardial infarction. Jama. 2000;283(4): 506-511.
220. Hemingway H, Marmot M. Evidence based cardiology: Psychosocial factors in the aetiology and prognosis of coronary heart disease: systematic review of prospective cohort studies. BMJ. 1999;318(7196): 1460-1467.
221. Chen Y-H, Lin H-C, Lin H-C. Poor clinical outcomes among pneumonia patients with schizophrenia. Schizophrenia bulletin. 2010;37(5): 1088-1094.
222. Daumit GL, Pronovost PJ, Anthony CB, Guallar E, Steinwachs DM, Ford DE. Adverse events during medical and surgical hospitalizations for persons with schizophrenia. Archives of general psychiatry. 2006;63(3): 267-272.
223. Crotty M, Henderson J, Ward P, Fuller J, Rogers A, Kralik D, et al. Analysis of social networks supporting the self-management of type 2 diabetes for people with mental illness. BMC Health Services Research. 2015;15.
224. Peterson D, Pere L, Sheehan N, Surgenor G. Experiences of mental health discrimination in New Zealand. Health & Social Care in the Community. 2007;15(1): 18-25.
225. Wright-Berryman JL, Cremering A. Physical health decision making and decision aid preferences of individuals with severe mental illness. Social Work in Mental Health. 2017;15(6): 1-12.
226. Wright-Berryman JL, Kim H-W. Physical Health Decision-Making Autonomy Preferences for Adults with Severe Mental Illness in Integrated Care. Journal of Social Service Research. 2016: 1-14.
227. Ehrlich C, Chester P, Kisely S, Crompton D, Kendall E. Making sense of self-care practices at the intersection of severe mental illness and physical health-An Australian study. Health & social care in the community. 2017.
228. Blanner Kristiansen C, Juel A, Vinther Hansen M, Hansen A, Kilian R, Hjorth P. Promoting physical health in severe mental illness: Patient and staff perspective. Acta Psychiatrica Scandinavica. 2015;132(6): 470-478.
229. Wesley Mission. The Wesley Report Keeping minds well: Caring till it hurts. Sydney: Wesley Mission, 2012.
230. Broady TR, Stone K. "How can I take a break?" Coping strategies and support needs of mental health carers. Social Work in Mental Health. 2015;13(4): 318-335.
231. Cummins R, Hughes J, Tomyn A, Gibson A, Woerner J, Lai L. Wellbeing of Australians: carer health and wellbeing: Australian Unity (Firm); 2007.
232. Pirkis J, Burgess P, Hardy J, Harris M, Slade T, Johnston A. Who cares? A profile of people who care for relatives with a mental disorder. Australian and New Zealand Journal of Psychiatry. 2010;44(10): 929-937.

233. Koutentaki E, Basta M, Stefanakis Z, Gavrilakis P, Panierakis C, Chrousos G, et al. EPA-0735–The stress of chronic mental illness affects both mental and physical health of the caregivers. European Psychiatry. 2014;29: 1.
234. Lawn S, Walsh J, Barbara A, Springgay M, Sutton P. The bond we share: Experiences of caring for a person with mental and physical health conditions. Mental Disorders-Theoretical and Empirical Perspectives: InTech; 2013.
235. Happell B, Wilson K, Platania-Phung C, Stanton R. Physical health and mental illness: listening to the voice of carers. Journal of Mental Health. 2017;26(2): 127-133.
236. Lee SJ, Crowther E, Keating C, Kulkarni J. What is needed to deliver collaborative care to address comorbidity more effectively for adults with a severe mental illness? Australian & New Zealand Journal of Psychiatry. 2013;47(4): 333-346.
237. Mental Health Council of Australia. Adversity to Advocacy: The lives and hopes of mental health carers. Canberra: MHCA; 2009.
238. New South Wales Mental Health Commission. Living Well A strategic plan for mental health in NSW 2014-2024. Sydney: NSW Mental Health Commission; 2015.
239. Lloyd-Evans B, Mayo-Wilson E, Harrison B, Istead H, Brown E, Pilling S, et al. A systematic review and meta-analysis of randomised controlled trials of peer support for people with severe mental illness. BMC psychiatry. 2014;14(1): 39.
240. Cyhlarova E, Crepaz-Keay D, Reeves R, Morgan K, Iemmi V, Knapp M. An evaluation of peer-led self-management training for people with severe psychiatric diagnoses. The Journal of Mental Health Training, Education and Practice. 2015;10(1): 3-13.
241. Wallcraft J, Amering M, Freidin J, Davar B, Froggatt D, Jafri H, et al. Partnerships for better mental health worldwide: WPA recommendations on best practices in working with service users and family carers. World psychiatry. 2011;10(3): 229-236.
242. Gronholm PC, Onagbesan O, Gardner-Sood P. Care coordinator views and experiences of physical health monitoring in clients with severe mental illness: A qualitative study. International Journal of Social Psychiatry. 2017;63(7): 580-588.
243. Kohen D. Physical health in mental illness: psychiatry's shared responsibility. Advances in Psychiatric Treatment. 2005;11(6): 457.
244. Working Group of Improving the Physical Health of People with SMI. Improving the health of adults with severe mental illness: essential actions London: Royal College of Psychiatrists, 2016 Contract No.: OP100.
245. Sacks S, Chaple M, Sirikantraporn J, Sacks JY, Knickman J, Martinez J. Improving the Capability to Provide Integrated Mental Health and Substance Abuse Services in a State System of Outpatient Care. Journal of Substance Abuse Treatment. 2012.
246. Martin JL, Lowrie R, McConnachie A, McLean G, Mair F, Mercer S, et al. Physical health indicators in major mental illness: data from the Quality and Outcome Framework in the UK. The Lancet. 2015;385:S61.
247. Vasudev K, Martindale BV. Physical healthcare of people with severe mental illness: everybody's business! Mental health in family medicine. 2010;7(2): 115.
248. Emerson T, Williams K, Gordon M. Physical health screening for patients with severe mental illness. Mental Health Practice (2014+). 2016;20(1): 21.
249. Greenwood PJ, Shiers DE. Don't just screen intervene: a quality improvement initiative to improve physical health screening of young people experiencing severe mental illness. Mental Health Review Journal. 2016;21(1): 48-60.
250. Bressington D, Mui J, Wells H, Chien WT, Lam C, White J, et al. Refocusing on physical health: Community psychiatric nurses' perceptions of using enhanced health checks for people with severe mental illness. International Journal of Mental Health Nursing. 2016;25(3): 214-224.
251. Tosh G, Clifton AV, Xia J, White MM. Physical health care monitoring for people with serious mental illness. The Cochrane Library. 2014.
252. Tosh G, Clifton A, Bachner M. General physical health advice for people with serious mental illness. Schizophrenia bulletin. 2011;37(4): 671-673.
253. White J, Gray RJ, Swift L, Barton GR, Jones M. The serious mental illness health improvement profile [HIP]: study protocol for a cluster randomised controlled trial. Trials. 2011;12(1): 167.
254. McClintock P. Healthcare 2010-11: Comparing Performance Across Australia: Report to the Council of Australian Governments. Canberra: COAG Reform Council, 2012 1921706341.
255. Ministerial Advisory Committee on Mental Health. Improving the physical health of people with severe mental illness: No mental health without physical health. Melbourne 2011.
256. Bardi J, Moorley C. Improving the physical health assessment of people with serious mental illness. Primary Health Care (2014+). 2016;26(10): 28.
257. Brunero S, Lamont S, Fairbrother G. Prevalence and predictors of metabolic syndrome among patients attending an outpatient clozapine clinic in Australia. Archives of psychiatric nursing. 2009;23(3): 261-268.
258. Reilly S, Planner C, Gask L, Hann M, Knowles S, Druss B, et al. Collaborative care approaches for people with severe mental illness. The Cochrane Library. 2013.
259. Fuller JD, Perkins D, Parker S, Holdsworth L, Kelly B, Roberts R, et al. Effectiveness of service linkages in primary mental health care: a narrative review part 1. BMC health services research. 2011;11(1): 72.
260. Fuller JD, Perkins D, Parker S, Holdsworth L, Kelly B, Roberts R, et al. Building effective service linkages in primary mental health care: a narrative review part 2. BMC health services research. 2011;11(1): 66.

261. Fuller JD, Perkins D, Parker S, Holdsworth L, Kelly B, Fragar L, et al. Systematic review on service linkages in primary mental health care: informing Australian policy and practice. 2009.
262. Whiteman KL, Naslund JA, Dinapoli EA, Bruce ML, Bartels SJ. Systematic Review of Integrated General Medical and Psychiatric Self-Management Interventions for Adults With Serious Mental Illness. Psychiatric services (Washington, DC). 2016;67(11): 1213.
263. Curtis J, Newall HD, Samaras K. The heart of the matter: cardiometabolic care in youth with psychosis. Early Intervention in Psychiatry. 2012;6(3): 347-353.
264. Swendsen J, Conway KP, Degenhardt L, Glantz M, Jin R, Merikangas KR, et al. Mental disorders as risk factors for substance use, abuse and dependence: results from the 10-year follow-up of the National Comorbidity Survey. Addiction. 2010;105(6): 1117-1128.
265. Lambert T, Reavley NJ, Jorm AF, Oakley Browne MA. Royal Australian and New Zealand College of Psychiatrists expert consensus statement for the treatment, management and monitoring of the physical health of people with an enduring psychotic illness. Australian & New Zealand Journal of Psychiatry. 2017;51(4): 322-337.
266. Mills K, Deady M, Proudfoot H, Sannibale C, Teesson M, Mattick R, et al. Guidelines on the management of co-occurring alcohol and other drug and mental health conditions in alcohol and other drug treatment settings. Sydney: National Drug and Alcohol Research Centre. 2009.
267. Stanley S, Laugharne J. Clinical guidelines for the physical care of mental health consumers. Perth: University of Western Australia. 2010.
268. Shiers D, Rafi I, Cooper S, Holt R. Positive Cardiometabolic Health Resource: an intervention framework for patients with psychosis and schizophrenia. 2014 update. Royal College of Psychiatrists. 2014.
269. Shiers D, Curtis J. Cardiometabolic health in young people with psychosis. The Lancet Psychiatry. 2014;1(7): 492-494.
270. Galletly C, Castle D, Dark F, Humberstone V, Jablensky A, Killackey E, et al. Royal Australian and New Zealand College of Psychiatrists clinical practice guidelines for the management of schizophrenia and related disorders. Australian & New Zealand Journal of Psychiatry. 2016;50(5): 410-472.
271. Canaway R, Lewis V, Merkes M. Supporting good practice in the provision of services to people with comorbid mental health and alcohol and other drug problems in Australia: describing key elements of good service models. BMC Health Services Research. 2010;10(1): 325.
272. Gaughran F, Stahl D, Ismail K, Atakan Z, Lally J, Gardner-Sood P, et al. Improving physical health and reducing substance use in psychosis–randomised control trial (IMPACT RCT): study protocol for a cluster randomised controlled trial. BMC psychiatry. 2013;13(1): 263.
273. Druss BG. The Health Outcomes Management and Evaluation (HOME) Study. In: US National Instiutes of Health, editor. 2013.
274. White J, Lucas J, Swift L, Barton GR, Johnson H, Irvine L, et al. Nurse-Facilitated Health Checks for Persons With Severe Mental Illness: A Cluster-Randomized Controlled Trial. Psychiatric Services. 2018;69(5): 601-604.
275. Gardner-Sood P, Lally J, Smith S, Atakan Z, Ismail K, Greenwood K, et al. Cardiovascular risk factors and metabolic syndrome in people with established psychotic illnesses: baseline data from the IMPaCT randomized controlled trial. Psychological medicine. 2015;45(12): 2619-2629.
276. Stewart R. Mental disorders and mortality: so many publications, so little change. Acta Psychiatrica Scandinavica. 2015;132(5): 410-411.
277. Schinnar AP, Rothbard AB, Kanter R, Jung YS. An empirical literature review of definitions of severe and persistent mental illness. American Journal of Psychiatry. 1990;147(12): 1602-1608.
278. Ruggeri M, Leese M, Thornicroft G, Bisoffi G, Tansella M. Definition and prevalence of severe and persistent mental illness. The British Journal of Psychiatry. 2000;177(2): 149-155.