

Achieving Cost Savings in Bipolar Disorder – A Preliminary Evaluation

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Executive Summary

In 2014, KPMG released a limited analysis of Bipolar Disorder. Bipolar Australia has used this to cost Bipolar more broadly and develop an economical intervention which can deliver \$1 billion in savings.

1. The Cost of Bipolar Disorders

- 1.1 Bipolar Spectrum Disorders (incorporating both severe and subthreshold forms of Bipolar) cost Australian Governments \$7.39 billion per annum.
- 1.2 The average cost per person is \$13,013 p.a., with Bipolar affecting 2.9% of Australians.
- 1.3 Expenditure is concentrated on hospitalisation and related services, and income support.

2. Potential Savings

- 2.1 Successful provision of optimal care as devised by KPMG would save approximately \$12.26 billion over nine years, with the majority of these savings realised within the first three years.
- 2.2 Early intervention targeting young people would save an additional \$2.01 billion over fourteen years, with the majority of these savings realised within the first seven years.

3. KPMG's Clinical Scenarios

- 3.1 KPMG has underestimated the severity of Bipolar Disorders, and this will reduce the savings which can be realised from the provision of optimal care as designed in their original analysis.
- 3.2 Despite these problems, we agree that significant savings are possible through the provision of optimal care to individuals who are severely and moderately impacted by the condition.

4. Barriers to Success

- 4.1 KPMG's focus on strengthening case management, medication adherence, and increased practitioner engagement would reduce hospitalisations for some targeted individuals.
- 4.2 However, by failing to consider the problem areas of comorbidity, carers, and practitioner collaboration, KPMG has endangered the overall intervention. Further research is required.

5. Proposed Intervention Strategy

- 5.1 We have developed an alternative non-systemic intervention, which for a direct cost of \$3.1 million (plus Medicare reimbursements) would deliver an estimated \$554.3 million net saving.
- 5.2 The intervention would only need to assist 13 people to break even; 32 people for any one government funder.
- 5.3 An optional extension to the core intervention is estimated to deliver a further \$482 million net saving, for a direct cost of \$4.3 million (plus additional Medicare reimbursements).
- 5.4 Significant savings would be achieved during the three year intervention delivery period.

¹ Advisory Panel codes: Co = Consumer Member; Ca = Carer Member; P = Professional Member (Mental Health); AP = Affiliated Professional Member (non-Mental Health); BAL = Bipolar Australia Member

Introduction

In 2014, the auditing firm KPMG provided a report to the National Mental Health Commission which attempted to provide insight into the economic benefits of mental health reform. One of the seven serious conditions modelled was Bipolar Disorder, an illness which affected approximately 458,000 Australians in 2007². Bipolar Disorder was by far the most expensive condition modelled in KPMG's analysis, and the condition with the greatest potential to reduce current expenditure³.

KPMG estimates that a person with severe Bipolar, defined in part as having been hospitalised for an average of 60 days per annum as an acute inpatient and 30 days per annum as a subacute inpatient, costs the public \$891,000 over nine years⁴. If the health system is able to deliver optimal care, through better resourcing and coordination of primary care services, KPMG estimates a potential saving of \$321,000 (36%) over the same period⁵. If a combination of earlier intervention and optimal care can reduce the severity of the person's Bipolar to a point where hospitalisation is not required, a potential saving of \$674,000 (75.6%) over nine years is reported⁶.

This report builds upon KPMG's original analysis by cross-referencing it with available statistics, current academic research, and Bipolar Australia's specialised insights into Bipolar Disorders, and addresses the following questions:

1. What is the current cost to Australian Governments of Bipolar Disorders?
2. How much money could be saved by transitioning to optimal care and/or through early intervention?
3. Are the clinical scenarios put forward by KPMG largely correct?
4. What barriers exist to the transitions proposed by KPMG?
5. What could be realistically achieved by 2021?

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- Australian Bureau of Statistics (2008), *National Survey of Mental Health and Wellbeing: Summary of Results*. Catalogue No. 4236.0.
- KPMG (2014), *Paving the way for mental health: The economics of optimal pathways to care*. Report to the National Mental Health Commission, November 2014.

² ABS (2008) Table 1

³ KPMG (2014) Table 1.2

⁴ KPMG (2014) Table 8.2

⁵ KPMG (2014) Table 8.2

⁶ KPMG (2014) Table 1.2

1. What is the current cost of Bipolar Disorders for Australian Governments?

Incidence

In 2008, the Australian Bureau of Statistics estimated that the lifetime prevalence for Bipolar Disorder in Australia was 2.9%, with a 12 month prevalence of 1.8%⁷. Notwithstanding some classification problems⁸, these rates are similar to the global averages of 2.4% lifetime and 1.5% 12-month prevalence reported by the World Mental Health Survey in 2011⁹, as well as the 2.63% lifetime prevalence reported in a 2015 systematic review¹⁰. They also match well with a recent meta-analysis which concluded that the incidence of Bipolar Disorder in primary care was 1.9%¹¹. (These figures are explored further in Appendix A.) Based on the most recent population snapshot released by the Australian Bureau of Statistics in June 2016, this means that there are approximately 568,000 people affected by Bipolar Disorder in Australia, of which 352,500 (62%) are currently impaired.

Unfortunately there is not good information from within Australia regarding the severity of Bipolar Disorder. However, the Singapore Mental Health Survey, which surveyed a representative sample of that country, has provided some useful estimates of role impairments that we have used to calculate the likely impact of Bipolar Disorders within Australia. (Appendix B contains additional information which grounds this comparison.) This reveals the following estimated incidence levels (as of June 2016¹²):

Level	Typical Scenario	Incidence
Severe	Average of 18 days of acute hospitalisation per year, 43 days of sub-acute hospitalisation (BAL), and 10 days of residential care (KPMG); 2 psychiatric hospitalisations per year (KPMG); 100% likelihood of receiving income support (BAL); 75% likelihood of receiving housing support (BAL)	18,155
Moderate	Average of 2 days of acute hospitalisation per year, and 9 days of sub-acute hospitalisation (BAL); 1 psychiatric hospitalisation per year (KPMG); 75% likelihood of receiving income support (BAL); 75% likelihood of receiving housing support (BAL)	21,030
Mild	Not hospitalised (KPMG); 50% likelihood of receiving income support (BAL); 28% likelihood of receiving housing support (BAL)	313,396
Total Currently Affected	All those with current symptoms	352,581
Not Currently Affected	Sub-clinical or no current symptoms	215,466
Total with Bipolar	All Australians aged 15 and older affected by Bipolar Spectrum Disorders, as at June 2016	568,047

Table 1.1: Estimated number of Australians affected by Bipolar Spectrum Disorders, June 2016

⁷ ABS (2008) Table 1 & Table 2

⁸ Mitchell et al (2013)

⁹ Merikangas et al (2011) Table 2

¹⁰ Clemente et al (2015): total of BPI (1.06%) + BPII (1.57%)

¹¹ Stubbs et al (2016)

¹² ABS (2016)

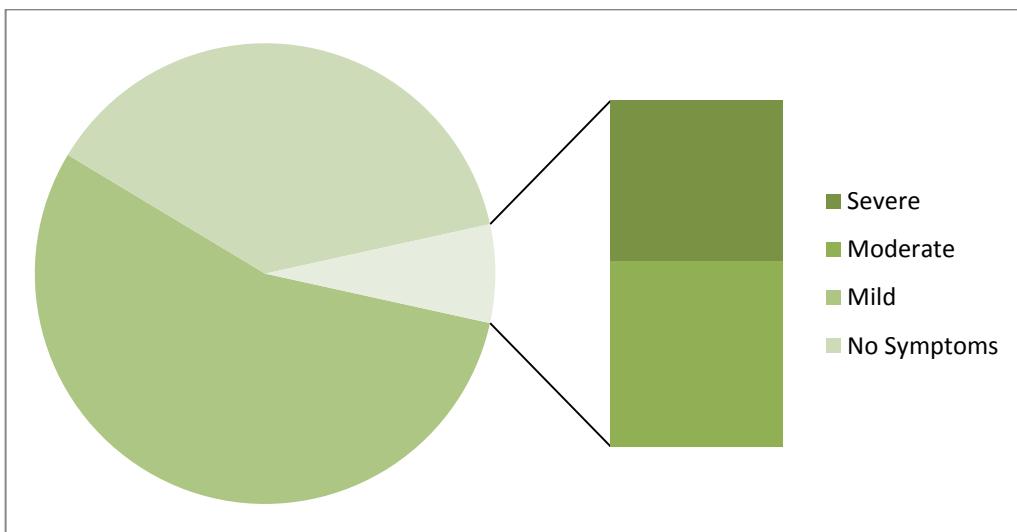


Figure 1.2: Severity for Bipolar Disorder; bar shows breakdown of individuals hospitalised within the past 12 months.

Based on the above estimates, we conclude that there were approximately 56,754 hospitalisations for Bipolar Disorder during 2016. In Financial Year 2014-2015, the Australian Institute of Health and Welfare reported 395,613 separations (episodes of care¹³) from public and private hospitals for which mental or behavioural health was the primary diagnosis¹⁴, representing a mental health separation for 1.67% of the population¹⁵. Drawing on our preliminary analysis, we estimate that approximately 21.9% of mental health hospital admissions during FY2014-15 were for a primary diagnosis of Bipolar Disorder (including separations which involved psychiatric comorbidities and undiagnosed or misdiagnosed instances of the condition). This contrasts with the Institute's estimate that 9.7% of separations with specialised psychiatric admitted care and 3% of separations without specialised admitted care related to a principal diagnosis of Bipolar¹⁶. These discrepancies are explored further in Appendix C.

Estimated Current Cost of Bipolar Disorder

Using our evidence-informed modifications to KPMG's clinical scenarios as the primary input, we estimate that the total direct cost of Bipolar Disorder in Australia is approximately **\$7.39 billion per annum**, or \$13,013 per person. If we exclude those with sub-clinical or no current symptoms from the per-individual calculation, the cost rises to \$20,965 per person. This represents approximately 2.56% of all health and welfare expenditure by Australian Governments¹⁷.

The total cost is significantly impacted by the approximately 6.9% of people (11.11% of currently affected) who we estimate have been hospitalised for Bipolar Disorder within the past 12 months. These 39,185 individuals account for 31.3% of expenditure, with 37.5% of this money (11.7% of the

¹³ AIHW (2016) p17

¹⁴ AIHW (2016a) Table 4.8

¹⁵ Based on population of 23,714,300: ABS (2015)

¹⁶ AIHW (2016b), Tables AD.7 and AD.13 [relating to financial year 2014-15, excluding the Australian Capital Territory]

¹⁷ \$7.19 billion in 2014 dollars (RBA 2017); measured against AIHW (2016c): \$161.6bn for health; and AIHW (2013): \$119.4bn for welfare

overall total, or \$867.5 million) resulting from public hospital admissions. Based on our analysis of hospital separations data and KPMG's original estimates regarding admission length, we forecast that 38.8% of public expenditure for mental health hospitalisation relates to Bipolar Disorder. This cost may be as low as \$613.6 million (21.9% of public hospital expenditure, or \$10,812 per admission) or as high as \$1.08 billion (48.5% of expenditure, or \$27,499 per admission), depending on the average number of days for each episode of care. Separately, we estimate that there is up to \$173.5 million of expenditure on private hospitalisation, which is indirectly subsidised in part by the Australian Government through the Private Health Insurance Rebate.

Following hospitalisation, the primary cost categories are the "income support" and "housing assistance" expenditure groups. In our preliminary analysis, we have modelled the Disability Support Pension as a proxy for a wide range of income support payments, including Newstart Allowance, Sickness Benefit, and Youth Allowance. Similarly, we have used the average Public Housing subsidy as a proxy for a variety of housing assistance expenditures, such as public and social housing subsidies, Commonwealth Rental Assistance, and Commonwealth carer payments.

Our preliminary analysis suggests that approximately 34% of all people with Bipolar Disorder (190,620 individuals) receive an income support payment, while 19% (110,300) receive housing assistance. We estimate that income support accounts for 49% of total government expenditure related to the condition, and that housing assistance accounts for a further 10%. However, these estimates may be conservative, as the Black Dog Institute reported in 2009, based on Bureau of Statistics data, that 51.9% of people with Bipolar were either unemployed (15.8%) or receiving government benefits as their primary income source (36.1%)¹⁸.

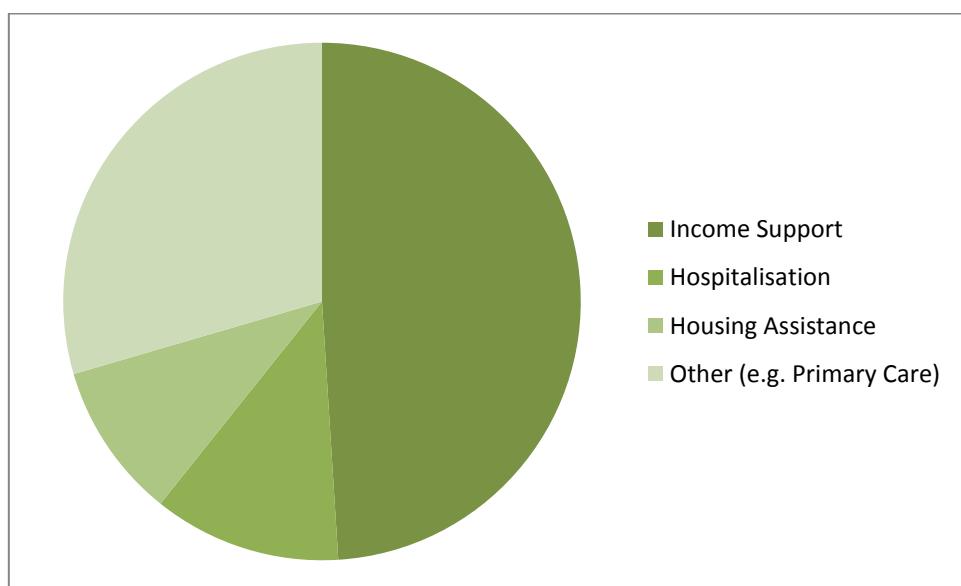


Figure 1.2: Analysis of the major costs for Bipolar Disorder; other costs include Medicare reimbursements, Pharmaceutical Benefits Scheme subsidies, and community mental health services

¹⁸ Black Dog Institute (2009)

Internationally, attempts to cost Bipolar Disorder vary widely, with annual costs ranging from US\$1,904 to US\$33,090 per person, and production losses (an indirect cost) making up between 20% and 94% of the total burden, but only in the 30% of studies which reported this¹⁹. However, we have been able to use the English model developed by McCrone et al²⁰ to calculate a simplified current cost of Bipolar Disorder for the United Kingdom in terms of the three major expenditure areas, namely healthcare, income support, and housing assistance. The following table summarises our findings regarding these costs.

Expenditure Area	Originally Reported (2008)	Calculated Impact (2016)
Healthcare, excepting hospitalisation	£933.01 per person	£1,236
Hospitalisation	£128.16 per person	£308
Welfare: income support and housing assistance	22.2% unemployed 18.4% unable to work	£5,336
Core costs for Bipolar Disorder in the United Kingdom		£6,880 per person

Table 1.2: Health and welfare costs for Bipolar in the United Kingdom, based on McCrone et al²¹

Converted to Australian dollars²², this amounts to an annual cost of \$11,103 per person, or 14.67% less than the estimated annual Australian cost of \$13,013 per person. Most of this difference is explained by the significantly lower hospitalisation rate; we estimate that Britons with Bipolar Disorder are hospitalised 76.73% less than their Australian counterparts. Further details regarding our costing of Bipolar Disorder in the United Kingdom can be found in Appendix D.

Within Australia, in 2013 the New South Wales Mental Health Commission published a short summary of previous studies which had attempted to price the cost of various mental health conditions²³. The following table places the relevant figures from this summary²⁴ in line with our current estimate for Bipolar Disorder.

Condition	Year	Originally Reported Impact	Calculated Impact (2016) ²⁵
Depression	2003	\$1.13bn ²⁶ \$11,330 per person ²⁷	\$1.56bn \$15,650 per person
Depression	2007	\$17,593 per person (Major) \$9,751 per person (Other)	\$21,820 per person (Major) \$12,094 per person (Other)
Schizophrenia	2002	\$1.4bn ²⁸ total	\$1.99bn \$42,866 per person ²⁹
Schizophrenia	2003	\$1.45bn total	\$2.01bn \$43,728 per person ³⁰

¹⁹ Jin & McCrone (2015)

²⁰ McCrone et al (2008), cited in Doran (2013)

²¹ McCrone et al (2008)

²² Bank of England (2017): 1 pound sterling = 1.6138 dollars

²³ Doran (2013) p12

²⁴ Ibid, Appendix 2

²⁵ Calculated using RBA (2017)

²⁶ \$1.59bn less lost earnings (\$434m)

²⁷ Applied proportionately to the original \$16,000 per person figure to remove lost earnings

²⁸ 1.85bn less lost earnings (\$448m)

²⁹ 46,423 individuals based on ABS (2016) & Morgan et al (2014) Table 1

Condition	Year	Originally Reported Impact	Calculated Impact (2016) ²⁵
Schizophrenia	2004	\$29,600 per person	\$1.86bn ³¹ \$39,949 per person
Eating Disorders	2012	\$2.06bn ³² total	\$2.8bn \$2,722 per person ³³
Bipolar Disorder (BAL Estimate)	2016		\$7.39bn \$13,013 per person (lifetime affected) \$20,965 per person (currently affected only)

Table 1.3: Previous Australian studies regarding the direct cost to government of mental health conditions in context, with indirect costs (such as productivity losses)³⁴ removed

As can be seen from the above calculations, Bipolar Australia's estimated annual cost of \$20,965 per person almost identical to the estimated annual cost of Major Depression (\$21,820 per person) and significantly less than the estimated annual cost of Schizophrenia (\$42,181 per person³⁵).

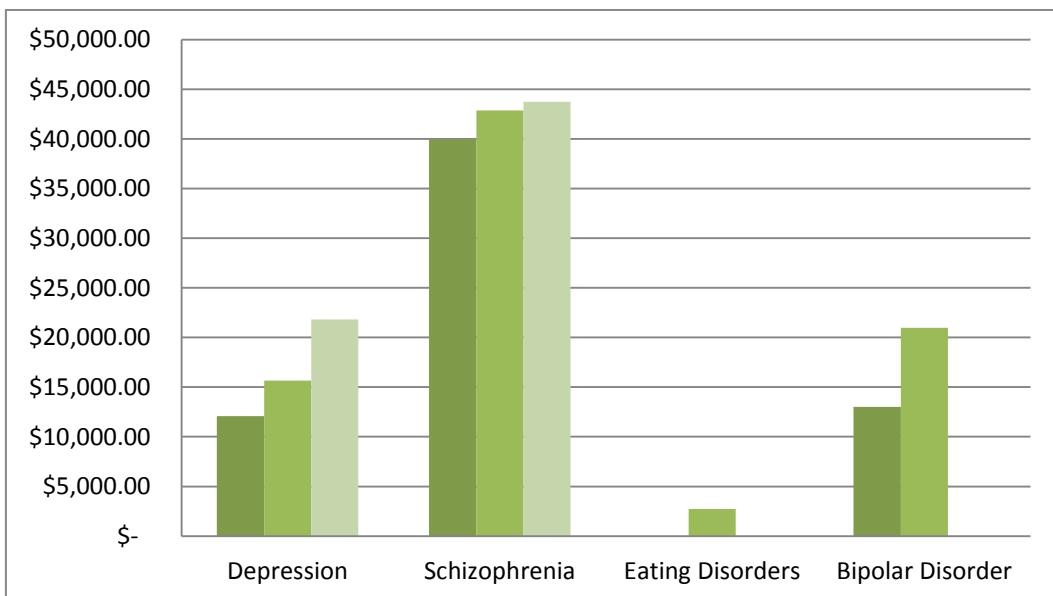


Figure 1.3: Projected per person costs of mental health conditions, in 2016 dollars, including lower and upper range estimates where available

The Future: The National Disability Insurance Scheme

The National Disability Insurance Scheme is still in its initial rollout phase, and therefore has not been incorporated into our modified version of KPMG's 2014 costings. However, there are some preliminary figures available from the National Disability Insurance Agency (NDIA) which can provide an early insight into the likely cost of Bipolar Disorder for people associated with the Scheme.

³⁰ Ibid

³¹ Ibid

³² \$17.18bn less lost productivity estimate (88%); Deloitte (2012)

³³ 1,028,399 individuals; based Deloitte (2012): 913,986 2012 incidence; ABS (2012): 4.26% of the population; ABS (2016): population 24,127,200

³⁴ Lijas (1998)

³⁵ Average across the three cited studies

The NDIA reports that the Scheme will serve approximately 64,000 people with a psychosocial disability (a term incorporating those with a permanent mental health condition) in 2019-20³⁶. The Agency further reports that the current (2016) average cost per active participant is \$79,400³⁷.

We estimate that this will include one third of those who have severe Bipolar Disorder, 10% of those with moderate Bipolar Disorder, and 2.5% of those with mild Bipolar Disorder, using the definitions established above. This would mean that approximately 16,000 people with Bipolar Disorder (including some with other primary conditions such as autism³⁸) would qualify for the Scheme had it been fully operational in 2016. In theory, this would mean an additional cost to the taxpayer of around \$1.27 billion per annum. However, it is likely that some services modelled by KPMG, such as case coordination and psychosocial supports, would be included in the Scheme and therefore a small proportion of that additional cost would not materialise.

Summary of Current Costs

We estimate that Bipolar Disorder costs Australian Governments approximately \$7.39 billion per annum, with an average of \$20,965 expended for each person currently affected by the condition. The two major areas of expenditure are hospitalisation and related services, with Bipolar Disorder accounting for approximately 21.9% of hospital admissions for which mental health was the primary diagnosis, and income support, with an estimated 190,630 people affected by the condition receiving a payment such as Disability Support Pension or Newstart Allowance.

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³⁶ NDIA (2016) p26

³⁷ NDIA (2016) p101

³⁸ Vannucchi et al (2014)

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2. What savings could optimal care and early intervention deliver?

KPMG's Original Estimates

Table 8.2 of the KPMG report provides the following estimate of savings which could be achieved over nine years through the transition to optimal care:

- Severe Bipolar Disorder - \$321,000 per person (36% of the cost as modelled by KPMG)
- Moderate Bipolar Disorder - \$142,000 per person (27.2%)
- Mild Bipolar Disorder - \$94,000 per person (30.2%)³⁹

Chart 8.3, which focuses on the Severe clinical scenario, reports that expenditure decreases in a near linear manner across each of the three three-year periods modelled. Chart 8.2 reports that the vast majority of these savings occur in the acute care category, for a total of \$297,000 over the nine year period per person.

Table 8.3 reports KPMG's assumptions regarding the efficacy of treatment, again for the Severe scenario. Depending on the efficacy of the optimal care intervention, savings over nine years are reported to range from \$273,000 to \$353,000 per person.

Bipolar Australia's Modified Estimates

Bipolar Disorder is a complex condition which requires many disparate factors to be addressed in order to bring about functional recovery⁴⁰. Unfortunately, we believe that KPMG has underestimated this complexity and therefore the likelihood of significant improvement within the nine year window of the original model.

We have therefore recalculated the likely average savings for optimal care in the three modelled clinical scenarios as follows:

- Severe Bipolar Disorder - \$330,570 per person (46.9% of the average cost as modelled by Bipolar Australia)
- Moderate Bipolar Disorder - \$142,940 per person (37.5%)
- Mild Bipolar Disorder - \$10,370 per person (7.1%)

In the Severe clinical scenario, the estimated saving is weighted against the probable outcomes for individuals after nine years. Due to the increased risk of suicide and the resulting reduction in direct costs, we estimate a slight rise in the average saving.

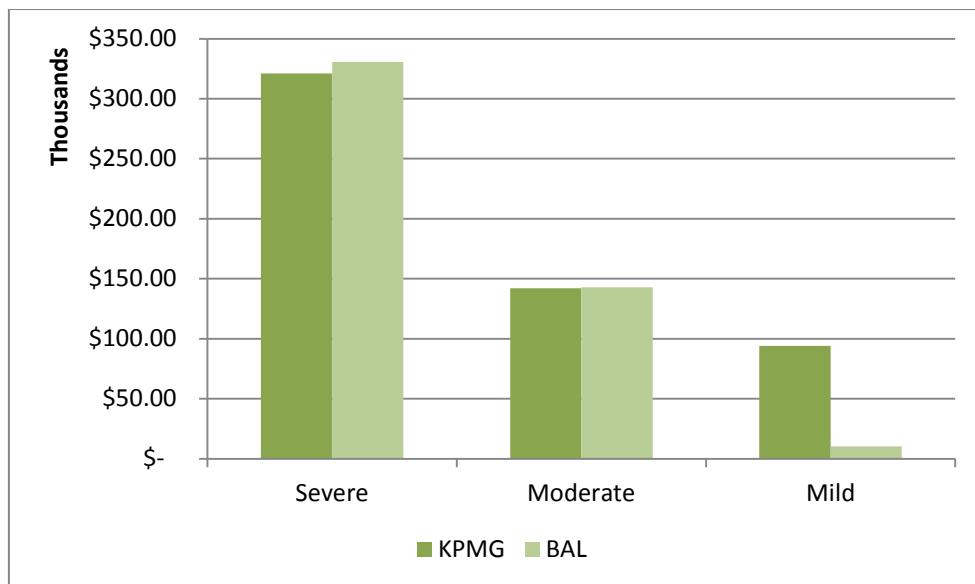
We have not fully remodelled a Moderate scenario in this preliminary analysis, as KPMG has based its original model largely on the Severe clinical scenario, changing only a few key variables related to hospitalisation and residential care⁴¹. Instead, we have taken the savings estimated for the Severe scenario and applied these proportionately to the Moderate scenario. Despite this limited methodology, our estimated saving of \$142,940 per person is almost identical to KPMG's original \$142,000 projection.

³⁹ KPMG (2014) Table 8.2

⁴⁰ Gitlin & Miklowitz (2017)

⁴¹ KPMG (2014) Table A11

For the Mild scenario, as described **below on page 20** we are unable to replicate KPMG's savings. However, we have added significant new assumptions into our revised model, including a return to work transition, reduced average use of income support, and reduced average use of housing assistance, many of which appear to have been overlooked in the original KPMG model. This generates a small saving of \$10,370 over nine years.



*Figure 2.1: Projected savings from the provision of optimal care,
KPMG and Bipolar Australia estimates*

Financial Modelling

Utilising our evidence-based modified cost estimates and the projections regarding the incidence and severity of Bipolar Disorder in Australia described above, we are able to predict the following savings for Australian Governments over a nine year period, assuming the provision of optimal care from 2020:

- Savings from the severely affected population - \$6 billion (46.9%)
- Savings from the moderately affected population - \$3.01 billion (37.5%)
- Savings from the mildly affected population - \$3.25 billion (7.1%)
- **Total achievable savings from optimal care provision - \$12.26 billion over nine years (18.4%)**

The total savings modelled are broadly similar to those envisioned by KPMG for those whose condition corresponds to the Severe and Moderate clinical scenarios, as we agree that reductions in hospitalisation would result in corresponding reductions in expenditure. However, we project that the per-person savings achievable for those corresponding to the Mild clinical scenario, which incorporates a majority of individuals with Bipolar Disorder, are minimal and more in line with KPMG's projected savings for children with Anxiety and Depression⁴² and people with moderate Post-Traumatic Stress Disorder⁴³. Despite this, due to the large number of individuals whose

⁴² KPMG (2014) Table 4.3

⁴³ Ibid Table 7.2

condition corresponds to the Mild scenario (approximately 55% of people with Bipolar), over \$3 billion can still be recouped.

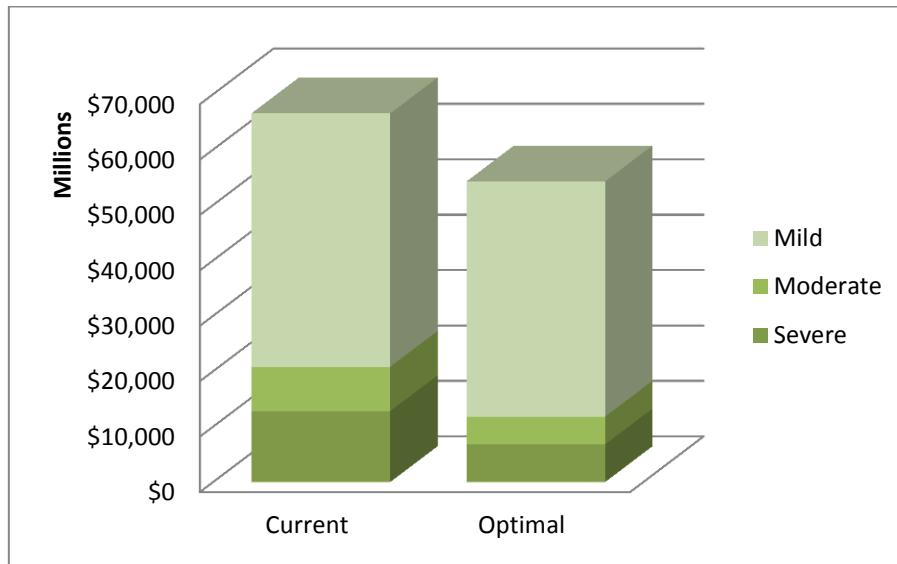


Figure 2.2: Cost of Bipolar Disorder over nine years, current and optimal care projections

We are also able to model the financial benefits of early intervention. The average duration between onset of symptomology and treatment is 9.6 years⁴⁴, and during that time each additional episode progressively increases the risk of illness severity, recurrence, and duration, as well as decreasing the individual's resilience⁴⁵. Illness severity is predictive of service usage among young people⁴⁶, suggesting that mild or moderate symptomology does not initially prompt engagement with formal treatment providers⁴⁷, while higher numbers of hospitalisations are predictive of long term income support use among adults⁴⁸.

We believe that successful early intervention will reduce the period before treatment, and therefore stabilise individuals at lower peak levels of clinical severity, before effective management takes hold and those individuals, on average, transition to lower levels of symptomology. However, given the overall severity of Bipolar, we have limited our predicted impact to one clinical degree, for example by reducing the peak from a Severe illness state, requiring 61 days of hospitalisation over 12 months, to a Moderate illness state, requiring 11 days of hospitalisation over 12 months.

As a result, we estimate the following achievable savings for each person early intervention successfully reaches:

- Peak at Moderate instead of Severe - \$466,940 over nine years per person (66.2%), including \$142,940 from the provision of optimal care

⁴⁴ Drancourt et al (2013)

⁴⁵ Ibid

⁴⁶ Khazanov et al (2015)

⁴⁷ Eisenberg et al (2012)

⁴⁸ Arvilommi (2016)

- Peak at Mild instead of Moderate - \$245,350 over nine years per person (64.4%), including \$10,370 from the provision of optimal care

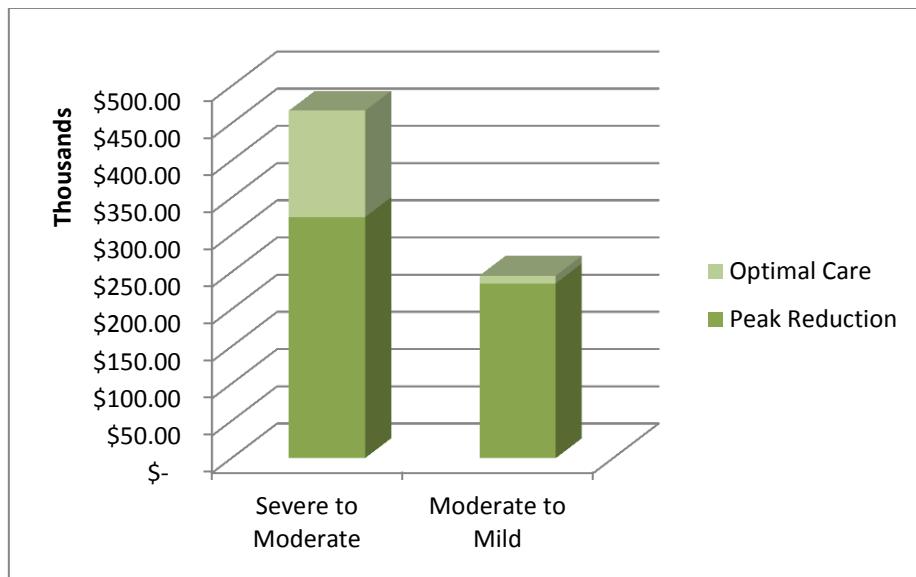


Figure 2.3: Benefits of early intervention over nine years per person, including savings from provision of optimal care

According to the Bureau of Statistics, there were 251,000 births in 2002⁴⁹. Our preliminary analysis concludes that 5,820 of these young people are likely to peak at Severe or Moderate Bipolar Disorder, as defined in KPMG's clinical scenarios. If early intervention can be achieved for 25% of this high risk population in 2020⁵⁰, there would be a saving to the taxpayer of \$506.6 million over nine years (including \$104.5 million from the provision of optimal care) through 2029. ABS data reveals similar birth rates during the subsequent five years⁵¹, meaning that a successful early intervention program consistently delivered for the five years from 2020 through to 2024 would result in a saving to the taxpayer of \$2.53 billion over fourteen years (including \$522.5 million from the provision of optimal care).

Limitations in the Preliminary Analysis

As this is a preliminary analysis, there are a number of limitations.

Firstly, we have relied almost exclusively on KPMG's costings for the Severe and Moderate clinical scenarios, which account for 43% of total expenditure. As described above, the three modifications we made were:

- To account for KPMG's underestimation of the seriousness of the condition;
- To account for the KPMG's overestimation of the average length of each hospitalisation; and
- To apply the savings from optimal care calculated by KPMG in the Severe category proportionately to the Moderate category.

⁴⁹ ABS (2003)

⁵⁰ Average age of onset is 17.9 years; Holtzman et al (2015) Table 2

⁵¹ ABS (2008) Table 2.16

Secondly, KPMG notes that it has included a productivity loss in its calculations⁵². This is an indirect cost⁵³ which we excluded from our cost comparison of other conditions **above on pages 6-7** as it is borne by society more broadly, rather than directly by government. For a person with Severe Bipolar Disorder, the productivity loss is estimated to be \$150,000 over nine years under current treatment, or approximately \$16,700 per annum. Given our conclusion that KPMG has underestimated the overall cost of Bipolar Disorder in its modelling by 14.1% for Severe Bipolar and 12.2% for Moderate Bipolar, and our finding that KPMG did not model at least one medical cost inherent to its Mild clinical scenario⁵⁴, for the purposes of this preliminary analysis we have assumed that these indirect costs are in fact unaccounted for and/or underestimated direct costs being incurred by Australian Governments, including direct costs associated with individuals currently experiencing subthreshold symptomology. Thus any saving projected has been regarded as a direct benefit to the taxpayer.

Thirdly, we have not fully accounted for the interactions between government expenditure and the private hospital usage. Our analysis of hospital separations data suggests that 30.9% of admissions for Bipolar Disorder occurred in private facilities. However, a 2015 United States based study on psychiatric readmissions found in part that poverty and multiple previous separations greatly predicted the use of public facilities⁵⁵; in addition, most admissions for Bipolar Disorder begin as acute according to KPMG's analysis⁵⁶, and these largely occur in public facilities.

Fourthly, the current analysis does not consider the impact of hospital admissions for cardio-metabolic comorbidities, which affect 60.5% of those with Bipolar Disorder⁵⁷. We estimate that people corresponding to the Severe and Moderate scenarios envisioned by KPMG are hospitalised in relation to physical comorbidities at average rates of once every two and four years respectively. It is therefore possible that our preliminary analysis underreports both expenditure and potential savings from the implementation of optimal care.

Finally, we have not incorporated an estimate for the cost of suicides related to Bipolar Disorder. A 2015 study concluded that direct costs related to the 169 deaths by suicide in the Australian construction industry during 2012 totalled \$365 million⁵⁸, although much of this was borne by non-government parties⁵⁹. In addition, suicide within the nuclear family predicts later psychosis by an odds ratio of 2.41 (1.77 adjusted)⁶⁰, thereby causing significant costs in the next generation.

⁵² KPMG (2014) p68

⁵³ Liljas (1998)

⁵⁴ Blood testing for Lithium; compare KPMG (2014) Tables A 11 & A 12 with Bauer & Gitlin (2016) p121

⁵⁵ Hamilton et al (2015) Table 2

⁵⁶ KPMG (2014) Table A12

⁵⁷ Correll et al (2017); see also Morgan et al (2014)

⁵⁸ Doran et al (2015) p14

⁵⁹ Doran et al (2015) Table 5

⁶⁰ Abel et al (2014) Table 4

Summary of Potential Savings

Combining KPMG's financial modelling with Australian Bureau of Statistics population data and our own analysis reveals that Australian Governments would save \$12.26 billion over nine years through the provision of optimal care to people affected by Bipolar Disorder, with the majority of these savings realised within the first three years. In addition, successfully delivering early intervention initiatives targeted at young people could save an additional \$2.01 billion over fourteen years, with the majority of this saving realised within the first seven years.

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3. Are the KPMG clinical scenarios largely correct?

The Severe Bipolar Clinical Scenario

KPMG has envisioned five clinical scenarios, Death, Severe Bipolar, Moderate Bipolar, Mild Bipolar, and No Bipolar⁶¹, and has modelled the middle three (Severe, Moderate, Mild)⁶². Building on pre-existing nine year longitudinal outcomes analysis, the report also estimates the outcome probabilities for a person with severe bipolar at the conclusion of nine years⁶³.

The “Severe” scenario is described as follows:

This scenario maps the pathway of a 36 year old female with bipolar disorder who is obese and suffering type II diabetes. She has experienced four episodes of mania in the past two years, all resulting in hospitalisation.

As someone with a severe mental disorder she is defined as having experienced an episode of mania, attempted suicide, or severe role impairment in at least one functional domain including work, school, social life, family life and home responsibilities.⁶⁴

(We have named this fictional woman “Ellen”, after the mother of Dr John Cade AO, who discovered the positive effects of Lithium on people with Bipolar Disorder⁶⁵.)

There is unfortunately no explanation put forward as to how Ellen reached her present level of severity, although by implication she benefits from some family support⁶⁶. Notwithstanding this limitation, we can draw on our specialised insights into complex Bipolar Disorder and add numerous details which will contextualise the reasons for Ellen’s current severe condition. Each of these includes a confidence index, the explanations for which may be found in Appendix E.

- Ellen has a diagnosis of Bipolar I Disorder
- She suffered childhood trauma, such as verbal abuse at home or bullying at school
- She has at least two psychiatric comorbidities: an anxiety disorder, post-traumatic stress disorder, and potentially an eating disorder
- Her illness onset was earlier, likely during mid-adolescence, and this has resulted in more severe episodes during adulthood
- Ellen has incomplete compliance with her medication regime
- She has a cognitive impairment as a result of her many episodes
- She has been unemployed for many years
- Ellen is not in a long-term relationship, having previously split from her last partner in acrimonious circumstances
- Her family has higher levels of expressed emotion, and therefore functions poorly compared to the general population; this provides frequent triggers for Ellen’s many episodes

⁶¹ KPMG (2014) Chart 8.1

⁶² KPMG (2014) Tables A11 & A12

⁶³ KPMG (2014) Chart 8.1

⁶⁴ KPMG (2014) p65

⁶⁵ Ironside (1993)

⁶⁶ KPMG (2014) Clinical Scenario 9.1, p72

As can immediately be appreciated, Ellen's case is highly complex and quite specific, and efforts to improve her condition will therefore defy pre-determined strategies for treatment. This complexity is common among those affected by Bipolar Disorder, with over 70% of those with the condition having two or more additional psychiatric conditions⁶⁷.

The roles played by previous trauma⁶⁸, psychiatric comorbidities⁶⁹, and poorer family functioning⁷⁰ in particular will likely mediate the effect of increased primary care efforts and therefore the likelihood that Ellen will avoid future relapses. In addition, the lack of employment and a stable relationship may also create ongoing triggers for further episodes, despite the new optimal care strategy⁷¹.

The Proposed Optimal Care Intervention

KPMG suggests that optimal intervention, comprised of additional general practitioner visits and psychologist visits, would halve the number of inpatient days and eliminate the use of both residential care and ambulatory services⁷². Given the complex nature of Ellen's case, we do not agree that these interventions will necessarily be sufficient by themselves. In particular, Ellen's care coordinator would need to ensure that all of her comorbid conditions, especially psychiatric conditions, and the intertwined relationships between them, are fully diagnosed, mapped out, and understood in their global and condition-specific contexts by her treatment team⁷³. For example, a psychologist who has experience helping clients to overcome childhood trauma but does not have experience with bipolar disorder is likely to be insufficiently skilled, given the additional presence of the latter condition and the complications this presents⁷⁴. Similarly, a dietitian without an understanding of both the cardio-metabolic links to Bipolar and the potential challenges posed by comorbid eating disorders risks exacerbating Ellen's anxiety and obesity rather than improving either condition⁷⁵.

In addition to the oversights regarding Ellen's treatment, Ellen's present living arrangements will play an important factor in assessing the outcomes which are achievable through optimal care provision. If Ellen still lives with her parents, as is quite possible, it is likely that unreconciled family conflict will provide major ongoing triggers for future episodes⁷⁶. Alternatively, if Ellen lives in unstable housing arrangements, simply coordinating care may prove to be an inadequate intervention strategy until she is able to access social housing⁷⁷. Whatever Ellen's living arrangements, psychosocial interventions targeting her family members will be critical to ensure that the maximum benefit possible is derived from the optimal care proposed by KPMG⁷⁸.

⁶⁷ Merikangas et al (2011), Table 3; Average of BP I (exactly 2 [10.1%] + >=3 [62.2%]) and BP II (10.5% + 58.3%)

⁶⁸ Daglas et al (2014)

⁶⁹ Gao et al (2015)

⁷⁰ Scott et al (2012); Reinares et al (2016a); Fredman et al (2015)

⁷¹ Koenders (2014); Milner et al (2013)

⁷² KPMG (2014) Table A 11

⁷³ Goodwin et al (2016), p500 & pp505-6; Gitlin & Miklowitz (2017), p20; APA (2010) p54

⁷⁴ Cotter et al (2015); Palmier-Claus et al (2016); Van Nierop et al (2015)

⁷⁵ Kemp & Fan (2012); Bauer et al (2016); Jen et al (2013); Beyer & Payne (2015); Kwan et al (2014)

⁷⁶ Scott et al (2012); Berutti et al (2016); Singh et al (2014); Marshall et al (2017)

⁷⁷ Hamiton et al (2015); Cerimele et al (2014); Rog et al (2014)

⁷⁸ Reinares et al (2016b)

Finally, the intervention also overlooks the need for blood testing for Lithium⁷⁹. Although Ellen is already taking this medication, it is inconsistent and at the very least she will need to be tested every three months⁸⁰. It is also possible that Lithium is inappropriate in her circumstances, given the presence of diabetes⁸¹, and is part of the cause of her instability. Therefore a transition to another medication, such as Quetiapine, may be in order. KPMG does not note the presence of hospitalisations for serious depression in the clinical scenario, so it is possible that Ellen has a tendency towards mania⁸² and therefore does not need the secondary benefit of lower suicide ideation that Lithium provides⁸³.

Severity Probability

KPMG has modelled the health outcomes for Ellen and other individuals affected by severe Bipolar Disorder after nine years of both current (baseline) and optimal treatment⁸⁴. However, we believe that these predictions, which appear not to account for either psychiatric comorbidities or family conflict, are far too optimistic. For example, the likelihood of death as an outcome under baseline treatment is predicted to be approximately 1%. This is significantly less than the reported lifetime suicide risk of 15%⁸⁵, and is also at odds with the annual suicide attempt rate of between 4.24%⁸⁶ and 8.3%⁸⁷ (especially given the significantly higher lethality of attempts⁸⁸). Suicide risk is concentrated in more severe cases⁸⁹, upticks in middle age⁹⁰, and is associated with previous acute episodes⁹¹. We therefore estimate a more accurate risk of death by age 45 of 10%.

Taking these considerations into account, we have modified the ninth year probabilities for a currently severe case following the provision of optimal care as follows:

Severity	KPMG Probability	BAL Probability	Notes
Death	1%	2.5%	Due to Ellen's elevated risk profile
Severe Illness	20%	20%	
Moderate Illness	34%	60%	
Mild Illness	31%	15%	
No Illness	14%	2.5%	Due to the initial severity of Ellen's illness, KPMG has badly overestimated the likelihood of major improvement

Table 3.1: Differences in severity predictions after nine years under optimal care

To provide some clarity regarding the potential financial outcomes based on KPMG's and our own predictions of outcomes, we have created an average saving calculation which estimates the cost curves resulting from various clinical outcomes and weights this using the ninth year outcome

⁷⁹ Bauer & Gitlin (2016) p121

⁸⁰ Bauer & Gitlin (2016) Table 11.4

⁸¹ McKnight et al (2012)

⁸² Carvalho et al (2014)

⁸³ Lewitzka et al (2015)

⁸⁴ KPMG (2014) Table 8.1

⁸⁵ Black Dog Institute (2013); Schaffer et al (2015) Table 1; see also: Costa et al (2015); Moor et al (2012)

⁸⁶ Tondo et al (2016)

⁸⁷ Mitchell et al (2013) Table 5

⁸⁸ Beyer & Weisler (2016)

⁸⁹ Tidemalm et al (2014)

⁹⁰ Commonwealth of Australia (2014) Figure 1

⁹¹ Holma et al (2014)

percentages. Despite disagreeing with KPMG regarding the likelihood of reduced severity, the good news is that the average saving per person with severe Bipolar Disorder, assuming optimal provision from 2020, rises slightly in real terms, from \$321,000 to \$331,570 per person. This represents a change from 36% of the nine year cost as estimated by KPMG (\$891,000) to 46.9% of the nine year cost as estimated by Bipolar Australia (\$704,870, which incorporates our evidence-based adjustments regarding severity and hospitalisation).

The Mild Bipolar Clinical Scenario

KPMG does not provide full details regarding the “Mild” scenario; however its primary distinction is that there is no hospitalisation; as the analysis notes, this is a major driver of costs across the board.

In order to cross-check KPMG’s costings, we have independently created the following clinical scenario:

A 36 year old male with Bipolar Disorder who has a comorbid Generalised Anxiety Disorder. He has experienced a number of short episodes of mild depression during the past two years, but has not been hospitalised. There is no major physical comorbidity, although he is overweight.

He currently takes Lithium to manage his Bipolar Disorder, and is fully compliant with this treatment. He also takes 20mg per day of temazepam (a benzodiazepine suitable for use in Bipolar) per day to help manage his Anxiety Disorder.

(We have named this fictional man “Duncan”, after the father of Dr Cade⁹².)

The full scenario for Duncan is contained in Appendix F. Our independent costing reported total annual baseline expenditure of \$33,622.51 per annum or approximately \$302,600 over nine years. This is extremely similar to the costing envisioned by KPMG (\$311,000). However, when we analysed the likely changes which would flow from more optimal service provision, we did not find the same \$94,000 saving over nine years that was originally suggested. Instead, we estimated an \$8,600 (2.84%) increase in costs to the taxpayer, largely because Duncan becomes a Disability Employment Services client in Year 4. To further explore the implications of our inability to replicate KPMG’s estimated savings, we have modelled the probability that an individual with Duncan’s clinical profile would be receiving the Disability Support Pension and a housing subsidy (modelled as Public Housing). Accounting for these additional factors, we estimate a small saving of \$10,370 per person (7.1% of the revised total cost), assuming Duncan finds and retains part time employment with the assistance of a Disability Employment Service provider.

Despite our inability to replicate KPMG’s findings, it is important to emphasise that there would be a considerable risk management benefit in the provision of the envisioned optimal care to an individual with mild Bipolar Disorder such as Duncan. In particular, Duncan would be far less likely to experience a major episode of mania or depression requiring hospitalisation⁹³, and his

⁹² Ironside (1993)

⁹³ Zhang et al (2011), p580

reengagement with the community through part time employment would likely reduce the ongoing risk of suicidal ideation⁹⁴, which is a major risk factor for hospitalisation⁹⁵.

Hospitalisation Estimates

KPMG predicted that individuals corresponding to the Severe clinical scenario would utilise 90 hospital bed days per year, and that those corresponding to the Moderate clinical scenario would utilise 20⁹⁶. Using these inputs to cost the public hospital admissions recorded as being directly related to Bipolar Disorder during financial year 2014-15⁹⁷ reveals that the 12,222 relevant admissions (6.2% of total public mental health hospitalisations) would cost \$572.1 million, or 20.4% of the entire public hospital budget⁹⁸. It is therefore likely that KPMG has miscalculated the average duration of admissions, as the overall average across all mental health hospitals for all conditions is just 13.5 days⁹⁹.

Compounding this problem further, Bipolar Disorder is not always recognised¹⁰⁰, which means that the number of actual admissions for the condition is likely to be more than those specifically reported against the correct diagnostic code. For example, many people with Bipolar initially suffer from major depression¹⁰¹, and the experience of Bipolar depression can be considerably more severe than that of its unipolar counterpart¹⁰². Even if KPMG is correct in its analysis of admissions related specifically to a recognised episode of Bipolar Disorder, many other incorrectly identified admissions will almost certainly be briefer.

KPMG also predicted long average acute bed usage and short average subacute bed usage for Bipolar Disorder admissions. However, data related to all mental health hospitalisations from the Australian Institute of Health and Welfare shows the reverse for mental health admissions overall. We have therefore adjusted KPMG's estimates regarding average admission duration by cross-referencing overall admissions data with incidence levels and KPMG's predictions regarding the distribution of hospitalisation costs between individuals corresponding to the Severe and Moderate clinical scenarios (the only illness categories in which hospitalisation occurs).

Admission Type	KPMG Average ¹⁰³	AIHW Average ¹⁰⁴	BAL Average
Acute for severe Bipolar	30 days	10.8 days	18 days
Sub-Acute for severe Bipolar	15 days	59.3 days	43 days
Acute for moderate Bipolar	5 days	10.8 days	2 days
Sub-Acute for moderate Bipolar	15 days	59.3 days	9 days

Table 3.2: Average hospital admission duration, calculated values based on AIHW data

⁹⁴ Milner et al (2013); Borg et al (2013)

⁹⁵ Zhang et al (2011), p581

⁹⁶ KPMG (2014) Table A11

⁹⁷ AIHW (2016a) Tables AD.7 & AD.13

⁹⁸ AIHW (2016b) Table EXP.1

⁹⁹ AIHW (2016a) Table AD.1

¹⁰⁰ Francesca (2014); Øiesvold et al (2012)

¹⁰¹ Faedda et al (2014)

¹⁰² Redlich et al (2015)

¹⁰³ Calculated based on KPMG (2014) Tables A11 & A12

¹⁰⁴ AIHW (2016a) Table AD.1

Financial Implications

We agree with KPMG that the primary cost benefit of optimal care is to reduce hospitalisation. This means that the bulk of achievable savings are concentrated in two areas: optimal treatment for cases of Bipolar Disorder which require hospitalisation, and early intervention in general. Once a person with Bipolar Disorder reaches the Mild clinical scenario, which can be regarded as quite disabling despite its label, optimal care provision does not appear to provide much in the way of savings, although it does reduce the risk of costs spiralling in the future.

Summary of KPMG's Clinical Scenarios

KPMG has modelled three clinical scenarios related to Bipolar Disorder: severe, moderate, and mild. We believe that KPMG has underestimated the severity of Bipolar Spectrum Disorders. Therefore, while we agree that there are significant savings to be made with regards to people who have severe and moderate Bipolar Disorder, we are unable to replicate KPMG's savings for people who are experiencing the mild form of this condition.

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4. What barriers exist to the transitions proposed by KPMG?

KPMG's Intervention Scenario

Bipolar Disorder is regularly described in academic literature as “complex” in a variety of contexts, including its diagnosis¹⁰⁵, medication regimes¹⁰⁶, conflicting treatment imperatives¹⁰⁷, and even the condition’s underlying genetic makeup¹⁰⁸. This complexity makes it especially difficult to design systemic interventions which can successfully lower costs by reducing hospitalisation or decreasing dependence upon income support.

It is into this minefield that KPMG has waded with its attempt to quantify systemic changes which will have a positive effect upon the lives of people affected by Bipolar Disorder. The core of the intervention modelled by KPMG is the addition of substantial new front-line primary care resources, coupled with care coordination at all levels (currently only utilised in severe cases).

These new resources, taken from Table A11, are summarised below:

Service	Clinical Scenario		
	Mild	Moderate	Severe
Care Coordination	NEW: 25 hours	NEW: 50 hours	Same (100 hours)
General Practitioner	+6 visits (12 total)	+7 visits (13 total)	+5 visits (17 total)
Psychiatrist	NEW: +6 visits	NEW: +9 visits	Same (12 visits)
Psychologist	+10 visits (12 total)	+10 visits (12 total)	+8 visits (12 total)
Community Mental Health Team	+6 visits (12 total)	+9 visits (18 total)	Same (24 visits)
Psychosocial Support	NEW: 25 hours	NEW: 50 hours	Same (100 hours)

Table 4.1: Summary of KPMG's proposed primary care intervention for Bipolar Disorder

This would result in a person with Bipolar Disorder having the following average schedule of contact visits with relevant practitioners:

Consultation Type	Clinical Scenario		
	Mild	Moderate	Severe
General Practitioner	30 days	28 days	21 days
Specialist Mental Health Practitioner – psychiatrist or psychologist	21 days	17 days	15 days
Community Service – mental health team or psychosocial support ¹⁰⁹	17 days	10 days	6 days
Average Between Consultations	7 days	5 days	4 days
Care Coordination ¹¹⁰	14 days	7 days	3.5 days
Average Between Any Contact Visits	5 days	3 days	2 days

Table 4.2: Average time between consultations in KPMG's proposed primary care intervention, assuming a maximum of one contact visit per day

¹⁰⁵ Singh & Rajput (2006)

¹⁰⁶ Weinstock et al (2014)

¹⁰⁷ Pfennig et al (2014)

¹⁰⁸ Kerner (2014)

¹⁰⁹ Assuming psychosocial support is delivered in 2.5 hour blocks

¹¹⁰ Assuming care coordination is delivered in 1 hour blocks

Strengths and Limitations of KPMG's Approach

KPMG's approach is grounded in the reality that medication adherence is one of the most important factors for stabilising mood¹¹¹. As a result, we believe that the modelled intervention will most likely work in the following ways:

- Reduced hospitalisation for some individuals corresponding to the Severe clinical scenario
- Stabilisation and prevention of graduation to a more acute illness level for many individuals corresponding to the Moderate and Mild scenarios
- Fewer suicide attempts among all affected individuals

However, KPMG's medically based approach has a severely limited recovery oriented component, and we are therefore concerned that those gains may be transitory and that high-cost individuals may not transition into lower cost states. For example, successfully transitioning an individual from the Severe clinical scenario to the Mild scenario would save \$558,990 over nine years; merely transitioning the person to the Moderate state would recoup just \$330,470 and significantly increase the risk that an adverse life event would return that individual to a Severe state in the future¹¹².

Barriers to Success

KPMG has overlooked three critical variables which will in many cases confound attempts to reduce hospitalisation and therefore costs: **comorbidity**, **carers**, and **collaboration**. The failure to account for any one of these factors might fatally undermine KPMG's intervention strategy in many cases; in particularly serious and costly cases, two or even all three variables will often be present.

The 2015 review into Headspace noted that 24.3% of clients in the evaluation's dataset experienced an increase in psychological distress during the study period¹¹³, and the authors were unfortunately unable to identify the reasons for this failure. Although some of the insights outlined in this section are specific to Bipolar Disorder, we believe these three key variables are of significant relevance to the high level of suboptimal outcomes within the Headspace program. For example, Hiltferty et al noted that of the 226 respondents to the Parents and Carers Survey¹¹⁴, only 46 (20.5%) reported that they had "discussed ways that the family could help [the young person] to feel better"¹¹⁵, perhaps indicating high levels of familial dysfunction among Headspace clients.

Comorbidity: every person is unique

Global data compiled as part of the World Mental Health Survey Initiative reveals that 88.2% of people affected by Bipolar I Disorder and 83.1% of those affected by Bipolar II Disorder (distinguished by the extent of manic symptoms¹¹⁶) have at least one additional comorbid psychiatric condition¹¹⁷. Over two-thirds of those have more two or more conditions¹¹⁸. The risk of suicide attempts in Bipolar Disorder, and therefore hospitalisation, is significantly magnified by comorbid

¹¹¹ Goldstein et al (2016), p6

¹¹² Koenders (2014)

¹¹³ Hiltferty et al (2015) Table 4.1

¹¹⁴ Ibid p73

¹¹⁵ Ibid Table 3.6

¹¹⁶ Kuiper et al (2012)

¹¹⁷ Merikangas et al (2011) Table 3

¹¹⁸ Ibid

diagnoses such as Attention Deficit and Hyperactivity Disorder (ADHD)¹¹⁹, Substance Use Disorders¹²⁰, and Anxiety Disorders¹²¹.

Bipolar Australia regards comorbidity as the “X” factor which is greatly underappreciated in the design of systemic interventions. A person with comorbid ADHD (27.5%¹²²) will present differently and have significantly different needs than a person with a comorbid Eating Disorder (27%¹²³). For example, the medication Lithium, which has long been referred to as the “gold standard” for Bipolar Disorder¹²⁴, has been reported to function as expected for just 57.1% of adolescents with comorbid ADHD¹²⁵. Similarly, a person with a comorbid Substance Use Disorder (44.4%¹²⁶) will have a different experience of Bipolar Disorder to a person with a comorbid Autism Spectrum Disorder (up to 7%¹²⁷).

The diagnosis of Bipolar Disorder is often complicated by comorbidity¹²⁸. In addition, Bipolar Disorder can itself often be misdiagnosed as a variety of other conditions, such as ADHD or Borderline Personality Disorder¹²⁹. These difficulties contribute to the estimated 9.6 years between the onset of symptomology and first treatment for the condition¹³⁰. Similarly, problems related to a person’s comorbidity can trigger their underlying Bipolar Disorder¹³¹. Critically, we believe that every person with Bipolar Disorder and one or more comorbidities will require professional support from practitioners who have expertise in their specific conditions in order for correct diagnosis and treatment to occur. For example, a psychologist whose primary expertise encompasses Bipolar Disorder and Substance Use Disorders would be of limited help to a person who has Bipolar Disorder and ADHD. This is of particular relevance to medication adherence, a major objective of the proposed KPMG intervention, as a recent meta-analysis found that comorbidity may be associated with poor adherence to antipsychotic medication¹³².

The continual presence of comorbidity presents a major barrier to the successful implementation of KPMG’s model due to the lack of relevant services and professional expertise¹³³. For example, our resource modelling reveals that KPMG’s proposed intervention would require the equivalent of 183 full time psychiatrists who accept bulk billed patients and whose experience encompasses both Bipolar Disorder and ADHD¹³⁴. However, a search of the Royal Australian and New Zealand College of Psychiatrists’ practitioner database reveals just 87 private psychiatrists who meet these criteria, including five or less in South Australia, Western Australia, and the Northern Territory, and none in

¹¹⁹ Lan et al (2015)

¹²⁰ Carrà et al (2014); Schaffer et al (2015)

¹²¹ Schaffer et al (2015)

¹²² Merikangas et al (2011) Table 3; Average of BP I (27.6%) & BP II (27.5%)

¹²³ McElroy et al (2016) Table 2

¹²⁴ Young & Hammond (2007) p1

¹²⁵ Perugi & Vannucchi (2015) p2199

¹²⁶ Merikangas et al (2011) Table 3; average of BP I (52.3%) and BP II (36.5%)

¹²⁷ Bipolar Australia calculation based on ABS (2016), ABS (2014), and Baldwin et al (2013) p5

¹²⁸ Murru et al (2015)

¹²⁹ Kernberg & Yeomans (2013); Bayes et al (2016); Marangoni (2015); Parker et al (2013)

¹³⁰ Drancourt et al (2013)

¹³¹ Yen et al (2016); Perugi et al (2013) Table 1

¹³² Goldstein et al (2016) Table 2

¹³³ Saini et al (2017)

¹³⁴ Bipolar Australia calculation based on ABS (2016), KPMG (2014), and Merikangas et al (2011)

Tasmania and the Australian Capital Territory¹³⁵. This amounts to approximately 6.1% of the private psychiatrist workforce¹³⁶. Allowing for the availability of similarly skilled psychiatrists working in community health care services, residential care, and corrections¹³⁷, the likely number of available psychiatrists rises to 125 (full time equivalent). However, it must be noted that many, if not all, of the practitioners with the relevant specialities undoubtedly also deal with many other types of cases, and are therefore not fully available to address current unmet need.

Comorbidity also presents a challenge in terms of informational resources regarding Bipolar Disorder. A simple Internet search reveals a proliferation of information and screening quizzes about Bipolar itself, but far fewer regarding common comorbidities such as anxiety and ADHD, and almost nothing based in Australia. This means that much of the existing basic information about Bipolar is either incomplete, or in some cases even misleading, for up to 85%¹³⁸ of those with the condition. Reinforcing these concerns, a 2015 review of mobile apps related to Bipolar Disorder concluded that “the content of currently available apps for [Bipolar] is not in line with practice guidelines or established self-management principles¹³⁹”.

Carers: helpers or hindrances?

The critical role played by those who care for an individual with Bipolar Disorder is underappreciated and deserves special attention¹⁴⁰. This importance begins even before a person develops Bipolar, with childhood emotional and sexual abuse having been found in significant numbers of adults with the condition¹⁴¹. In addition, a previous family history of psychiatric illness predicts both illness complexity and severity¹⁴². The link continues to manifest following the onset of symptomology, as a person with Bipolar whose caregivers have high levels of expressed emotion and/or engage in critical dialogue are more likely to experience a relapse¹⁴³. (There is similar evidence of a link between family functioning and symptomology in schizophrenia.¹⁴⁴)

Bipolar Australia regards the positive involvement of a person’s carers as one of the major contributing factors towards recovery. Conversely, a young person with poor family relationships is at risk of experiencing greater episode severity¹⁴⁵ and is more likely to have suicidal thoughts¹⁴⁶, while an adult has a 70% chance of adjusting poorly within marriage¹⁴⁷. Unfortunately, there also appears to be a link between Bipolar Disorder and risk of domestic violence, with a 2014 study finding that around a quarter of women with serious mental illness were exposed to domestic

¹³⁵ RANZCP (2017)

¹³⁶ AIHW (2016) Table WK.8

¹³⁷ Ibid

¹³⁸ Merikangas et al (2011) Table 3; Average of BP I + BP II with at least one comorbidity

¹³⁹ Nicholas et al (2015)

¹⁴⁰ Reinares et al (2016a)

¹⁴¹ Palmier-Claus et al (2016); Maniglio (2013); Post et al (2015a)

¹⁴² Post et al (2015b)

¹⁴³ Hooley (2007); Scott et al (2012); Nader et al (2013); Reinares et al (2016b)

¹⁴⁴ Hesse et al (2015); Pitschel-Walz et al (2001); Butzlaff & Hooley (1998)

¹⁴⁵ Siegel et al (2015)

¹⁴⁶ Ellis et al (2014)

¹⁴⁷ Muke et al (2014)

violence within the past 12 months¹⁴⁸. Current contact with a community mental health team may also be correlated with significantly higher rates of victimisation¹⁴⁹.

Reducing hospital admissions is a key aim of the proposed KPMG intervention. Of great importance, therefore, is a small but highly significant 2012 study which sought to determine whether the family-related interdependencies long acknowledged as being present in cases of schizophrenia¹⁵⁰ and more recently explored in cases of cancer¹⁵¹ are also prevalent in cases of Bipolar Disorder. In that study, Scott et al found that as with schizophrenia, perceived criticism from family members was statistically correlated with higher rates of admission, while greater family knowledge about Bipolar was correlated with reduced admissions¹⁵². Reinforcing this conclusion, a later 2016 study found that a positive family environment was associated with good psychosocial functioning and the absence of both axis II (personality disorder¹⁵³) comorbidities and previous hospitalisations, while a negative family environment was associated with greater numbers of both episodes and suicide attempts¹⁵⁴. Separately, a 2015 study also found that social support is correlated with positive attitudes towards medication¹⁵⁵. It is also possible that parents underestimate their use of criticism¹⁵⁶ and have impaired problem solving abilities¹⁵⁷.

Unfortunately KPMG has failed to account for these issues in its intervention model, instead relying primarily on the presence of appropriately skilled practitioners to moderate the effects of poor family functioning. This may be partly due to the fact that family-oriented therapeutic intervention is an area which remains “complex and contested¹⁵⁸”. Nonetheless, there is over 30 years of literature relating to Family Focused Therapy, a key evidence-based psychosocial intervention for Bipolar Disorder¹⁵⁹, and a recent systemic review of family interventions concluded that there is a “need to involve caregivers in the therapeutic management of [Bipolar Disorder] through tailored interventions based on patients’ characteristics and family needs¹⁶⁰”.

Collaboration: management is a team activity

The recent report of the Primary Health Care Advisory Group regarding chronic and complex health conditions concluded:

Most patients with multiple chronic conditions receive treatment from many health providers: most of them working in different locations, and often working in different parts of the health system. As a result, effective communication between the health ‘team’ can be

¹⁴⁸ Khalifeh et al (2014); see also Trevillion et al (2012)

¹⁴⁹ Anderson et al (2016)

¹⁵⁰ Butzlaff & Hooley (1998)

¹⁵¹ Kershaw et al (2015)

¹⁵² Scott et al (2012) Table 2

¹⁵³ Røysamb et al (2011)

¹⁵⁴ Reinares M et al (2016b)

¹⁵⁵ Chang et al (2015)

¹⁵⁶ Swenson et al (2016)

¹⁵⁷ Young et al (2013)

¹⁵⁸ Burbach (2013) p(vii)

¹⁵⁹ Miklowitz & Chung (2016)

¹⁶⁰ Reinares (2016)

challenging and may be inconsistent. This leads to concern regarding the quality and safety of patient care.¹⁶¹

These concerns are paramount for people with severe mental health conditions, as is noted elsewhere in the Advisory Group's report¹⁶². KPMG's proposed intervention incorporates five different primary health services: general practitioners, psychiatrists, psychologists, psychosocial support, and community mental health teams. Bipolar Australia believes that the level of collaboration between these practitioners, and therefore the prospect of successful intervention, is likely to depend on:

- Practitioners' informal communication with their colleagues regarding individuals under their care and supervision¹⁶³;
- The knowledge and experience of the care coordinator regarding both Bipolar Disorder and each individual's specific comorbidities¹⁶⁴;
- The level of staff turnover in each individual's care team, particularly of psychiatrists¹⁶⁵; and
- Strong organisational support¹⁶⁶.

In order to improve their clinical outcomes and thereby reduce their resource utilisation over time, individuals must learn a degree of self-management¹⁶⁷. This means that a person's active participation in her treatment course will be of similar importance to the capacity of the various primary health providers involved in her care¹⁶⁸.

Unfortunately, creating active participation is a multidimensional issue of considerable complexity. At its core is the therapeutic relationship with each team member, and particularly the psychiatrist¹⁶⁹. Each relationship is itself comprised of two aspects, the professional and the personal; the former relates to mainly skills and experience, while the latter involves the ability of the practitioner to identify the personality traits and values of an individual, then to adjust their approach accordingly to make him comfortable¹⁷⁰. It also requires insight on the part of the individual with Bipolar, something which may be more difficult if neurocognitive deficits have taken hold during previous episodes¹⁷¹. Finally, Bipolar Australia believes that active participation can only occur if an individual with Bipolar is able to network with and learn from other people affected by the condition, including carers. Research consistently shows that group psychoeducation has a positive impact on medication adherence and rehospitalisation rates¹⁷², and we believe this is a critical missing link in the recovery process.

¹⁶¹ Commonwealth of Australia (2016) p6

¹⁶² Ibid p25

¹⁶³ Kutash et al (2014)

¹⁶⁴ Grande et al (2016); Tatlow-Golden et al (2016)

¹⁶⁵ Whitebird et al (2014); Hoertel et al (2014)

¹⁶⁶ Kutash et al (2014); Bodenheimer et al (2014)

¹⁶⁷ Siantz & Aranda (2014); Kelly et al (2014)

¹⁶⁸ Loos et al (2017)

¹⁶⁹ Catty et al (2013); Whitebird et al (2014)

¹⁷⁰ Gaebel et al (2014); Gaudiano et al (2017)

¹⁷¹ Garcia et al (2016); Mora et al (2013); Fonagy & Allison (2014)

¹⁷² Bond & Anderson (2015); Ocampo (2015)

Summary of Barriers

KPMG's focus on strengthening case management, medication adherence, and increased practitioner engagement will likely reduce hospitalisations for individuals in the Severe clinical scenario, and reduce the likelihood of deterioration for others. However, by failing to consider the issues of comorbidity, carers, and collaboration, KPMG has also put these gains at risk. 85.65%¹⁷³ of people with Bipolar have one or more comorbid psychiatric conditions, which complicates diagnosis and management, as well as presenting important resourcing challenges. Conflict with, and criticism from, carers can disrupt clinical progress as well as providing continual triggers for new hospitalisations, and Bipolar Australia therefore believes that including family members as an integral part of any intervention will be critical to its success. Finally, successful collaboration between the members of each individual's care team, combined with the active participation of the individuals themselves, will significantly increase the quality of care, and the resulting financial value of intervention to the taxpayer.

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¹⁷³ Merikangas et al (2011) Table 3; Average of BPI+BPII

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5. What could be realistically achieved by 2021?

Assumptions

Bipolar Australia recognises that the systemic change which would enable the provision of optimal care as envisioned by KPMG is unlikely in the near term, given the complex nature of the health system and the need to coordinate reforms through bodies such as the Council of Australian Governments. However, we also believe that a cost-effective intervention strategy which delivers significant savings to government can be developed for implementation in fiscal year 2021-22.

In designing this intervention proposal, we have assumed that the health care system will remain in its current form. We have also made the unfortunate assumption that it will not be possible to successfully assist a large number of individuals for whom systemic changes will be required, particularly those who:

- Live in rural and remote areas, Tasmania, and the Northern Territory;
- Have more than two major psychiatric comorbidities;
- Do not have at least a minimal level of family support at the point of intervention;
- Are unable to access affordable or bulk billed practitioners who have sufficient skill and experience to address their specific needs; and
- Already have severe, recurrent episodes resulting in hospitalisation, plus any one of the other risk factors identified above.

Proposed Intervention Strategy

Bipolar Australia believes that the following three components, developed and then delivered in an integrated manner, will reduce hospitalisation for both newly diagnosed individuals and a subset of those corresponding to KPMG's Severe and Moderate clinical scenarios:

- A chronic disease management model usable immediately without systemic changes;
- At-risk population targeting; and
- Direct-to-consumer health promotion messaging.

Chronic Disease Management Model

KPMG's proposed case management intervention is at its heart an economic model, not a clinical one. Bipolar Australia believes that further work would need to be done in order to address the additional elements we have identified, namely comorbidity, carers, and collaboration, before proceeding to pilot a reorientation of health resources in the manner proposed.

However, many of the components which make up the proposed intervention do not require systemic changes in order to be activated for people affected by Bipolar Disorder. In particular, consultations with general practitioners, psychiatrists, and psychologists are all eligible for Medicare funding under certain conditions¹⁷⁴. Furthermore, general practitioners are eligible to receive

¹⁷⁴ Commonwealth of Australia (2016a)

Medicare payments for Chronic Disease Management¹⁷⁵ and can therefore serve in the care coordination role envisioned by KPMG if they are sufficiently upskilled and supported.

In our revised non-systemic model, a General Practitioner (GP) creates an annual treatment plan, and reviews it every three months. The GP also sees the individual on a weekly basis for 30 minutes. The individual sees a psychiatrist once per month, a psychologist 10 times per year, and a dietitian five times per year.

Service (MBS Item)	Medicare Rebate ¹⁷⁶	Annual Units	Annual Cost	Current Usage ¹⁷⁷ Mild/Mod/Sev
GP – Management Plan (721)	\$144.25	1	\$144.25	N/A
GP – Team Coordination (723)	\$114.30	1	\$114.30	
GP – Plan Review (732)	\$72.05	3	\$216.15	
GP – Consult (36)	\$71.70	48 ¹⁷⁸	\$3441.60	
Psychiatrist – Consult (306)	\$183.65	12	\$2203.80	0 / 0 / 12
Psychologist – Consult (80010)	\$146.45	10 ¹⁷⁹	\$1464.50	2 / 2 / 4
Dietician – Consult (10954)	\$62.25	5 ¹⁸⁰	\$311.25	6 / 6 / 12
Annual Cost before co-payments			\$7895.85	
Medicare Safety Net Threshold			\$453.20 ¹⁸¹	
Total Annual Cost excluding Extended Safety Net rebates			\$7442.65	

Table 5.1: Chronic disease management model without systemic change: direct cost per individual

This intervention would result in a person with Bipolar Disorder having an average of one contact visit every **4.5 days**, which is similar to KPMG's proposed intervention for the Mild clinical scenario, although it is less than the 3 day and 2 day averages proposed for the Moderate and Severe scenarios. In some more complex cases, additional GP visits might be sufficient to successfully sustain the proposed intervention; however, this has not been modelled.

Our modified non-systemic version of KPMG's original intervention would need to be supported by five additional elements:

1. An information resource for people affected by Bipolar Disorder (including families and carers) outlining the structure of the intervention and encouraging its uptake;
2. A detailed resource for general practitioners outlining their role in the intervention, and providing background information regarding evidence-based practice for the diagnosis and management of Bipolar Disorder, the diagnosis and management of comorbidities, and carer psychoeducation;
3. Video content which supplements the information resources for stakeholders, including an on-demand webinar targeted at general practitioners;

¹⁷⁵ Commonwealth of Australia (2014)

¹⁷⁶ As of December 2016; Commonwealth of Australia (2016a)

¹⁷⁷ KPMG (2014) Table A11

¹⁷⁸ Commonwealth of Australia (2016a) p62: restrictions on same-day GP claiming

¹⁷⁹ Ibid p823: total psychologist service rebate eligibility

¹⁸⁰ Ibid p820: total dietitian service rebate eligibility

¹⁸¹ Commonwealth of Australia (2017)

4. A searchable database of relevant bulk billing practitioners, including information regarding each practitioner's experience with comorbidities (either standalone or integrated with a pre-existing database such as the National Health Services Directory, as appropriate); and
5. Targeted promotion and electronic distribution of these resources.

Optionally, a personal electronic health record system modelled on the resource developed in the United States¹⁸² incorporating relapse prevention modules modelled on the resource developed in the United Kingdom¹⁸³ would both add further value by providing a framework for information sharing between practitioners, care coordinators, and those affected by the condition. In their evaluation of the U.S. based health record project, Druss et al reported that "having a personal health record resulted in significantly improved quality of medical care and increased use of medical services among patients"¹⁸⁴. Both of these outcomes were major objectives of KPMG's proposed intervention.

At-Risk Population Targeting

Although the issue of comorbidity considerably complicates the diagnosis and treatment of Bipolar Disorder, it simultaneously provides a clear early intervention roadmap. Correctly diagnosing the condition upon the first incidence of mania and then successfully intervening to prevent future recurrence will generally produce the best clinical outcomes¹⁸⁵. The high levels of childhood trauma and premorbid psychiatric conditions such as depression and Attention Deficit Hyperactivity Disorder (ADHD)¹⁸⁶ will allow at-risk populations to be targeted¹⁸⁷ with a considerable degree of precision. In addition, providing psychoeducation resources for carers and family members in the immediate aftermath of diagnosis will reduce the risk of family problems triggering future episodes.

Bipolar Australia believes that an integrated early intervention strategy can begin to reduce the escalation of newly impacted individuals to more severe states requiring hospitalisation. This strategy would involve seven elements:

1. Publicly accessible screening tools targeting common comorbidities and precursor conditions, including anxiety, depression, ADHD, and childhood trauma, conceptually similar to the Maryland based M-3 checklist¹⁸⁸;
2. Information resources for general practitioners and psychologists outlining the diagnosis of both Bipolar Disorder and each targeted comorbidity or precursor¹⁸⁹, and giving guidance regarding their communication of new diagnoses to patients¹⁹⁰;

¹⁸² Druss et al (2014)

¹⁸³ Lobban et al (2015)

¹⁸⁴ Druss et al (2014) p1

¹⁸⁵ Lee et al (2014); Arvilommi (2016); Drancourt et al (2013); Kessing & Andersen (2017); Kapczinski et al (2014)

¹⁸⁶ Birmaher et al (2014); Correll et al (2014); Joo et al (2012); Bukh et al (2016); Serra et al (2015)

¹⁸⁷ Versus universal (e.g. stigma reduction); Costello (2016)

¹⁸⁸ Gaynes et al (2010)

¹⁸⁹ Cerimele et al (2013); Lampe et al (2013)

¹⁹⁰ Milton & Mullan (2014); Milton et al (2016)

3. Information resources for parents outlining the interdependencies between Bipolar and each targeted comorbidity and precursor, variance in symptoms, and typical alterations in treatment versus Bipolar-only cases;
4. An information resource for parents outlining the issues which carers often face in the period immediately following initial diagnosis of Bipolar, including overviews of other intervention components, such as the management model, bulk billing practitioner database, and comorbidity screening tools;
5. Video content which supplements the information resources by collating and sharing the experiences of individuals from within the target demographics (both people with Bipolar and carers);
6. Content and messaging coordination with existing peak bodies that represent and support each targeted group; and
7. Targeted promotion and electronic distribution of these resources.

Optionally, face to face education and training programs targeting general practitioners and psychologists, parents of at-risk teenagers, and carers of individuals who have recently been diagnosed would add further value to the proposed information resources. For practitioners, improving comfort with complex diagnostic processes¹⁹¹ and enhancing communication between the primary care and mental health practitioners¹⁹² would be key deliverables. For the parent and carer component, it is important to note that a 2013 comparison of individually delivered Cognitive Behavioural Therapy and group psychoeducation reported similarly positive clinical outcomes¹⁹³; the cost benefits of group delivery are self-evident. Furthermore, a 2016 trial found that even a brief two session intervention can deliver large and enduring improvements for caregivers¹⁹⁴.

Direct-to-Consumer Health Promotion

The Internet is increasingly becoming a primary resource for people affected by serious mental health conditions such as Bipolar Disorder. A 2016 international survey of people with Bipolar found that 77% used the Internet to research the condition¹⁹⁵, a number which is broadly consistent with other mental health information seeking studies¹⁹⁶. Individuals whose Bipolar interfered with their mood and/or regular activities were more likely to be using the Internet to find out about the condition¹⁹⁷. Carers and young people, both key demographics in terms of successfully intervening in Bipolar Disorder, are also reported to use the Internet: a 2013 survey of an Australian Bipolar information website found that 68.3% of respondents to that instrument were carers¹⁹⁸, while a 2014 study reported that young people are increasingly getting peer to peer support through social media services such as YouTube¹⁹⁹. Separately, the Internet is now routinely used to recruit people

¹⁹¹ Lampe et al (2013); Hughes et al (2016)

¹⁹² Chang et al (2014)

¹⁹³ Parikh (2013); see also Kallestad (2016)

¹⁹⁴ Hubbard et al (2016)

¹⁹⁵ Conell et al (2016)

¹⁹⁶ Grohol et al (2014)

¹⁹⁷ Conell et al (2016) Table 1

¹⁹⁸ Berk et al (2013)

¹⁹⁹ Naslund et al (2014)

for mental health studies and interventions for conditions such as dementia²⁰⁰, depression²⁰¹, and cigarette smoking²⁰².

Bipolar Australia believes that the near-ubiquitous prevalence of existing Internet usage presents an opportunity to deliver direct-to-consumer health promotions messages²⁰³ to target demographics²⁰⁴. However, the health promotion field is littered with examples of failure and unintended consequences, including for school based emotional learning education interventions²⁰⁵, anti-smoking efforts²⁰⁶, drug advertising²⁰⁷, and stigma reduction social media campaigns²⁰⁸. As a result, we believe the method described by Kravitz et al in their 2013 report regarding an innovative collaboration between academic researchers and marketing professionals²⁰⁹ provides the best way to minimise potential failure. In that study, a working party evaluated direct-to-consumer health promotion advertising through the mechanism of focus groups, with the authors concluding that "it is feasible to develop targeted [advertisements] that are not only empirically grounded but also captivating and persuasive"²¹⁰.

Advertising costs are likely to be of concern for any health promotion initiative²¹¹. Drawing on a report from the United States regarding recent innovative practice in this area²¹², Bipolar Australia has developed a community-based model which would allow for the delivery of up to US\$6 million in Google advertising per annum, including video advertising on YouTube, for an investment of AU\$300,000 per annum (approximately 5% of the total spend delivered). Such advertising would connect individuals with Bipolar, young people at risk of developing the condition, and carers with the information developed for their specific demographics. The campaign's monetary value would be similar to recent government advertising initiatives targeting tobacco use and physical activity for young women²¹³, albeit without much of the direct expenditure associated with those projects.

This intervention would involve five elements:

1. Exploratory focus groups comprised of three key target demographics, parents of teenaged children, young people aged 18-21, and carers of people frequently hospitalised for episodes of Bipolar Disorder, recurrent depression, or substance use disorders;
2. Recruitment of stakeholders to assist with the implementation of the community-based advertising strategy;

²⁰⁰ O'Dwyer & Moyle (2014)

²⁰¹ Lindner et al (2015)

²⁰² Muñoz et al (2015)

²⁰³ Becker (2015)

²⁰⁴ Eaton & Kenyon (2014)

²⁰⁵ Evans et al (2015)

²⁰⁶ Earp et al (2013)

²⁰⁷ Corrigan et al (2014)

²⁰⁸ Livingston et al (2013)

²⁰⁹ Kravitz et al (2013)

²¹⁰ Ibid p10

²¹¹ Clement et al (2013), p32

²¹² Edwards (2016)

²¹³ Commonwealth of Australia (2016b) Table 1

3. Development of text and video advertisements to be delivered through Google and YouTube advertising systems;
4. Investigative focus groups comprised of targeted demographics, to ensure that advertisements are relevant, effective, and avoid key unintended consequences; and
5. Ongoing coordination of advertising delivery and community-based stakeholders, to be able to react to successful and unsuccessful strategies and increase cost efficiency.

Optionally, the Google and YouTube advertisements could be supplemented with limited advertising on Facebook and other social media platforms. In addition, developing a professionally monitored social therapy platform modelled on the 2013 trial by Lederman et al²¹⁴ would allow for cost-effective peer to peer self-support as part of a structured psychoeducation intervention.

Proposed Evaluation Strategy

Nous Group commented in its 2014 independent evaluation of beyondblue that it was “difficult to determine whether beyondblue activities over the past four years have directly resulted in a measureable improvement in health outcomes for individuals currently experiencing, or at risk of developing depression and anxiety²¹⁵”. The reviewers continued:

Similarly the extent to which the social and economic consequences of these conditions have been impacted by the work of beyondblue remains unclear. In part this is a result of fragmentation in mental health service funding and delivery, which makes it challenging to estimate expenditure on mental health services and hence identify improvements across the sector generally. It is even more challenging to attribute improvements to beyondblue activities.²¹⁶

Bipolar Australia strongly believes that given the complexity of Bipolar Disorder and the economic consequences, any intervention must include measures to ascertain stakeholder benefits against treatment as usual. We therefore propose to engage a PhD student to undertake a full evaluation of the interventions, and to directly fund recruitment of both intervention beneficiaries and treatment as usual controls to ensure validity of the resulting assessment.

Participant recruitment would take place in three ways:

1. Referral incentives for practitioners who have registered for online resources, such as the on-demand webinar, or are listed in the bulk billing database;
2. Directly from those who have completed a diagnostic screening tool online; and
3. Through Google AdWords²¹⁷.

In addition to this qualitative research, we would be able to track quantitative data, such as the number of diagnostic surveys completed, usage statistics for the practitioner database, and registrations for the on-demand practitioner webinar.

²¹⁴ Lederman et al (2014)

²¹⁵ Nous Group (2014), p69

²¹⁶ Ibid

²¹⁷ Eaton & Kenyon (2014)

Financial Modelling

We estimate that the proposed intervention strategy, delivered beginning in July 2021 and ending in June 2024, can successfully reach 2,173 individuals (3.7% of the targeted demographics) with Bipolar Disorder at various illness stages and deliver \$554.3 million in savings to the taxpayer, with the bulk of these achieved within the delivery period. To achieve the projected saving, the cost is estimated to be \$26.9 million, comprised of \$3.1 million in direct program expenditure, plus \$23.8 million in additional practitioner reimbursements through Medicare. Due to the high level of achievable savings, we estimate that the proposed program would only have to successfully reach 13 (thirteen) individuals in order to be revenue-neutral for Australian Governments collectively, or approximately 32 individuals to achieve revenue neutrality for a single governmental entity (state or federal)²¹⁸.

If the components of the strategy are extended, beginning with the optionally proposed additions, there is the potential to achieve up to \$1.95 billion in further savings. However, it is likely that these savings will become progressively more costly to achieve, and so for the purposes of this preliminary evaluation, we have costed an expanded intervention targeting a further 2,018 individuals (3.4% of the targeted demographics) and estimated to deliver an additional \$482 million of savings. The cost of the expanded program is estimated to be \$27.5 million, comprised of \$4.3 million in direct program expenditure, plus \$23.2 million in additional Medicare reimbursements.

Although it is possible, perhaps even likely, that some successfully targeted individuals will successfully reduce peak severity by more than one degree (e.g. from Severe to Mild, rather than merely to Moderate), this has not been predicted in the financial model. We project that savings incurred from these unexpectedly positive results will be counterbalanced by less than expected results in other cases.

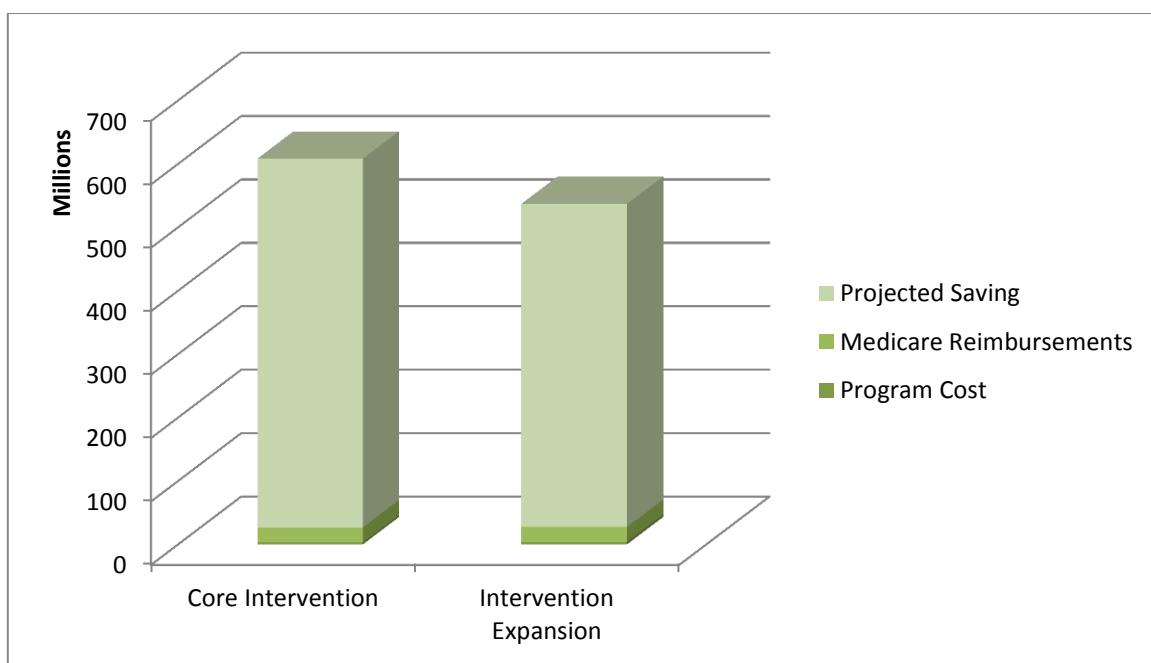


Figure 5.1: Core and Expanded Interventions, costs and gross projected savings, in 2016 dollars

²¹⁸ Assuming that the government accrues savings of at least 40% of the total

Core Intervention – Program Budget

For the core intervention, the first three years would be dedicated to resource development and market research. Primarily this work would be done by appropriately skilled students on placement as part of their university or vocational education courses, and would be coordinated by a full time Executive Officer and part time Senior Coordinator. The resource development would be undertaken in close partnership with the three peak bodies for mental health in New South Wales, WayAhead (the Mental Health Association of NSW), Mental Health Carers NSW, and Being (formerly the Consumer Advisory Group). Bipolar Australia would join the Collective Purpose hub in Woolloomooloo, ensuring that we have immediate access to high quality financial, human resources, and Information Technology services. In the delivery phase, a full time Program Manager would be added to coordinate issues related to the Google partnership and manage the \$6 million USD annual advertising spend, while a full time PhD student would be recruited to conduct a thorough evaluation of the intervention strategy.

Expense	Cost Per Year ²¹⁹	Years Required	Cost to FY 2023/24 ²²⁰
Executive Officer	\$110,000	2018/19-2023/24	\$660,000
Senior Coordinator	\$20,000	2018/19-2023/24	\$120,000
Web Developer	\$30,000	2018/19-2020/21	\$90,000
Video Production	\$50,000	2020/2021	\$50,000
Occupancy	\$60,000	2018/19-2023/24	\$360,000
Administration	\$30,000	2018/19-2023/24	\$180,000
Travel and Networking	\$15,000	2018/19-2023/24	\$90,000
Market Research	\$50,000	2018/19-2020/21	\$150,000
Promotion Manager	\$100,000	2021/22-2023/24	\$300,000
Promotion Program	\$200,000	2021/22-2023/24	\$600,000
Evaluation PhD Student	\$40,000	2021/22-2023/24	\$120,000
Evaluation Recruitment	\$30,000	2023/24	\$30,000
Estimated Total before inflation			\$2,750,000
13.5% cumulative inflation			\$372,000
Total Program Cost over six years			\$3,122,000

Table 5.2: Core intervention program budget, calculated with 2.5% annual inflation, in 2016 dollars

Core Intervention – Estimated Gross Saving

Demographic	Projected Outcome	Gain P/P	Target (% of total)	Estimated Saving
Premorbid – Aged 18 in 2022, 2023, or 2024	Peak reduced from Severe to Moderate	\$324,003	404 (5%)	\$130,897,123
	Peak reduced from Moderate to Mild	\$234,988	703 (7.5%)	\$165,196,571
Current – Severe Illness during 2021-24	Reduce to Moderate, via CDM model	\$324,003	389 (2%)	\$126,037,081
Current – Moderate Illness during 2021-24	Reduce to Mild, via CDM model	\$234,988	677 (3%)	\$159,086,883
Total Gross Saving 2022-2033 with the bulk achieved in 2021/22-2024/25				\$581,217,658

Table 5.3: Core intervention gross savings estimate, absent systemic change, in 2016 dollars

²¹⁹ Expressed in 2016 dollars

²²⁰ Expressed in 2016 dollars, before inflation

Core Intervention – Estimated Net Saving

Item	Impact ²²¹
Program Expenditure over six years from 2018/19 to 2023/24	-\$3,122,000
Premorbid Population Intervention primarily realised over five years from 2021/22	\$296,093,693
Current Population Intervention primarily realised over three years from 2021/22	\$285,123,963
Medicare Expenditure over three years, \$7422.65 per current target per annum	-\$23,801,595
Total Net Saving 2021-2032 with the bulk achieved in 2021/22-2024/25	\$554,294,061

Table 5.4: Core intervention net savings estimate, absent systemic change, in 2016 dollars

Intervention Expansion – Program Budget

For the intervention expansion, additional resources would be dedicated to the development of an Internet-based system that would provide a comprehensive evidence-based self-help service, incorporating shared monitoring, structured peer psychoeducation, and 24 hour support, into a single, personalised, one stop destination. In the third year of the development phase, a full time Education Manager would be added to prepare for the delivery phase. For the delivery phase, six full time educators would be added to deliver targeted messaging to high-value and high-risk demographics, including carers of people hospitalised for the first time, parents of teenage children with precursor mental health conditions, general practitioners, and psychologists. In addition, eight full time equivalent (FTE) employees would be added to manage the self-help service.

Expense	Cost Per Year ²²²	Years Required	Cost to FY 2023/24 ²²³
Web Development	\$90,000	2018/19-2020/21	\$270,000
Education Manager	\$100,000	2019/20-2023/24	\$400,000
2X GP Educators	\$150,000	2021/22-2023/24	\$450,000
4X Public Educators	\$250,000	2021/22-2023/24	\$750,000
Travel & Accommodation	\$100,000	2021/22-2023/24	\$300,000
8 FTE ²²⁴ Online Support	\$480,000	2021/22-2023/24	\$1,440,000
Additional Occupancy	\$15,000	2020/21-2023/24	\$60,000
Administration	\$30,000	2021/22-2023/24	\$90,000
Estimated Total before inflation			\$3,760,000
13.5% cumulative inflation			\$508,000
Total Program Cost over six years			\$4,268,000

Table 5.5: intervention expansion program budget, calculated with 2.5% annual inflation, in 2016 dollars

Intervention Expansion – Estimated Gross Saving

For the intervention expansion, we project that it will become more difficult to successfully reduce peak severity in the premorbid population through health promotion means alone. We have therefore assumed that 50% of young people who would otherwise peak at Severe will require additional management through the Chronic Disease Management Model in order to achieve the desired effect, as well as 25% of those who would otherwise peak at Moderate.

²²¹ Expressed in 2016 dollars

²²² Expressed in 2016 dollars

²²³ Expressed in 2016 dollars, before inflation

²²⁴ Full Time Equivalent

Demographic	Projected Outcome	Gain P/P	Target (% of total)	Estimated Saving
Premorbid – Aged 18 in 2022, 2023, or 2024	Peak reduced from Severe to Moderate, 50% via CDM model	\$324,003	202 (2.5%)	\$65,448,561
	Peak reduced from Moderate to Mild, 25% via CDM model	\$234,988	1171 (12.5%)	\$275,170,960
Current – Severe Illness during 2021-24	Reduce to Moderate, via CDM model	\$324,003	194 (1%)	\$62,856,539
Current – Moderate Illness during 2021-24	Reduce to Mild, via CDM model	\$234,988	451 (2%)	\$105,979,593
Total Gross Saving 2022-2033 with the bulk achieved in 2021/22-2024/25				\$509,455,653

Table 5.6: Intervention expansion gross savings estimate, absent systemic change, in 2016 dollars

Intervention Expansion – Estimated Net Saving

Item	Impact ²²⁵
Program Expenditure over six years from 2018/19 to 2023/24	-\$4,268,000
Premorbid Population Intervention primarily realised over five years from 2021/22	\$340,619,521
Current Population Intervention primarily realised over three years from 2021/22	\$168,836,131
Medicare Expenditure over three years, \$7422.65 per current target per annum	-\$23,198,741
Total Net Saving 2021-2032 with the bulk achieved in 2021/22-2024/25	\$481,988,911

Table 5.7: Intervention expansion net savings estimate, absent systemic change, in 2016 dollars

Summary of Proposed Intervention

Starting from the assumption that the systemic changes proposed by KPMG are unlikely to occur by 2021, Bipolar Australia has devised an alternate non-systemic strategy to recoup between \$554.3 million and \$1.04 billion beginning in fiscal year 2021-22, with the bulk of those savings achieved by 2025-26. The core intervention strategy comprises a chronic disease management model which encourages full use of existing primary care resources, at-risk population targeting to maximise early intervention potential, carefully planned direct-to-consumer health promotion which leverages partnerships to deliver a significantly outsized impact, and an integrated outcomes-based evaluation. This would cost \$3.1 million over six years to develop and deliver, plus an estimated \$23.8 million in indirect expenditure through Medicare, and would deliver an estimated \$554.3 million in savings, primarily through reduced hospitalisation and income support payments. The expanded intervention comprises supplemental Internet-delivered resources grounded in the latest evidence-based research, and targeted face-to-face education for practitioners, parents of at risk teenagers, and carers of individuals who have recently been diagnosed. This would cost a further \$4.3 million over six years, plus an estimated \$23.2 million in indirect expenditure through Medicare, and would deliver an estimated \$482 million in savings.

²²⁵ Expressed in 2016 dollars

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Appendix A: Evaluating the Reliability of the Australian Bureau of Statistics Bipolar Data

Overview

This Appendix discusses the classification problems identified by Mitchell et al²²⁶ in the Australian Bureau of Statistics' methodology for the 2007 National Survey of Mental Health and Wellbeing, as well as the resulting implications for our more recent costing of Bipolar Spectrum Disorders in Australia.

Background

Previous surveys

In the 2007 National Survey of Mental Health and Wellbeing, the Australian Bureau of Statistics originally reported a lifetime incidence level for Bipolar Disorder of 2.9%, and a 12 month prevalence of 1.8%²²⁷. However, the ABS utilised an outdated categorisation algorithm to analyse the results of its survey interviews²²⁸. Rather than reporting Bipolar Spectrum Disorders in their constituent parts – comprising Bipolar I Disorder, Bipolar II Disorder, and Subthreshold Bipolar – the final ABS report merely grouped all of these conditions together as “Bipolar Affective Disorder”. This also appears to have also been the case in the underlying dataset made available to researchers²²⁹.

In their 2013 reassessment of the original survey interviews, Mitchell et al reported that the recalibrated 12 month incidence levels for Bipolar I Disorder and Bipolar II Disorder were 0.5% and 0.4% respectively²³⁰. The remaining 0.9% of interviewees originally identified as currently experiencing symptomology for Bipolar Affective Disorder were retrospectively re-categorised as corresponding to the new “Bipolar Subthreshold” variable, as per the updated instructions from the Harvard Medical School²³¹. Unfortunately, the authors did not report a recalibrated lifetime incidence for Bipolar I and Bipolar II Disorders in their reassessment.

²²⁶ Mitchell et al (2013)

²²⁷ ABS (2008)

²²⁸ Mitchell et al (2013) p382

²²⁹ e.g. compare Sunderland et al (2014) Table 1 with Mitchell et al (2013) Table 2

²³⁰ Mitchell et al (2013) Table 1

²³¹ Mitchell et al (2013) p382

The updated approach to categorisation which should have been employed in the 2007 ABS study was subsequently utilised in the 2011 World Mental Health Survey. In that study, which employed the same structured interview as the earlier Bureau of Statistics survey, the worldwide lifetime prevalence of Bipolar Spectrum Disorders was estimated to be 2.4%, comprised of a 0.6% incidence for Bipolar I Disorder, 0.4% for Bipolar II Disorder, and 1.4% for Subthreshold Bipolar²³². However, a 2014 reassessment of the World Mental Health Survey data by Karam et al found that between 6.8% and 18.9% of the 47,552 people interviewed for that study had been screened out inappropriately²³³. Although not all of these people would have been added to the Bipolar Spectrum Disorders group had they been correctly screened, as a whole they had a substantially higher history of suicide attempts (29.1% vs 6.4% for the reference group) as well as more average illness episodes (4.2 vs 2.7)²³⁴. Given that an almost identical interview was utilised by the Bureau of Statistics in 2007²³⁵, it is likely that the 2013 reassessment by Mitchell et al similarly resulted in an unknown number of relevant individuals with Bipolar Spectrum Disorders being excluded.

During the past few years, updated estimates for Bipolar Disorders have been published in both the United Kingdom and the United States. The United Kingdom survey utilised a representative sample from England, and reported a lifetime incidence for Bipolar Disorders of 2.0%²³⁶. However, Marwaha et al also noted that the survey sensitivity was limited by the chosen methodology, and suggested that the result might be an underestimate²³⁷. This does in fact appear to be the case, as the reported lifetime incidence for Bipolar Disorder in people aged 75 and over was nil²³⁸. In the United States, Hasin and Grant, drawing on data collected from 2001 to 2005, reported lifetime incidences for Bipolar I and Bipolar II Disorders of 3.3% and 1.1% respectively, as well as a 12 month prevalence of 2.0% for Bipolar I and 0.8% for Bipolar II²³⁹. A more recent study, drawing on data collected during 2012 and 2013, reported a lifetime incidence of 2.1% for Bipolar I Disorder only²⁴⁰, with no updated assessment regarding Bipolar II Disorder and no new 12 month estimate.

²³² Merikangas et al (2011)

²³³ Karam et al (2014) Table 2

²³⁴ Karam et al (2014) Table 3

²³⁵ Mitchell et al (2013) pp383-4

²³⁶ McManus et al (eds.) (2016) Table 9.1

²³⁷ McManus et al (eds.) (2016) p232; see also Poon et al (2012)

²³⁸ McManus et al (eds.) (2016) Table 9.1

²³⁹ Hasin & Grant (2015) Table 2

²⁴⁰ Blanco et al (2017)

Meta-analyses and increased reported prevalence

The first large scale attempt to systematically quantify the number of people affected by Bipolar Disorders worldwide was published by a Cross-National Collaborative Group in 1996²⁴¹. In that study, Weissman et al noted the presence of significant regional and gender variations, with lifetime incidences ranging from 0.3% in Taiwan to 1.5% in Christchurch, New Zealand²⁴². At the time, the reported incidence level for the United States was 0.9%²⁴³. However, just seven years later a U.S.-based team, including Weissman, was reporting an updated estimate of 3.3% for that country²⁴⁴. In their 2003 report, Hirschfeld et al noted that “only one in five positive subjects reported a diagnosis of [Bipolar Spectrum Disorder]; nearly half reported a diagnosis of unipolar depression”²⁴⁵.

Two recent meta-analyses provide suggestions as to why reported prevalence rates may have increased since Weissman et al’s 1996 report. In their 2015 systematic review and meta-analysis of Bipolar Disorder prevalence, Clemente et al focused on the evolving criteria for diagnosis, including updates to the Diagnostic and Statistical Manual (DSM) over the years, and highlighted difficulties posed by the structured interviews typically utilised in epidemiological surveys²⁴⁶. In their separate 2016 systemic review and meta-analysis of Bipolar Disorder in primary care settings, Stubbs et al similarly concluded that evolving criteria might have contributed to the increasing diagnosis rates, while also suggesting that increasing awareness of the condition among Western professionals might have contributed to the higher reported prevalence during recent years²⁴⁷.

These two studies also provide a current snapshot of the incidence levels for Bipolar Disorders worldwide. Clemente et al estimated that the lifetime incidences for Bipolar I and Bipolar II Disorders were 1.06% and 1.57% respectively, with a 12 month prevalence of 0.71% for Bipolar I and 0.5% for Bipolar II²⁴⁸. Stubbs et al took the novel approach of calculating the current prevalence of Bipolar Disorder among primary care attendees, and provided an estimate of 1.9% of current patients, while also reporting a lifetime prevalence estimate of 3.7% and a 12 month incidence estimate of 0.7%²⁴⁹.

²⁴¹ Weissman et al (1996) p293

²⁴² Weissman et al (1996) Table 3

²⁴³ Weissman et al (1996) Table 3

²⁴⁴ Hirschfeld et al (2003)

²⁴⁵ Ibid

²⁴⁶ Clemente et al (2015) pp159-60

²⁴⁷ Stubbs et al (2016) p637

²⁴⁸ Clemente et al (2015) pp156-7

²⁴⁹ Stubbs et al (2016) p637

Bipolar Spectrum Disorders are often conceptualised as existing on a continuum beginning with unipolar depression at one end and ending with Bipolar I Disorder at the other²⁵⁰. However, as Bipolar I, Bipolar II, and subthreshold conditions are at present all distinct, discrete entities for the purposes of diagnosis, accurate identification is hampered by artificially stringent criteria and some individuals with hypomania are not correctly classified as having a Bipolar Disorder²⁵¹. This suggests that caution should be taken when utilising artificially high thresholds for diagnosis²⁵². Conversely, there is also a risk that the spectrum continuum could be expanded far beyond what might be reasonably recognised as a Bipolar Disorder. For example, a 2013 systematic review suggested that broadly defined Bipolar Spectrum Disorders might affect 15.1% of the world's population, although the authors to their credit noted that this included a 10.7% estimated incidence for "soft hypomanic" episodes whose definition differed to current DSM criteria²⁵³.

Analysis

Incidence levels

Despite the poor classification by the Australian Bureau of Statistics, there is sufficient data to suggest that the overall estimates which were provided in 2008 are largely correct. Both the 12 month and lifetime prevalence estimates are comfortably within the global averages, with the exception of the 12 month Subthreshold Bipolar estimate, which is 0.1% higher than the global average reported in the 2011 World Mental Health Survey.

	Australia			Worldwide		
	Bipolar Disorders	Fully Diagnosed	Subthreshold	Bipolar Disorders	Fully Diagnosed	Subthreshold
12 Month Incidence	1.8% ²⁵⁴	0.9% ²⁵⁵	0.9% ²⁵⁶	1.5% ²⁵⁷ – 1.9% ²⁵⁸	0.7% ²⁵⁹ – 1.21% ²⁶⁰	0.69% ²⁶¹ – 0.8% ²⁶²

²⁵⁰ Kuiper et al (2012)

²⁵¹ Malhi et al (2016); Tamayo et al (2013)

²⁵² Ghaemi & Dalley (2014) p321; Angst et al (2014)

²⁵³ Dell'Aglio Jr. et al (2013) p103

²⁵⁴ ABS (2008) Table 2

²⁵⁵ Mitchell et al (2013) Table 1

²⁵⁶ Calculated, not reported

²⁵⁷ Merikangas et al (2011)

²⁵⁸ Stubbs et al (2016)

²⁵⁹ Merikangas et al (2011): total of BP I (0.4%) & BP II (0.3%)

²⁶⁰ Clemente et al (2015): total of BP I (0.71%) & BP II (0.5%)

²⁶¹ Calculated, not reported, based on Stubbs et al (2016): 1.9% prevalence less 1.21% fully diagnosed

	Australia			Worldwide		
	Bipolar Disorders	Fully Diagnosed	Subthreshold	Bipolar Disorders	Fully Diagnosed	Subthreshold
Lifetime Incidence	2.9% ²⁶³	Not Reported	Not Reported	2.4% ²⁶⁴ – 3.7% ²⁶⁵	1.0% ²⁶⁶ – 2.63% ²⁶⁷	1.4% ²⁶⁸

Table A.1: Comparison of Australian Bipolar Spectrum Disorder prevalence rates versus the estimated global averages (*note:* due to the use of differing data sources, not all estimates are fully compatible)

There is also evidence of diagnostic convergence occurring over time. Although only half of the individuals identified by the ABS as being currently affected by a Bipolar Spectrum Disorder met the criteria for either Bipolar I or Bipolar II Disorder²⁶⁹, the reported 2.9% lifetime incidence rate is only marginally greater than the 2.63% global average calculated in a 2015 meta-analysis²⁷⁰. This suggests that the ABS has correctly projected the likelihood of later diagnostic conversion due to more precise or sophisticated diagnosis²⁷¹ and/or the emergence of new symptomology²⁷². Similarly, the ABS appears to have accurately captured the number of people with Bipolar Spectrum symptomatology who are impacted in a meaningful way, as the reported 12 month incidence rate of 1.8% is strikingly similar to the worldwide 1.9% average prevalence in primary care²⁷³.

²⁶² Merikangas et al (2011)

²⁶³ ABS (2008) Table 1

²⁶⁴ Merikangas et al (2011)

²⁶⁵ Stubbs et al (2016)

²⁶⁶ Merikangas et al (2011): total of BP I (0.6%) & BP II (0.4%)

²⁶⁷ Clemente et al (2015): total of BP I (1.06%) & BP II (1.57%)

²⁶⁸ Merikangas et al (2011)

²⁶⁹ Mitchell et al (2013)

²⁷⁰ Clemente et al (2015)

²⁷¹ Drancourt et al (2012); Øiesvold et al (2012); Zimmerman (2016)

²⁷² van Meter et al (2016)

²⁷³ Stubbs et al (2016)

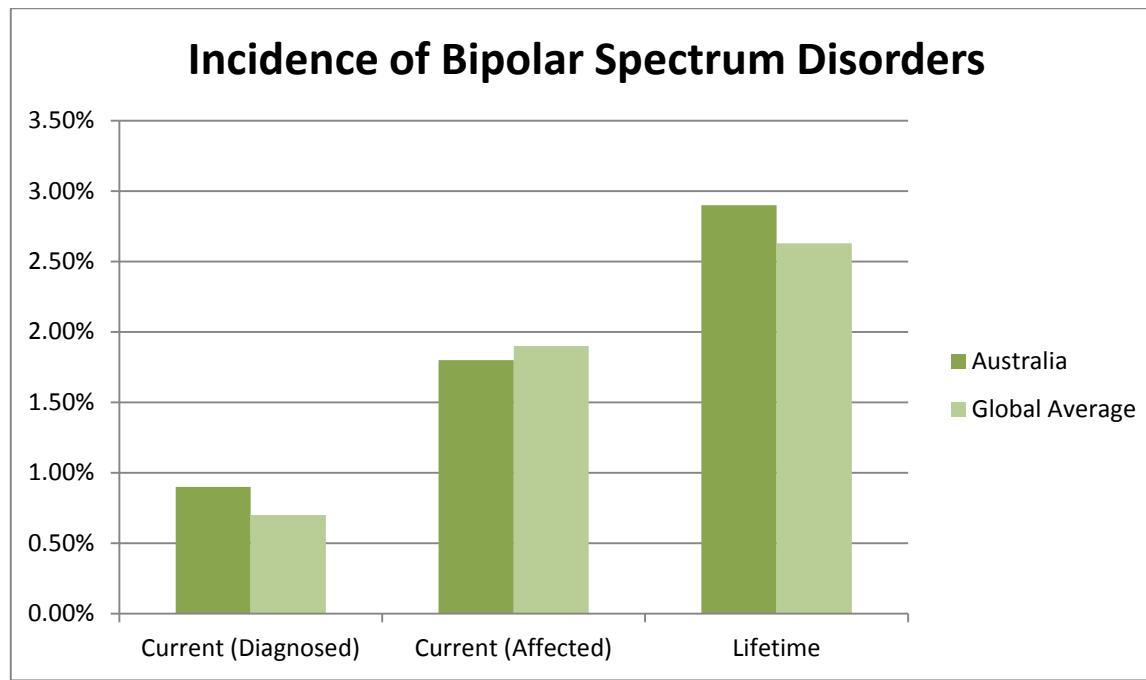


Figure A.1: Incidence of Bipolar Spectrum Disorders in Australia and worldwide²⁷⁴

Finally, the estimated 2.9% lifetime prevalence for Australia sits comfortably between the reported 2.0%²⁷⁵ and 4.4%²⁷⁶ incidences for England and the United States respectively. Similarly, Australian hospitalisation rates for Bipolar Disorders are higher than England's and lower than in the United States²⁷⁷.

²⁷⁴ ABS (2008); Stubbs et al (2016); Clemente et al (2015)

²⁷⁵ McManus et al (eds.) (2016) Table 9.1

²⁷⁶ Hasin & Grant (2015) Table 2: total of BP I (3.3%) and BP II (1.1%)

²⁷⁷ Clacey et al (2015) Table 1

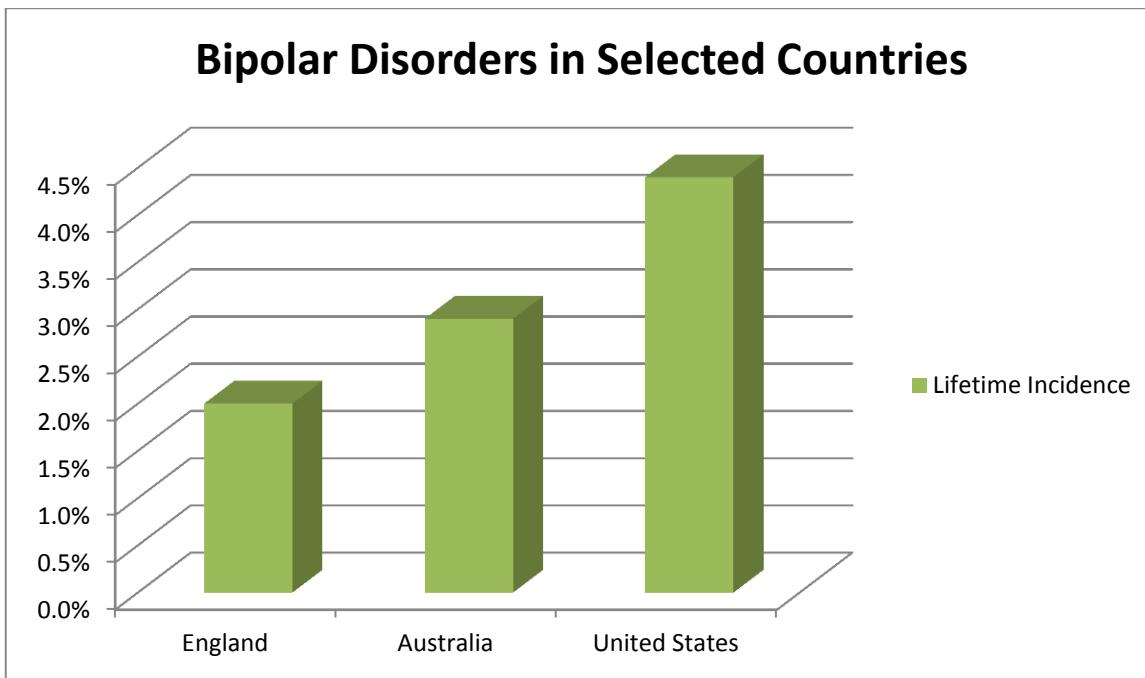


Figure A.2: Lifetime incidence of Bipolar Spectrum Disorders as reported in the United Kingdom, Australia, and the United States²⁷⁸

²⁷⁸ McManus et al (eds.) (2016); ABS (2008); Hasin & Grant (2015)

Human and economic impact

Although half of the 1.8% of people reported by the ABS to be currently impacted by Bipolar Spectrum Disorders did not meet the criteria for either Bipolar I Disorder or Bipolar II Disorder, there is considerable evidence that they were nonetheless significantly affected. 7.6% of people with Subthreshold Bipolar were admitted to a mental health facility during the prior twelve months²⁷⁹, versus approximately 0.3% of the general population²⁸⁰. Even more strikingly, 7.2% had recently attempted suicide²⁸¹, only slightly less than the 9.4% of those who were fully diagnosed²⁸². Given these facts, it is certain that Australian Governments are expending significant resources on these individuals who have been classified as having Subthreshold Bipolar, in terms of hospitalisation, primary care, and income support, regardless of their exact categorisation. We therefore conclude that our preliminary costing of Bipolar Spectrum Disorders is not impacted by the classification problems identified in the ABS data.

Furthermore, demographic analysis of the ABS data by Sunderland et al has identified an alarming increase in Bipolar Spectrum symptomology among Australia's young people²⁸³, suggesting that absent intervention there may be a significant rise the number of people affected by Bipolar Disorders in the future. While the 12 month prevalence of fully diagnosed Bipolar Disorder among individuals aged 16-34 was only 1.3%²⁸⁴, a further 5.3% reported subthreshold symptomology²⁸⁵. Although it is unlikely that all of these individuals will go on to develop Bipolar I or Bipolar II Disorder, it is noteworthy that 3.4% of English youth aged 16-24 are estimated to be affected by Bipolar Disorder²⁸⁶. As a result, we are concerned that Australian incidence levels may begin to rival those in the United States, with all of the resulting increase in cost to government, during the coming years.

²⁷⁹ Calculated, not reported: based on Mitchell et al (2013) Table 6

²⁸⁰ Calculated, not reported: based on Mitchell et al (2013) Table 6; increased OR of 51.5 = 15.4% BP admission rate

²⁸¹ Calculated, not reported: based on Mitchell et al (2013) Table 5

²⁸² Mitchell et al (2013) Table 5

²⁸³ Sunderland et al (2014) Table 1

²⁸⁴ Mitchell et al (2013) Table 2: ages 25-34

²⁸⁵ Calculated, not reported: Based on Sunderland et al (2014) Table 1, Mitchell et al (2013) Table 2

²⁸⁶ McManus et al (eds.) (2016) Table 9.1: Lifetime incidence

	Australia				England	Global Average
	Bipolar Disorders	Fully Diagnosed	Subthreshold	General Population		
Hospitalisation during the past year	11.5% ²⁸⁷	15.4% ²⁸⁸	7.6% ²⁸⁹	0.3% ²⁹⁰	Not Reported	Not Reported
Suicide Attempt during the past year	8.3% ²⁹¹	9.4% ²⁹²	7.2% ²⁹³	0.4% ²⁹⁴	Not Reported	4.24% ²⁹⁵ (Fully Diagnosed Only)
12 Month Incidence for ages 16-34	6.6% ²⁹⁶	1.0% (16-24) 1.3% (25-34) ²⁹⁷	At least 5.3% ²⁹⁸	1.8% ²⁹⁹ (All Ages)	Not Reported	1.21% ³⁰⁰ (All Ages)
Lifetime Prevalence for ages 16-34	Not Reported	Not Reported	Not Reported	2.9% ³⁰¹ (All Ages)	3.4% (16-24) 3.1% (25-34) ³⁰²	2.63% ³⁰³ (All Ages)

Table A.2: Selected characteristics of persons affected by Bipolar Spectrum Disorders in Australia, the United Kingdom, and worldwide

²⁸⁷ Mitchell et al (2013) Table 6

²⁸⁸ Mitchell et al (2013) Table 6

²⁸⁹ Calculated, not reported

²⁹⁰ Calculated, not reported: based on Mitchell et al (2013) Table 6; increased OR of 51.5 = 15.4% BP admission rate

²⁹¹ Mitchell et al (2013) Table 5

²⁹² Mitchell et al (2013) Table 5

²⁹³ Calculated, not reported

²⁹⁴ Calculated, not reported: based on ABS (2008) Table 9

²⁹⁵ Tondo et al (2016)

²⁹⁶ Sunderland et al (2014) Table 1

²⁹⁷ Mitchell et al (2013) Table 2

²⁹⁸ Calculated, not reported

²⁹⁹ ABS (2008) Table 2

³⁰⁰ Clemente et al (2015): total of BP I (0.71%) & BP II (0.5%)

³⁰¹ ABS (2008) Table 1

³⁰² McManus et al (eds.) (2016) Table 9.1

³⁰³ Clemente et al (2015): total of BP I (1.06%) & BP II (1.57%)

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Appendix B: Australia and Singapore – A Snapshot

Overview

This Appendix contains detailed information regarding our rationale for the use of mental health severity figures originating from Singapore.

Country Comparison

World Bank Data

An examination of data collated by the World Bank reveals that Australia and Singapore are both highly advanced economies with comparable levels of education, employment, and health. Despite a markedly less well developed government safety net³⁰⁴, the outcomes experienced by Singaporeans are often similar, and in some cases better, than those of Australians: the city-state's education levels, life expectancy, female managerial rate, and long term unemployment ratio are all similar to Australia's, while its adolescent pregnancy, suicide, and homicide rates are markedly lower.

Indicator	Data Code	Australia	Singapore
Mobile Subscriptions per 100 people	IT.CEL.SETS.P2	132.80	146.14
Internet Users per 100 people	IT.NET.USER.P2	84.56	82.10
High School Educated Population	SE.SEC.CUAT.UP.ZS	71.23% (2014)	69.57%
University Educated Population	SE.TER.CUAT.BA.ZS	24.95% (2014)	27.74% (2014)
Senior Roles Occupied by Women	SG.GEN.LSOM.ZS	36.72% (2008)	33.89% (2011)
Immunisation Rates for measles, diphtheria, and hepatitis B	SH.IMM.MEAS SH.IMM.IDPT SH.IMM.HEPB	91% (<i>measles</i>) 93% (<i>diphtheria</i>) 93% (<i>hepatitis B</i>)	95% (<i>measles</i>) 96% (<i>diphtheria</i>) 96% (<i>hepatitis B</i>)
Suicide Rate per 100,000 people	SH.STA.SUIC.P5	11.6 (2012)	9.0 (2012)
Self Employed Population	SL.EMP.SELF.ZS	10.3% (2013)	14.9% (2013)
Labour Force Participation Rate	SL.TLF.CACT.ZS	65.09%	67.6% (2014)
Long Term Unemployment as a percentage of the unemployed	SL.UEM.LTRM.ZS	21.8% (2014)	21.0% (2012)
Population Born Overseas	SM.POP.TOTL.ZS	28.22%	45.39%
Adolescent Fertility Rate	SP.ADO.TFRT	13.84%	3.79%
Life Expectancy	SP.DYN.LE00.IN	82.25 years (2014)	82.50 years (2014)
Intentional Homicides per 100,000 people	VC.IHR.PSRC.P5	1.0 (2014)	0.3 (2014)

Table B.1: Selected World Bank indicators: Australia and Singapore³⁰⁵; indicators are from calendar year 2015 except where noted

³⁰⁴ World Bank (2017a); World Bank (2017b); Data Codes: Public health expenditure as % of total health expenditure (SH.XPD.PUBL); General government expenditure (NE.CON.GOV.T.ZS); see also Ng (2015)

³⁰⁵ World Bank (2017a); World Bank (2017b)

Mental Health Data

As early as 1999, researchers were noting similarities between Australia and Singapore in terms of mental health literacy³⁰⁶. Large-scale surveys of mental health literacy and stigma are available for both jurisdictions, allowing us to drill down to issues of specific relevance to the task of comparing mental health outcomes.

Incidence Rates

On paper, Singapore has a significantly lower incidence of Bipolar Disorder than Australia. However, this is complicated by the fact that Singapore's reported incidence of mental health conditions overall is far too low to be plausible: 12% lifetime incidence versus the 21.4% average reported for high income Asian countries by the World Mental Health Survey Initiative and the 29.2% global average³⁰⁷. Potential explanations for these inconsistencies include methodological differences³⁰⁸ and rising rates of diagnosis among younger Singaporeans³⁰⁹. Bearing these inconsistencies in mind, it is likely that Singapore also under-reports the incidence of Bipolar Disorder by a considerable margin.

Condition	Australia	Incidence Singapore ³¹⁰	Global
Any mental disorder within the past year	20% ³¹¹	4.4%	17.6% ³¹²
Any mental disorder during the lifetime	45.5% ³¹³	12%	29.2% ³¹⁴
Bipolar Disorder with symptoms in the past year	1.8% ³¹⁵	0.6%	1.5% ³¹⁶
Bipolar Disorder during the lifetime	2.9% ³¹⁷	1.2%	2.4% ³¹⁸
Bipolar Disorder current symptoms as % of lifetime ³¹⁹	62%	50%	62.5%

Table B.2: Mental health condition incidence – Australia and Singapore

Service Utilisation

Although similar percentages of those affected by mental health conditions do not seek treatment, the types of treatments utilised vary, with a significant minority of Singaporeans consulting social workers, non-medical counsellors, and religious advisors instead of mental health professionals or general practitioners³²⁰. In addition, Australians were significantly more likely to consult general

³⁰⁶ Parker et al (1999)

³⁰⁷ Steel et al (2014) Table 2

³⁰⁸ Baxter et al (2013); Mitchell et al (2013); Clemente et al (2015)

³⁰⁹ Subramaniam et al (2013) Table 1: 2% lifetime prevalence of Bipolar in ages 18-34 vs 0.4% in ages 50-64

³¹⁰ Chong et al (2012a), Table 2

³¹¹ ABS (2008), Table 2

³¹² Steel et al (2014), Table 1

³¹³ ABS (2008), Table 1

³¹⁴ Steel et al (2014), Table 2

³¹⁵ ABS (2008), Table 2

³¹⁶ Merikangas et al (2011), Table 2: Bipolar Spectrum (incorporating subthreshold BP)

³¹⁷ ABS (2008), Table 1

³¹⁸ Merikangas et al (2011), Table 2: Bipolar Spectrum (incorporating subthreshold BP)

³¹⁹ Calculated, not reported

³²⁰ Chong et al (2012b), Table 2

practitioners while experiencing symptoms. Consistent with the Singaporean findings³²¹, Australian women were more likely to utilise services than their male counterparts.

Service Utilisation	Australia	Singapore
Did not utilise a service despite experiencing symptomology	65.1% ³²²	68.2% ³²³
Mental health professional such as a psychiatrist or psychologist	21.6% ³²⁴	15.7% ³²⁵
General Practitioner	24.7% ³²⁶	7.67% ³²⁷

Table B.3: Mental health service utilisation – Australia and Singapore

Stigma

Both Australians and Singaporeans have high levels of stigma towards mental illness. However, and perhaps surprisingly given international studies suggesting a negative correlation between non-European ethnicity and mental health service engagement³²⁸, attitudes towards those suffering from both depression and schizophrenia were often significantly more positive in Singapore.

Attitudinal Description	% of Respondents who Agree	
	Australia	Singapore ³²⁹
People with depression are dangerous	43.5% ³³⁰	22.1%
People with schizophrenia are dangerous	66% ³³¹	44.7%
People with depression are unpredictable	71.5% ³³²	60.6%
People with schizophrenia are unpredictable	83.5% ³³³	77%
Depression is not a real medical illness	49% ³³⁴	40.6%
Schizophrenia is not a real medical illness	45.5% ³³⁵	31.7%
Depression is a sign of personal weakness	51.75% ³³⁶	57.9%
Schizophrenia is a sign of personal weakness	47.5% ³³⁷	51.5%

Table B.4: Attitudes towards people with depression and schizophrenia – Australia and Singapore

³²¹ Chong et al (2012b), p157

³²² ABS (2008), Table 12: Lifetime mental disorder with 12-month symptoms

³²³ Chong et al (2012b), p158

³²⁴ ABS (2008), Table 12: Lifetime mental disorder with 12-month symptoms; estimate based on 25% crossover between individuals accessing Psychiatrists (7.9%), Psychologists (13.2%) and other mental health professionals (7.7%)

³²⁵ Chong et al (2012b), Table 2

³²⁶ ABS (2008), Table 12: Lifetime mental disorder with 12-month symptoms

³²⁷ Chong et al (2012b): estimate based on 9.1% consultation rate (Table 2), of which 84.3% were GPs (p157)

³²⁸ Sagayadevan et al (2015), p258

³²⁹ Subramaniam et al (2016), Tables 2a & 2b

³³⁰ Reavley & Jorm (2011), Figure 2-13: average of Depression (39%) and Depression with Suicidal Thoughts (48%)

³³¹ Ibid: average of Early Schizophrenia (60%) and Chronic Schizophrenia (72%)

³³² Ibid: average of Depression (69%) and Depression with Suicidal Thoughts (74%)

³³³ Ibid: average of Early Schizophrenia (81%) and Chronic Schizophrenia (86%)

³³⁴ Ibid: average of Depression (49%) and Depression with Suicidal Thoughts (49%)

³³⁵ Ibid: average of Early Schizophrenia (45%) and Chronic Schizophrenia (46%)

³³⁶ Ibid: average of Depression (52%) and Depression with Suicidal Thoughts (51.5%)

³³⁷ Ibid: average of Early Schizophrenia (47%) and Chronic Schizophrenia (48%)

Interpreting Severity Estimates

Assumptions

Singapore is an advanced Asian country, with similar levels of technology use, education, health, and employment to Australia. It has both lower self-reported incidence of mental health conditions, including Bipolar Disorder, and also markedly lower levels of stigma (excepting measures of personal blame). Conversely, there is a major difference in treatment-seeking patterns, with Singaporeans preferring non-medical professionals. In addition, a 2013 comparison of family decision making in health care between Singapore and New Zealand reported that “the family plays a central—and often dominant—role in the long term care of elderly and terminally ill patients”, a state of affairs which “often manifests itself in collusion between family and physicians”³³⁸. Interestingly, only 50% of those who reported lifetime Bipolar symptomology said that they were currently experiencing symptoms, versus the approximately 62% Australian and global estimates.

The Singapore Mental Health Survey and the Australian Survey of Mental Health and Wellbeing both relied on similar self-reporting of symptomology and service utilisation, with large sample sizes and face to face interviewers³³⁹. The Singapore survey found that 17.9% of respondents currently affected by Bipolar Disorder had been hospitalised within the past 12 months³⁴⁰. This compares to the 11.5% hospitalisation figure calculated for Australia in 2007³⁴¹, and our revised 2016 estimate of 11.11%. We assess that much of the difference can be explained by lower primary care usage in Singapore (e.g. 24.7%³⁴² versus 7.67%³⁴³ for general practitioners), which, as KPMG theorised in its Australian analysis, would tend to cause higher rates of hospitalisation.

Calculation

Previous hospitalisations and poor therapeutic relationships are both predictive of increased severity for Bipolar Disorder³⁴⁴; we also accept KPMG’s key premise that lack of primary care use is correlated with increased acute hospitalisation. Singapore appears to be underreporting mental health conditions, including Bipolar, which means that increased severity is likely to be correlated with service use, and therefore formal diagnosis, in the city-state³⁴⁵. Therefore for the purposes of this preliminary analysis, we have utilised the role impairments reported in the Singapore survey solely to interpret the original 11.5% of Australians who were hospitalised in 2007.

Clinical Scenario	Hospitalised (AU)	Impairment (SG)	Estimate
Severe	Yes (11.5%)	Severe (44.78%)	3.20%
Moderate		Moderate + Mild (46.12%)	3.70%
Mild	No	None (9.1%), plus all non-hospitalised	93.10%

Table B.5: Combining Singaporean and Australian estimates to calculate current hospitalisation

³³⁸ Chan et al (2014)

³³⁹ Subramaniam et al (2012); ABS (2008), pp50-54

³⁴⁰ Subramaniam et al (2013), p2 (methodology), p6 (result)

³⁴¹ Mitchell et al (2013), Table 6

³⁴² Burgess et al (2009), Table 3

³⁴³ Chong et al (2012b), Table 2

³⁴⁴ Zhang et al (2011); Farrelly et al (2014); Sylvia et al (2013a)

³⁴⁵ Psychosis predicts treatment seeking: DeVylder et al (2014); previous hospitalisation also predicts later suicide: Dougall et al (2014); Sylvia et al (2013b)

Validation

We have predicted a hospitalisation rate of approximately 11.11% in Financial Year 2014-15, versus 11.5% in 2007-8. If that forecast is correct, the Australian Institute of Health and Welfare should report a small drop in hospital separations related to Bipolar Disorder when measured against the currently affected population. Calculated using either recorded Bipolar Disorder separations only, or an estimate of total Bipolar related separations (based on Appendix C), the average number of hospitalisations per person currently affected by the condition does indeed fall between 2007 and 2014.

Statistic	2007	2014
Australian Population in June³⁴⁶	21,017,200	23,490,700
Exclude Individuals Aged Under 15	-4,073,624	-4,422,886
Australian Population at risk of Bipolar	16,945,583	19,069,828
12-Month Bipolar Incidence of 1.8%³⁴⁷	305,020 ³⁴⁸	343,256
Separations for FY beginning June 1³⁴⁹	23,139	18,167
Missing Separations calculated as per Appendix C	34,461 ³⁵⁰	38,781
Estimated Total Separations	57,600	56,948
Separations as % of 12-month incidence BP³⁵¹	18.88%	16.59%
Separations as % for BP recorded separations only	7.5%	5.3%

Table B.6: Preliminary validation of the independently derived hospitalisation estimate against AIHW and ABS data

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³⁴⁶ ABS (2007); ABS (2014)

³⁴⁷ ABS (2008)

³⁴⁸ Calculated, not reported: 19,420 more than noted in ABS (2008) Table 2 due to counting children aged 15 years

³⁴⁹ AIHW (2009); AIHW (2016) Tables AD.7 & AD.13; for Bipolar only: see Appendix C for a preliminary retrospective review of classifications

³⁵⁰ Calculated value based on 88.86% of 2016 population in 2014 (ABS 2016; ABS 2014)

³⁵¹ Note: multiple separations are predicted for most individuals; this is the raw percentage only

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Appendix C: Hospitalisations Associated with Bipolar Disorder – A Preliminary Retrospective Review

Overview

This Appendix analyses the 395,613³⁵² hospital separations for mental and behavioural disorders reported by the Australian Institute of Health and Welfare for the financial year 2014-15. We estimate that approximately 56,754 (or 14.3%) of mental health separations were for admissions relating to a diagnosis of Bipolar Disorder. However, Institute data records only 18,167 such separations (4.6%).

We believe that the principal reason for this discrepancy is misdiagnosis, such as patients who are classified with depression despite mania having been present on a prior occasion. For example, a 2014 European study rescreened treatment resistant cases of major depression and found that 57.4% of those examined had experienced a previous episode of hypomania³⁵³. Similar, albeit less spectacular, results also have been reported by researchers in Egypt³⁵⁴, Iran³⁵⁵, Russia³⁵⁶, Taiwan³⁵⁷, and mainland China³⁵⁸.

A secondary problem is poor classification, where a comorbid condition, such as Anxiety Disorder or Substance Use Disorder, appears to be the principal diagnosis to the reporting clinician. A 2012 Norwegian study found that of the 58 people professionally assessed as having Bipolar Disorder, only 17 received this primary diagnosis upon admission³⁵⁹. A 20-year review of diagnostic data from Rhode Island suggests that some of this confusion may be caused by patients who specifically request treatment for symptomology which is not principally caused by their primary mood disorder diagnosis³⁶⁰.

The thesis underlying many of our retrospective assessments is that the severity of Bipolar Disorder will predict more hospitalisations related to a comorbid condition in comparison to hospitalisations for individuals who have the other non-Bipolar condition alone. For example, Bipolar increases the risk of

³⁵² AIWH (2016a), Table 4.8

³⁵³ Francesca (2014)

³⁵⁴ Okasha et al (2013)

³⁵⁵ Abhari et al (2013)

³⁵⁶ Mosolov et al (2014)

³⁵⁷ Li et al (2012)

³⁵⁸ Xiang et al (2013)

³⁵⁹ Øiesvold et al (2012)

³⁶⁰ Zimmerman (2016)

dementia by a ratio of 2.36³⁶¹, which means that it is likely that at 6.8% of people who have dementia also have comorbid Bipolar³⁶². We believe that many hospitalisations in this dual diagnosis population coded as being related to dementia or Alzheimer's disease will in fact be related primarily to their pre-existing Bipolar Disorder, particularly as there is usually significant cognitive dysfunction when the two conditions are present³⁶³.

Sepations Data Analysis

Admitted Care Separations – Preliminary Reassessment

Principal Diagnosis	ICD-10-AM Code	Separations			Bipolar Disorder	
		Specialist ³⁶⁴	General ³⁶⁵	Total	% Total	Separations
Dementia	F00–F03	785	6,098	6,883	5%	344
Other organic mental disorders	F04–F09	777	12,643	13,420	5%	671
Mental and behavioural disorders due to use of alcohol	F10	7,173	17,966	25,139	20%	5,028
Disorders due to other psychoactive substance use	F11–F19	10,611	7,142	17,753	20%	3,551
Schizophrenia	F20	21,211	3,880	25,091	5%	1,255
Schizotypal and other delusional disorders	F21,F24,F28,F29	3,158	1,063	4,221	5%	211
Persistent delusional disorders	F22	1,132	515	1,647	5%	83
Acute and transient psychotic disorders	F23	1,560	709	2,269	25%	567
Schizoaffective disorders	F25	8,912	1,701	10,613	25%	2,654
Manic episode	F30	892	358	1,250	75%	939
Bipolar affective disorders	F31	15,217	2,950	18,167	95%	17,259
Depressive episode	F32	27,329	11,210	38,539	25%	9,635
Recurrent depressive disorders	F33	8,904	2,379	11,283	50%	5,642
Persistent mood (affective) disorders	F34	1,233	183	1,416	50%	709
Other and unspecified mood (affective) disorders	F38–F39	264	55	319	50%	160
Phobic anxiety disorders	F40	160	50	210	12.5%	27

³⁶¹ Diniz et al (2017)

³⁶² Based on a lifetime incidence of 2.9%: ABS (2008), Table 1

³⁶³ da Silva et al (2013)

³⁶⁴ AIHW (2016b), Table AD.7 [relating to financial year 2014-15, excluding the Australian Capital Territory]: separations with specialised psychiatric care

³⁶⁵ AIHW (2016b), Table AD.13 [relating to financial year 2014-15, excluding the Australian Capital Territory]: separations without specialised psychiatric care

Principal Diagnosis	ICD-10-AM Code	Specialist ³⁶⁴	Separations General ³⁶⁵	Total	Bipolar Disorder % Total	Bipolar Disorder Separations
Other anxiety disorders	F41	5,119	5,386	10,505	12.5%	1,313
Obsessive-compulsive disorders	F42	740	107	847	15%	127
Reaction to severe stress and adjustment disorders	F43	15,701	4,929	20,630	15%	3,095
Dissociative (conversion) disorders	F44	507	1,457	1,964	5%	98
Somatoform and other neurotic disorders	F45,F48	147	826	973	5%	48
Eating Disorders	F50	1,792	1,843	3,635	12.5%	454
Behavioural syndromes with physiological and physical factors	F51–F59	301	704	1,005	5%	50
Specific personality disorders	F60	7,672	1,212	8,884	7.5%	667
Disorders of adult personality and behaviour	F61–F69	369	261	630	7.5%	47
Disorders of psychological development	F80–F89	418	684	1102	5%	55
Conduct Disorders	F91	248	584	832	10%	83
Other disorders with onset in childhood or adolescence	F92–F98	377	362	739	5%	36
Mental disorder not otherwise specified	F99	59	182	241	5%	12
Alzheimer's disease	G30	488	2,451	2,939	5%	147
Related to mental and behavioural disorders and substance use	N/A	239	282	521	7.5%	40
Other specified mental health-related principal diagnosis	N/A	2,454	7,298	9,752	5%	488
Other	N/A	10,819	N/A	10,819	5%	542
Estimated Separations excluding the Australian Capital Territory						56,037
Estimate for the Australian Capital Territory ³⁶⁶						911
Estimated Bipolar Disorder Separations for Australia						56,948

Table C.1: Hospital separations by Principal Diagnosis, with reassessments as to the percentage with misdiagnosed or underlying Bipolar Disorder.

³⁶⁶ Calculated value, based on 1.6% of total Australian population: ABS (2016), Table 8

Principal Diagnosis Preliminary Reassignment – Explanatory Notes

Principal Diagnosis	ICD-10 Code	% BD	Explanation
Dementia	F00–F03	5%	Bipolar increases odds ratio of dementia by 2.36 times (Diniz et al, 2017 ; c.f. da Silva et al, 2013)
Other organic mental disorder	F04–F09	5%	5% diagnostic instability for Schizophrenia etc. should predict baseline catch-all conversion rate
Alcohol-related	F10	20%	Psychotic disorders increase odds ratio of alcohol abuse by 3.96 times and substance use by 4.62
Substance-related	F11–F19	20%	(Hartz et al, 2014); comorbid ADHD increases odds ratio by 4.3 (van Emmerik et al, 2014)
Schizophrenia	F20	5%	There is some evidence of limited conversion from schizophrenia spectrum diagnoses to Bipolar Disorder (Heslin et al, 2015, Table 2 ; Fusar-Poli et al, 2016); atypical symptoms (e.g. comorbid Autism Spectrum Disorder; see Vannucchi et al, 2014) may predict misdiagnosis
Schizotypal/other delusional	F21,24,28,29	5%	
Persistent delusional	F22	5%	
Transient psychosis	F23	25%	Poor diagnostic stability, often resulting in conversion to Bipolar (Udomratn et al, 2012)
Schizoaffective	F25	25%	Diagnostic reliability lower than Schizophrenia, Bipolar, and Depression (Santelmann et al, 2015)
Manic episode	F30	75%	Youth hypomania continues into adult mood disorder in 60.9% of cases (Päären et al, 2014)
Bipolar	F31	95%	There is some evidence of diagnostic conversion from BP I to Schizophrenia (Consoli et al, 2014)
Depressive episode	F32	25%	Up to 32.8% with major depressive disorder retrospectively reclassified with Bipolar (Dudek et al, 2013); diagnostic conversion associated with “treatment resistance” and number of episodes
Recurrent depression	F33	50%	
Persistent mood/affective	F34	50%	Insufficient initial symptomology to allow conversion; further episodes should robustly predict future conversion to Bipolar (e.g. Medici et al, 2015, Table 1 ; Carlborg et al, 2015, Figure 3)
Other mood/affective	F38–F39	50%	
Phobic anxiety disorders	F40	12.5%	Mood disorder (incl. Depression) comorbidity ranges from 34.7%-43.6% (Wardenaar et al, 2017)
Other anxiety disorders	F41	12.5%	17% BP prevalence in people with Generalised Anxiety Disorder (Simon, 2009)
Obsessive-compulsive	F42	15%	3.9% BP I prevalence in people with OCD & 13.5% BP II prevalence (Amerio et al, 2016)
Reaction to stress/adjustment	F43	15%	Stressful events precede episodes in 62.2% of cases and predict relapses (Simhandl et al, 2015)
Dissociative/conversion	F44	5%	See Schizotypal/other delusional (F21,24,28,29)
Somatoform/other neurotic	F45,F48	5%	1.4% of those with somatic symptoms have BP, an odds ratio of 1.82 times (Edgcomb et al, 2016)
Eating Disorders	F50	12.5%	Bipolar present in between 16.7% and 49.3% of Eating Disorder cases (Tseng et al, 2016)
Psychological with physical	F51–F59	5%	See Other organic mental disorder (F04–F09)
Personality disorders	F60	7.5%	42% of people with Bipolar have a comorbid personality disorder (Friborg et al, 2014, Table 2); a comorbid personality disorder significantly increases suicide attempt risk (Jylhä et al, 2016)
Adult personality/behaviour	F61–F69	7.5%	
Psychological development	F80–F89	5%	See Personality Disorders (F60), Adult personality (F51-59), and Conduct Disorders (F91)
Conduct Disorders	F91	10%	Risk factor for BP (Faedda et al, 2014); BP may predict CD severity (Birmaher, 2013, Table 2)
Childhood/adolescent onset	F92–F98	5%	Paediatric BP is controversial (Birmaher, 2013); diagnosis rates vary greatly (Clacey et al, 2015)

Principal Diagnosis	ICD-10 Code	% BD	Explanation
Not otherwise specified	F99	5%	See Other organic mental disorder (F04–F09)
Alzheimer's disease	G30	5%	See Dementia (F00–F03)
Related to substance use	N/A	7.5%	See Substance-related (F11-F19)
Other specified diagnosis	N/A	5%	7.5-12.5% conversions for Personality, Anxiety, Eating, & Conduct Disorders should be predictive
Other	N/A	5%	See Other organic mental disorder (F04–F09)

Table C.2: Principal Diagnoses with notes regarding our reasoning for retrospectively re-categorising some separations as being related to Bipolar Disorder.

Comparison to the 2007 National Survey

In their 2013 analysis of the 2007 National Survey of Mental Health and Wellbeing conducted by the Australian Bureau of Statistics, Mitchell et al reported that 11.5% of people currently affected by Bipolar had been hospitalised within the past 12 months³⁶⁷. However, Bipolar Australia has calculated an 11.11% hospitalisation rate, based on a more recent 2012 severity estimate from Singapore (see Appendix B).

Due to the small sample size, Mitchell et al noted a standard error of 4.7³⁶⁸, which puts our updated estimate comfortably within the margin of error. Given that we have predicted significant future diagnostic conversion from Depression and other affective disorders, as well as noting both rising diagnosis in youth³⁶⁹ and problems of underdiagnoses in primary care³⁷⁰, it is possible that our updated hospitalisation estimate may in fact be too low.

³⁶⁷ Mitchell et al (2013), Table 6

³⁶⁸ Mitchell et al (2013), Table 6

³⁶⁹ Sunderland et al (2014)

³⁷⁰ Lampe et al (2013)

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Appendix D: Core Costs for Bipolar Disorder in the United Kingdom

Overview

This Appendix contains detailed information regarding our analysis of core government expenditure related to Bipolar Disorder in the United Kingdom. This analysis is derived in large part from a previous study published by the King's Fund in 2008, which sought to price the current and future cost of a number of high-profile conditions, including Bipolar Disorder, schizophrenia, and eating disorders³⁷¹.

Assumptions

Original assumptions

In their 2008 study, McCrone et al made the following assumptions regarding Bipolar Disorder:

1. An average health care cost of £1,424 per person in 2007³⁷², of which 9% related to inpatient services and 28% related to informal care³⁷³;
2. Total health care expenditure of £2.05 billion in 2016, with costs rising faster than inflation due to a demographic effect³⁷⁴;
3. 46% unemployment, of which 60% could work (27.6% total) and 40% could not (18.4% total)³⁷⁵; and
4. Bipolar related unemployment of 22.2% after accounting for the general unemployment rate at the time of publication³⁷⁶.

In a later study, Young et al proposed that the cost of hospitalisation related to Bipolar Disorder accounted for 60.4% of costs to the National Health Service (NHS)³⁷⁷. In order to establish whether this might be correct, we analysed NHS admissions records for the financial year 2015-16³⁷⁸ and the reference costs for the financial year 2015-16³⁷⁹. Using admissions strictly coded for Bipolar Disorder (ICD F31), we found that there was average hospital expenditure of £173.97 per person in 2016, or 8.9% of the total, which is extremely similar to the 9% predicted by McCrone et al³⁸⁰.

We utilised the recently reported lifetime incidence of 2.0%³⁸¹ for Bipolar Disorder in the United Kingdom to make our calculations. This differs significantly from Young et al, who appear to have projected that just 0.18% of Britons would be currently impacted by the condition³⁸². Taking the

³⁷¹ McCrone et al (2008)

³⁷² Ibid, p75

³⁷³ Ibid, p74

³⁷⁴ Ibid, p76

³⁷⁵ Ibid, p76

³⁷⁶ Ibid, p76

³⁷⁷ Young et al (2011) Table 3

³⁷⁸ HSCIC (2016), Primary Diagnosis 3 character

³⁷⁹ Department of Health (2016)

³⁸⁰ McCrone et al (2008) p74

³⁸¹ McManus et al (eds.) (2016) p226

³⁸² Young et al (2011) p452 – GP 10 consults on average = 86,641, with 78% of people consulting a GP = 111,078 total incidence

non-hospitalisation portion of the NHS costing per person devised by Young et al³⁸³ and applying it to the newly reported incidence rate of 2.0%³⁸⁴ suggests actual NHS expenditure for Bipolar Disorder of £1,355,470,742 in the financial year 2009-10. This equates to per person cost of £1,072.67 for 2009-10, which is 4.62% more than the 2007-08 cost projected by McCrone et al. We therefore believe that the true incidence rate for Bipolar Disorder, which was not available to Young et al in 2011, accounts for the discrepancy they reported when assessing McCrone's earlier work³⁸⁵.

Additional assumptions

Utilising our own analysis of missing admissions in Australia (see Appendix C) and applying these proportionately to the United Kingdom, we predict a further £134.38 per person of expenditure on hospitalisation, based on 8,725 admissions coded to primary diagnoses other than Bipolar Disorder. This approach was also utilised by Young et al, but not as comprehensively³⁸⁶.

In order to calculate welfare expenditure, we have utilised the Universal Credit payment as our data source. Universal Credit is being phased in across the United Kingdom and is intended to replace a wide range of payments³⁸⁷. For this simplified costing, we have assumed that each individual is entitled to support based on a single bedroom allotment, and that the individual does not have a partner or dependent children (which would decrease and increase their payments respectively). We have also calculated that 2.2% of the population live within the Greater London boroughs, and are therefore entitled to additional payments, due to the increased Benefits Cap for that region.

Core Costing

Using the assumptions described above, we are able to calculate the following core costs:

Expenditure Area	Original Data	Method Recalculated	Total Cost
Health	£1,424 per person (2007) £2.05 billion total (2016)	Inflation + 8% to account for the aging population	£2.07 billion
Informal Care	28% informal care	Direct proportional decrease	-£580 million
Missing Hospital Admissions	N/A	Proportional increase, based on 23% of AU hospitalisation rate	£142 million
Unemployment	22.2% of affected population	Universal Credit for Manchester, £244.82 per week	£2.99 billion
Unable to Work	18.4% of affected population	Universal Credit for Manchester, £257.69 per week	£2.6 billion
London Benefit Cap Increase	5.4% of UK population	Increase of £38.66 per week for 2.2% of the affected population	£46 million
Annual core costs of Bipolar Disorder for the United Kingdom			£7.27 billion
<i>Core costs per person</i>			£6,881
Core costs per person in Australian Dollars			\$11,103

Table D.1 Core costs for Bipolar Disorder in the United Kingdom, in 2016 pounds

³⁸³ Young et al (2011) p452

³⁸⁴ McManus et al (eds.) (2016) p226

³⁸⁵ Young et al (2011) p454

³⁸⁶ Ibid, Table 2

³⁸⁷ Millar & Bennett (2017)

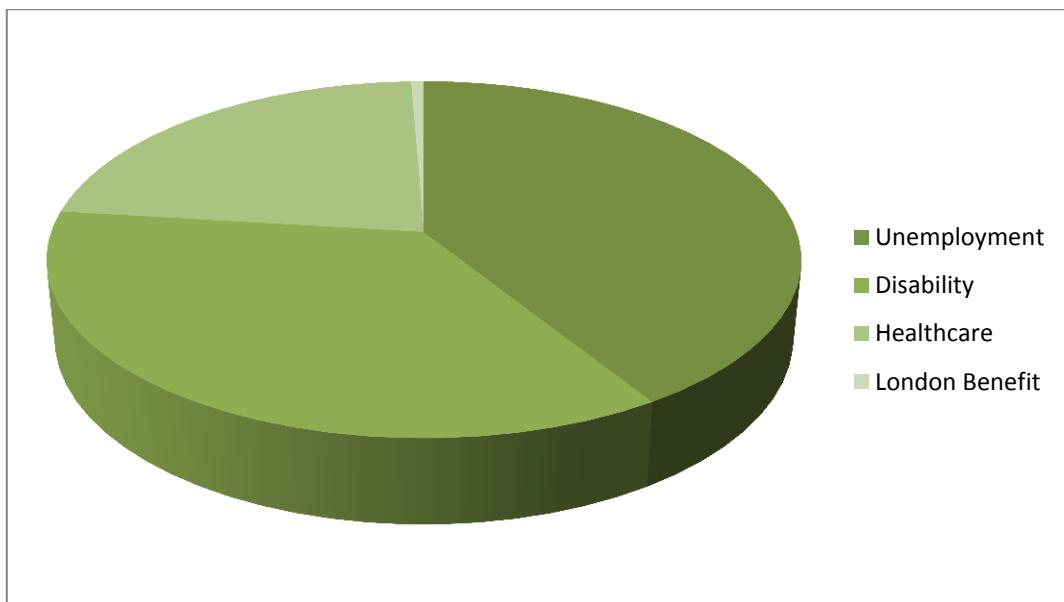


Figure D.1: Core costs of Bipolar Disorder in the United Kingdom

Although this assessment of core costs does not capture numerous expenditure areas, including education, personalised support, and criminal justice³⁸⁸, much of the 14.67% difference between Australian and British per person costs can be explained by the far higher hospitalisation rates in Australia. We estimate that the United Kingdom hospitalises people for Bipolar Disorder at just 23.27% of Australia's admission rate. If Britons affected by the condition were admitted at similar levels, the cost of hospitalisation would rise from £326 million to £2.47 billion per annum (a 659% increase). After accounting for the likely reduction in primary care utilisation, we estimate that this would result in a 19.53% rise in core expenditure, for a total annual core cost of £8,224 per person, or \$13,271 Australian dollars. This is entirely compatible with our own estimated annual cost of \$13,013 per person for Bipolar Disorder in Australia.

Analysis

In 2014, the Organisation for Economic Co-operation and Development described the United Kingdom as “one of the most innovative mental health systems in the OECD”³⁸⁹, noting that the UK had “developed impressive programmes that other countries can learn from”³⁹⁰. As early as 1994, programs were aiming to provide support for people with serious mental illness in the community and reduce hospitalisations³⁹¹; in 1995 a Supervised Discharge function was added to the pre-existing guardianship powers under the *Mental Health Act 1983*³⁹².

By 1998, the United Kingdom hospitalised people for Bipolar Disorder at a rate of 23.5 per 100,000 people, while Australia had a hospitalisation rate of 77.1 per 100,000 people³⁹³. In the seventeen years to 2015, hospitalisation rates declined in the United Kingdom by a further 24.3% while

³⁸⁸ KPMG (2014) Figures 3.3 & 3.5

³⁸⁹ Hewlett (2014)

³⁹⁰ Ibid

³⁹¹ Conway et al (1994)

³⁹² Hatfield et al (2001)

³⁹³ Bipolar Australia analysis of ABS, ONS, AIHW and NHS data

remaining at similar levels in Australia³⁹⁴. This may be one of the underlying reasons for the large disparity in per capita spending on mental health: while the National Health Service for England spends an average of just \$168 per person each year, Australia's federal, state, and territory governments spend approximately \$357 per person³⁹⁵.

Since the 1990s, initiatives aimed at reducing costs related to serious mental health conditions such as Bipolar Disorder have included Crisis Resolution and Home Treatment Teams³⁹⁶, Assertive Outreach Teams³⁹⁷, Joint Crisis Plans³⁹⁸, large-scale peer worker integration³⁹⁹, police training to reduce involuntary detentions⁴⁰⁰, and incentives for general practitioners to provide proactive care⁴⁰¹. While the evidence regarding the impact of some of these programs is mixed⁴⁰², the overall results are not any worse than Australia's. In 2015, the United Kingdom's suicide rate was 10.9 per 100,000 people⁴⁰³, while in Australia the rate was 12.6⁴⁰⁴. During the period from 2006 to 2015, the intentional death rate both overall and for women, who are at a significantly greater risk of making a suicide attempt if Bipolar Disorder is present⁴⁰⁵, remained reasonably similar until a recent spike in this country⁴⁰⁶.

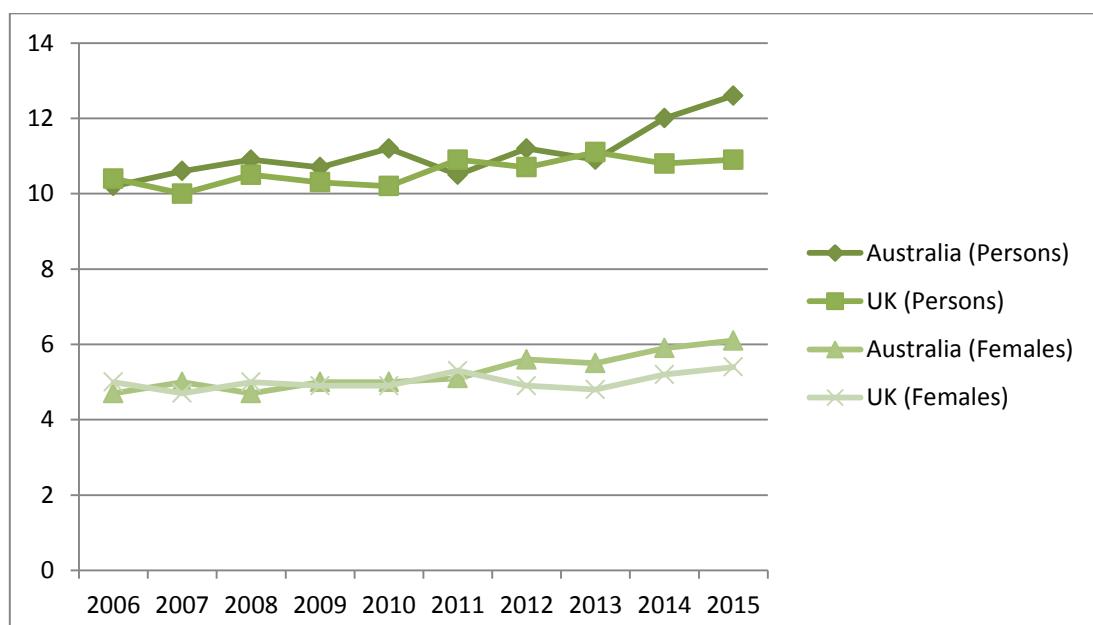


Figure D.2: Suicide data from Australia and the United Kingdom, 2006-2015

³⁹⁴ Ibid; 1.0% reduction in Australia, but this may not be statistically significant

³⁹⁵ Bipolar Australia analysis of NHS, AIHW and National Mental Health Commission data

³⁹⁶ Glover et al (2006)

³⁹⁷ Hamilton et al (2015)

³⁹⁸ Farrelly et al (2014)

³⁹⁹ Gillard et al (2013)

⁴⁰⁰ Keown et al (2016)

⁴⁰¹ Gutacker et al (2015)

⁴⁰² Green & Griffiths (2014); Gutacker et al (2015); Lloyd-Evans et al (2017); Brugha et al (2012); Green & Gowans (2015); Ramanuj et al (2015)

⁴⁰³ ONS (2016a) Table 1

⁴⁰⁴ ABS (2016) Table 11.6

⁴⁰⁵ Schaffer et al (2015); Holma et al (2014)

⁴⁰⁶ ONS (2016a) Table 1; ABS (2016) Table 11.6

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Appendix E: Expanded “Ellen” Case Study – Explanatory Notes

Overview

This Appendix contains supplemental information regarding our analysis of the severe Bipolar Disorder case study prepared by KPMG in its 2014 report.

Each new clinical element added by Bipolar Australia to the original KPMG scenario is annotated with two percentage figures. The first is the raw number of people with Bipolar Disorder who are estimated to be affected according to current academic literature. The second figure is a weighted percentage which explains our confidence level regarding the element being present in Ellen’s case, with reasoning based on our specialised insights into the literature and Ellen’s specific case history as devised by KPMG.

Table of Additional Clinical Elements

Element	% Population Affected	% Confidence Level (Ellen)	Explanatory Notes
Bipolar I Disorder	Unclear ⁴⁰⁷	95%	KPMG reports the presence of mania (KPMG, 2014, p65), not hypomania, which eliminates Bipolar II as a possible diagnosis (Łojko et al, 2014, p249)
Childhood Trauma	54.29% ⁴⁰⁸	95%	Childhood Trauma is strongly correlated with BP I (Sala et al, 2014, Table 2); emotional abuse increases odds of BP by 4.04 times (Palmier-Claus et al, 2016)
Verbal Abuse	24% ⁴⁰⁹	75%	Verbal abuse predicts comorbid anxiety disorder and symptom severity, especially depression but also mania (Post et al, 2015)
Bullying at School	89.9% ⁴¹⁰	95%	Bullying predicts depression and anxiety (Lereya et al, 2015); as a form of emotional abuse (Calvete, 2014; Pilch & Turska, 2014), it increases the odds ratio of subsequent Bipolar by up to 4.04 (Palmier-Claus et al, 2016); by comparison, the incidence in the general school population is 35% (Modecki et al, 2014, p6)

⁴⁰⁷ Merikangas & Lamers (2012)

⁴⁰⁸ Sala et al (2014) Table 1

⁴⁰⁹ Post et al (2015)

⁴¹⁰ Parker et al (2013) Table 3: Average of BP I (93%) and BP II (86.8%)

Element	% Population Affected	% Confidence Level (Ellen)	Explanatory Notes
Sexual Abuse (Not Present)	23% (Present) ⁴¹¹	45% (Not Present)	Sexual abuse is less likely as there is no reported history of hallucinations within bipolar psychosis (Upthegrove et al, 2015) and, indeed, the absence of reported psychosis may suggest non-sexual trauma (Daglas, 2014)
At Least Two Psychiatric Comorbidities	70.55% ⁴¹²	95%	72.3% of individuals with BP I have two or more comorbidities (Merikangas et al, 2011, Table 3); given Ellen's severity it is highly likely she has two or more comorbidities
Anxiety Disorder	75.55% ⁴¹³	95%	76.5% of individuals with BP I have a comorbid Anxiety Disorder (Merikangas et al, 2011, Table 3); anxiety comorbidity reduces the likelihood of remission (Kim et al, 2014)
Post-Traumatic Stress Disorder	25.65% ⁴¹⁴	75%	The DSM-V expands the definition of PTSD (Stein et al, 2014); BP I is more likely if a PTSD comorbidity exists (Hernandez et al, 2013)
Eating Disorder	27% ⁴¹⁵	45%	35.8% of people with an eating disorder have comorbid Bipolar, notably Binge Eating Disorder (Tseng et al, 2016, p601); 41.2% of obese individuals have a comorbid binge eating disorder (Segura-Garcia et al, 2017, Table 1); 10.1% of people with type 2 diabetes have a comorbid eating disorder (de Groot et al, 2016)
Pre-Adult Onset of Symptoms	65.3% ⁴¹⁶	95%	More than 10 lifetime mood episodes (51.1% vs 22.9% adult onset) and greater clinical severity (CGI-BP-OS score 4.0 vs 3.6 adult) predict earlier onset (Holtzman et al, 2015, Table 2); manic polarity also predicts earlier onset (Carvalho et al, 2014a)
Adolescent Onset (13-18 years)	43.4%	95%	More likely (45.8% vs 36.4% child) to have Bipolar I; average onset age of 15.5 years (Holtzman et al, 2015, Table 2)

⁴¹¹ Maniglio (2013)

⁴¹² Merikangas et al (2011) Table 3; Average of BP I (exactly 2 [10.1%] + >=3 [62.2%]) and BP II (10.5% + 58.3%)

⁴¹³ Ibid; Average of BP I (76.5%) and BP II (74.6%)

⁴¹⁴ Ibid; average of BP I (26.3%) and BP II (25%)

⁴¹⁵ McElroy et al (2016)

⁴¹⁶ Holtzman et al (2015) Table 2

Element	% Population Affected	% Confidence Level (Ellen)	Explanatory Notes
Poorer Resultant Clinical Outcomes	N/A	75%	Early onset increases the odds of a comorbid personality disorder by 2.34 times and rapid cycling by 1.80 times (Joslyn et al, 2016); each of these in turn predicts poorer outcomes (Latalova et al, 2013; Carvalho et al, 2014b); earlier onset and resultant longer period to diagnosis predict relapses (Hong et al, 2016); note: obesity may also contribute to increased symptomology (Cerimele & Katon, 2013)
Incomplete Compliance with Medication Regime	20%-35% ⁴¹⁷	95%	Implied in KPMG scenario (KPMG, 2014, Table A11); Lithium usage is recorded for only 50 weeks of the year
Cognitive Impairment	30%-57% ⁴¹⁸	95%	Childhood trauma is associated with lower psychosocial functioning (Larsson et al, 2013) and impaired social and occupational functioning (Cotter et al, 2015)
Resulting from Numerous Recurrent Episodes	N/A	75%	Longstanding illness and/or multiple episodes are associated with deficits (Cullen et al, 2016; Torrent et al, 2012)
Unemployed	35.45% ⁴¹⁹	95%	Due to her frequent hospitalisations, it is highly likely that Ellen is unemployed (Tse et al, 2014); cognitive deficits are also strongly associated with lower likelihood of employment (Gilbert & Marwaha, 2013)
Single Relationship Status	56.1% ⁴²⁰ - 85% ⁴²¹	75%	Due to her frequent hospitalisations, anxiety, and obesity, it is unlikely that Ellen has a current relationship
Previous Separation	20.2% ⁴²²	35%	It is possible that Ellen has had a prior relationship (however brief); Bipolar Disorder and Generalised Anxiety Disorder are both associated with earlier marriage age (Breslau et al, 2011)
Domestic Violence Survivor	26.7% (women) 7.1% (men) ⁴²³	30%	Childhood trauma predicts adult domestic violence (Anderson et al, 2016); PTSD and Depression independently attract much higher rates of violence (Trevillion et al, 2012)

⁴¹⁷ Sylvia et al (2014)

⁴¹⁸ Szmulewicz et al (2015)

⁴¹⁹ Average of BP I (42.5%) and BP II (28.4%); Parker et al (2013) Table 1; see also Marwaha et al (2013)

⁴²⁰ Heslin et al (2016)

⁴²¹ Walid & Zaytseva (2011)

⁴²² Black Dog Institute (2009)

⁴²³ Trevillion et al (2012) p8; see also Khalifeh et al (2015)

Element	% Population Affected	% Confidence Level (Ellen)	Explanatory Notes
Poor Family Functioning	Unknown, but 94% predictive of relapse in young adults ⁴²⁴	95%	Perceived criticism predicts hospital admission (Scott et al, 2012); poor family support also predicts readmission (Singh et al, 2014) and more severe illness course (Reinates et al, 2016); the emotional over involvement of a caregiver reduces the benefits of psychoeducation for individuals with Bipolar (Fredman, 2015)
High Expressed Emotion	Unknown, but doubles relapse rates ⁴²⁵	75%	High levels of expressed emotion predicts later Bipolar (Nader et al, 2013) as well as suicide ideation in adolescents (Ellis et al, 2014)
Frequent Episode Trigger	Unknown	75%	High levels of expressed emotion predicts relapse (Butzlaff & Hooley 1998); family attitudes can inhibit help seeking (Suka et al, 2016); elevated social strain is seen in between episodes (Eidelman et al, 2012)

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⁴²⁴ Miklowitz & Chung (2016), p486

⁴²⁵ Butzlaff & Hooley (1998), p550; see also Hooley (2007)

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Appendix F: “Duncan” Case Study – Explanatory Notes

Overview

This Appendix contains information regarding our independent reconstruction of the mild Bipolar Disorder case study prepared by KPMG in its 2014 report, and adjusted for use in our revised costings.

To construct the scenario, we have added many common elements beyond the diagnosis of Bipolar Disorder itself. Duncan is 36 years of age and experienced his first episode of mania at age 21. He was subsequently diagnosed with Bipolar II Disorder. Duncan also has a comorbid anxiety disorder, as do 75.55%⁴²⁶ of those with Bipolar, and has suffered from considerable anxiety since childhood⁴²⁷. He has not recently been hospitalised, and we estimate that this is the case for approximately 88.89% of people with current symptomology. Duncan’s relative stability may be due to his medication compliance, a precondition for avoiding relapse⁴²⁸ that approximately 65% to 80% of those with the condition currently meet⁴²⁹.

Duncan is a Centrelink customer and currently receives the Disability Support Pension, having previously been a Youth Allowance recipient. We estimate that approximately 34% of people with Bipolar Disorder currently receive an income support payment. Duncan recently became a public housing tenant, having lived with his parents for many years⁴³⁰. We estimate that approximately 19% of people with the condition currently receive housing assistance, either as a subsidised public housing tenant or through cash payments such as Rent Assistance.

Case Study

Current Care – Aged 36

Clinical

Duncan takes 1800mg of Lithium to control his mood, which is the maximum recommended daily dose⁴³¹. Due to his comorbid anxiety disorder, Duncan also takes 50mg of Temazepam, a benzodiazepine often used as adjunctive therapy in Bipolar, to manage this secondary condition⁴³². Duncan is slightly overweight, but is not obese⁴³³ and does not currently have a major physical comorbidity, although he is at high risk of developing a metabolic syndrome in the future⁴³⁴.

Although he has not been hospitalised for his mental health conditions in many years, Duncan suffers persistent and debilitating bouts of mild depression⁴³⁵, which are often triggered by episodes

⁴²⁶ Merikangas et al (2011) Table 3; Average of BP I (76.5%) and BP II (74.6%)

⁴²⁷ Duffy et al (2014)

⁴²⁸ Simhandl et al (2014)

⁴²⁹ Sylvia et al (2014)

⁴³⁰ Zhang et al (2011) p580

⁴³¹ Shah et al (2015) Table 3

⁴³² Preti et al (2016) p79; Vázquez et al (2014); Bobo et al (2015)

⁴³³ Obesity odds ratio of 1.77 versus the general population; Zhao et al (2016)

⁴³⁴ 32.6% risk; Vancampfort et al (2015)

⁴³⁵ Redlich et al (2015) Figure 1

of anxiety⁴³⁶. This may be because Lithium is better at controlling mania than depression⁴³⁷, especially when a comorbid anxiety disorder is present⁴³⁸. Duncan has irregular contact with various medical professionals, including a General Practitioner, a psychologist, and a dietitian. However, he is unable to find a psychiatrist who bulk bills.

Financial

Duncan's anxiety while studying⁴³⁹, and a serious episode of depression after experiencing conflict with another employee at his part time job⁴⁴⁰, resulted in a hospitalisation at the age of 22. A psychiatrist later determined that Duncan was at risk of further recurring episodes of escalating severity, and advised Centrelink that he should be moved from Youth Allowance on to the Disability Support Pension⁴⁴¹. Duncan's condition subsequently stabilised, and he began to consider having his own apartment. After spending a few years on the public housing waiting list, he was able to move into a small flat near his parents' house.

Optimal Care – Aged 36 to 45

Clinical

Duncan's new care coordinator was able to introduce him to a psychiatrist, who switched his medication from the combination of Lithium and Temazepam to 600mg of the newer slow release Quetiapine, which reduced both Duncan's mood instability and anxiety levels⁴⁴². He now sees the psychiatrist once a month, as well as a psychologist and his general practitioner 10 times per year each. The care coordinator also arranged for two hours of psychosocial support each week, plus some additional time when Duncan feels especially anxious. Finally, Duncan also sees a specialist dietitian once every three months⁴⁴³, and with her help he has lost a little bit of weight, thereby lowering his risk of developing a metabolic syndrome or other weight-related comorbidity.

By the time Duncan turns 45 (nine years after optimal care begins), he sees his psychiatrist once every three months, and his psychologist once every two months. He no longer needs any additional clinical support.

Financial

When Duncan turns 39 (three years after optimal care begins), his psychologist encourages him to look for work. Duncan approaches Centrelink and is assigned to a Disability Employment Service (DES) provider, whose personnel work closely with his care team, supervised by the care coordinator⁴⁴⁴. After a few months, Duncan obtains employment at a local community centre for 12 hours a week⁴⁴⁵. Every 18 months or so, Duncan experiences significant anxiety due to issues such as

⁴³⁶ Pavlova et al (2016)

⁴³⁷ Selle et al (2013); Gao et al (2016)

⁴³⁸ Vázquez et al (2014)

⁴³⁹ Lovell et al (2015)

⁴⁴⁰ Verkuil et al (2015); Ganster & Rosen (2013); Yen et al (2016); Harvey et al (2017)

⁴⁴¹ Arvilommi et al (2015) Table 3

⁴⁴² Maneeton et al (2016); Suttajit et al (2014)

⁴⁴³ Kwan et al (2014)

⁴⁴⁴ Hoffmann et al (2014)

⁴⁴⁵ Marwaha et al (2013)

changes in personnel or stress related to special events, and the DES provider returns to the community centre to provide him with additional support in his workplace.

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