Centre for Primary Health Care and Equity

Central and Eastern Sydney Primary and Community Health Cohort/Linkage Resource

Defining a mental health cohort from the 45 and Up Study within the Central and Eastern Sydney area

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Suggested citation: Welberry H and Barr M, (2020) Defining a mental health cohort from the 45 and Up Study within the Central and Eastern Sydney area, CPHCE, UNSW.

For further information, please contact Centre for Primary Health Care and Equity (CPHCE).

This report was prepared for the Sydney Local Health District under the Central and Eastern Sydney consortium using the Central and Eastern Sydney Primary and Community Health Cohort/Linkage Resource. Ethical approval was granted for this research project by the New South Wales Population and Health Services Research Ethics Committee (Ref # 2016/06/642) and from the University of New South Wales Human Research Ethics Committee for the 45 and Up Study overall. All participants provided written consent before participating in the 45 and Up Study, this included consent to: follow them over time using their health and other records; contact them in the future about changes in health and lifestyle; and use their data for health research.

The Central and Eastern Sydney Primary and Community Health Cohort/Linkage Resource is jointly funded by NSW Health Sydney Local Health District, NSW Health South East Sydney Local Health District and the Central and Eastern Sydney Primary Health Network. Current members of the management committee are Mark Harris (Chair), Margo Barr, Lou-Anne Blunden, Fiona Blyth, Elizabeth Comino, AnnMarie Crozier, Deb Donnelly, Julie Finch, Sonia van Gessel, Brendan Goodger, John Hall, Liz Harris, Ben Harris-Roxas, Tony Jackson, Alamgir Kabir, Kylie Vuong, Heidi Welberry and Lisa Woodland.

This research was completed using data collected through the 45 and Up Study (www.saxinstitute.org.au). The 45 and Up Study is managed by the Sax Institute in collaboration with major partner Cancer Council NSW; and partners: the Heart Foundation; NSW Ministry of Health; NSW Department of Communities and Justice; and Australian Red Cross Lifeblood. We thank the many thousands of people participating in the 45 and Up Study. We acknowledge the NSW Centre for Health Record Linkage (CHeReL) for linkage and provision of the hospital, emergency department and death data (http://www.cherel.org.au/) and Services Australia (formerly the Australian Government Department of Human Services) for supply of the Medicare Benefits Schedule (MBS) and Pharmaceutical Benefits Scheme (PBS) data. We also acknowledge the Secure Unified Research Environment (SURE) for the provision of secure data access.

Executive Summary

Introduction

It is well established that mental illness is associated with poor physical health and chronic diseases possibly related to high levels of risk factors such as smoking, physical inactivity, poor diet and alcohol consumption. There is also evidence to suggest that having a mental illness may be related to poorer management of chronic diseases. Health service providers wanted to investigate this in Central and Eastern Sydney (CES).

Objectives and Approach

The purpose of this study was to scope the feasibility of identifying a mental illness cohort using CES residents (n=30,049) in the 45 and Up Study (n = 267,153) linked to administrative health datasets for five years from the 45 and Up Study participant recruitment date (2006-2009). These included Medicare Benefits Schedule (MBS) and Pharmaceutical Benefits Scheme (PBS) provided by Services Australia and hospital admissions provided by the NSW Centre for Health Record Linkage. We then compared differences in the identified cohort size, characteristics and the 8-year mortality rates.

Results

Using only hospitalisation data, 6% of the CES cohort were identified as having a mental illness, compared to 17% using MBS data only, 26% PBS data only, 35% using both the MBS and PBS data and 36% using all of the data sources. Crude mortality was 58% in those identified in the hospitalisation data, 27% based on the PBS data,10% using MBS data, 21% using the MBS and PBS data and 23% based on all combined sources.

Conclusion / Implications

We decided that the most appropriate option was to include the MBS, PBS and hospitalisation data to identify the mental illness cohort. This cohort will now be used to examine difference in the management of chronic disease, such as care plans and cycles of care, between those who do and do not have a mental illness.

Contents

Background

It is well established that mental illness has been associated with poor physical health in the community and with increased levels of chronic disease[1,2]. The mechanism for such an association is likely to work in both directions. Those with chronic disease are at increased risk of developing a mental illness – particularly depression and anxiety[3,4]. This may be due to the reduced quality of life caused by their chronic disease or other stresses caused through the diagnosis and treatment process such as financial and family stress[5]. Those with a mental illness are also at higher risk for developing chronic diseases such as diabetes[6], cardiovascular disease [7]. This is possibly due to the higher association of mental illness with a range of risk factors such as smoking[8], lowered levels of physical activity and increased BMI[9,10] as well as psychological distress potentially independently leading to disease[5,11].

There is also evidence to suggest that having a mental illness may be related to poorer management of chronic disease for example through reduced adherence to treatment[12] and presence of risk behaviours[13]. Understanding the needs of those with mental illness and how they access health services is therefore important in order to identify vulnerable groups and manage treatment of both mental and physical health within this group.

The CES Primary and Community Health Cohort/Resource (CES-P&CH)[15] provides an opportunity for Sydney Local Health District to investigate patterns of health service use among a local cohort of older people with mental illness. At recruitment to the 45 and Up Study in (2006-2009, mainly in 2008[14]), which included a baseline questionnaire, approximately 30,000 people resided in CES and have consented to on-going linkage of their questionnaire data with health records. This means that there is now around 10 years of follow-up data related to health service use in the community.

While there is some limited information within the 45 and Up Study questionnaire datasets regarding self-reported chronic disease including depression and anxiety, the purpose of this project is to scope the feasibility of identifying a mental health cohort through administrative health data. The advantage of this approach is that it will allow a more widely translatable framework for on-going monitoring of groups via existing data sources.

The use of administrative health data to identify a mental health cohort has recently been investigated by the Australian Bureau of Statistics through their Mental Health Services – Census data integration project. This joins the 2011 census with Medicare Benefits Schedule (MBS) and Pharmaceutical Benefits Scheme (PBS) claims through data linkage[16] and also to deaths data.[17] As some data is publicly available at the Primary Health Network level, this provides a benchmark for comparing any findings within the CES area to other PHNs within Australia.

Aim

This brief exploratory study aimed to:

1. Investigate an appropriate definition to identify a mental health cohort within the Central and Eastern Sydney Area (CES) area of Sydney who are participants within the 45 and Up Study.
2. Investigate the feasibility of potential areas for further research on health service utilisation within this group.

Methods

This research used the CES-P&CH. This resource brings together population-based data from the Sax Institute's 45 and Up Study in New South Wales (NSW) and national and state administrative datasets provided by Services Australia and the NSW Centre for Health Record Linkage. Linkage to the national administrative datasets were undertaken by the Sax Institute using a unique identifier and deterministic methods. Linkage to the state administrative datasets were undertaken by the NSW Centre for Health Record Linkage using probabilistic techniques.[18]

The 45 and Up Study is conducted in a population of NSW aged 45 and over. Prospective participants were randomly sampled from the Services Australia (formerly the Australian Government Department of Human Services) Medicare enrolment database, which provides near complete coverage of the population. People aged 80 and over and residents of rural and remote areas were oversampled. A total of 267,153 participants joined the Study by completing a baseline questionnaire (between Jan 2006 and December 2009) and giving signed consent for follow-up and linkage of their information to routine health databases.[14,18] The cohort has been followed up twice since baseline; firstly in 2010 as part of the Social, Economic and Environmental Factors (SEEF) sub-study[19] and during the 5-year follow-up (2012-2015). Details of this study have been described elsewhere.[14]

All people residing in the CES area at baseline were included for analysis using the PHN_code_2015 variable provided by the Sax Institute (specifically limiting to PHN101) which was defined using the geocodes from the baseline addresses and the PHN shape files. Those holding a Department of Veteran's Affairs card were excluded due to incomplete MBS data resulting in 30,049 participants being included in the study.

For this study we used the 45 and Up Study questionnaire data within CES-P&CH linked to MBS, PBS, Admitted Patient Data Collection (APDC) and the Deaths Registry data. The reference period for identifying the groups was five years from date of recruitment to the 45 and Up Study.

Four mutually exclusive mental health groups were identified: (i) those who had an MBS claim for mental health services, but no PBS claim; (ii) Those who had a PBS claim for a mental health related medicine, but no MBS claim for mental health services; (iii) Those who had an MBS claim and PBS claim;

(iv) Those who had neither and MBS nor a PBS claim but were hospitalised with a mental health-related diagnostic code.

MBS related mental health claims include any MBS subsidised mental health services such as: Psychiatrists, GP mental health services, psychologists. See Appendix 1.

PBS related mental health claims includes any claims made for medicines within the broad categories of psycholeptics (including hypnotics, anti-psychotics, anxiolytics) and psychoanaleptics (antidepressants, psychostimulants). See Appendix 2.

Hospitalisations were included if they had a diagnostic code from ICD10 Chapter 5 “Mental and Behavioural Disorders” (F00-F99) anywhere within the principle or associated diagnosis fields.

Descriptive statistics were used to investigate selected characteristics of each group as well as the proportion who had died within each group (up to end 2017). Details of the variables are provided in Appendix 3.

Results

Characteristics of the mental health related groups

There were 10,461 people within CES who had a MBS or PBS claim for mental health related services or medicines within 5 years of 45 and Up Study baseline period (35%). Of these: 5,300 had a PBS claim only; 2,673 had MBS claim only and 2,488 had a claim for both PBS and MBS. There were an additional 503 people identified who had experienced a hospitalisation with Mental Health diagnostic code but had no MBS or PBS claims.

Figure 1 presents the age structure of each group and Table 1 presents selected characteristics of the four cohorts defined by the combination of PBS and MBS claims as well as those without mental health related claims. Some brief observations:

- Females are more likely to claim both PBS and MBS services (but particularly MBS).
- The PBS tends to include older people and the bias towards those over 80 - suggests this grouping is possibly being influenced by a group with dementia or dementia-like symptoms.
- The MBS is biased towards the younger ages.
- Those accessing MBS services only without PBS tend to be wealthier.
- Those accessing BOTH MBS and PBS services appear to include all ages and income levels and also have the highest proportion with a chronic condition (although this is influenced to a large degree by depression/anxiety).
- Those who were hospitalised without MBS or PBS claims were predominantly older (>75 yrs) and male.

Figure 1: Age structure of mental health groups

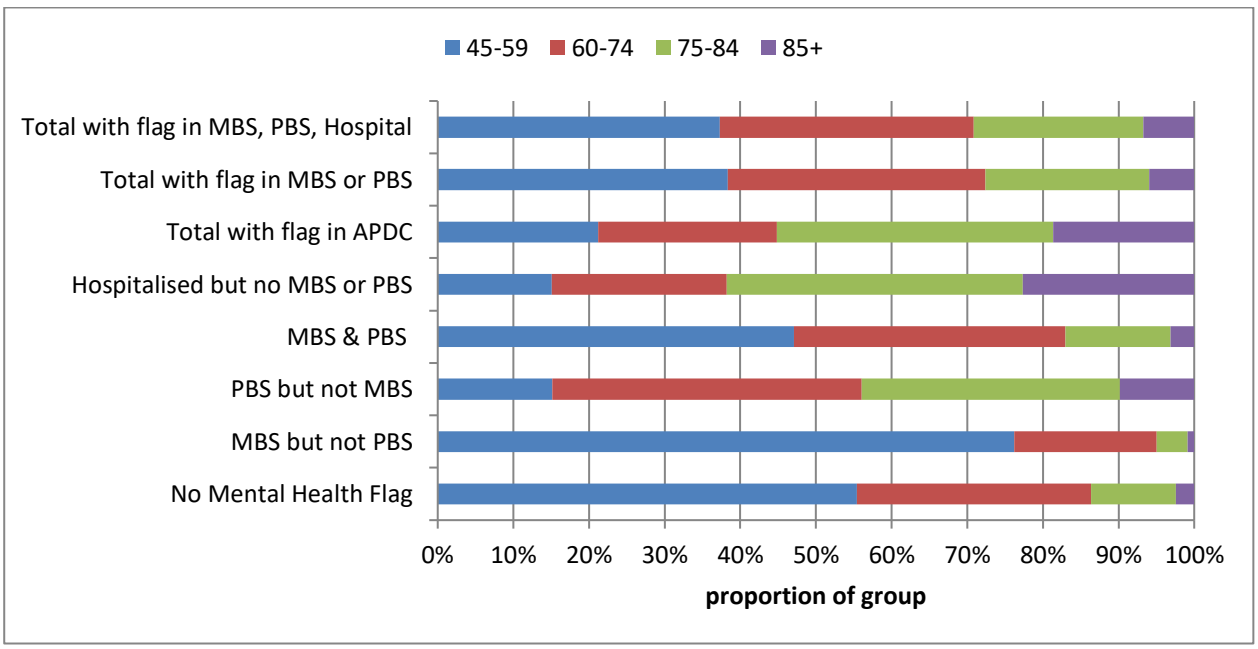


Table 1: Characteristics of mental health cohorts defined by combinations of MBS and PBS mental health claims as well as those who were hospitalised without any MBS or PBS claims

	No claims or mental health related hospitalisation		PBS mental health claim only		MBS mental health claim only		PBS & MBS mental health claims		Hospitalised with MH diagnostic code*, but no MBS or PBS	
Characteristics	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Total	19,085	100%	5,300	100%	2,673	100%	2,488	100%	503	100%
Sex										
Male	9,706	51	2,306	44	1,011	38	903	36	316	63
Female	9,379	49	2,994	57	1,662	62	1,585	64	187	37
Age group										
45-59	10,576	55	803	15	2,038	76	1,172	47	76	15
60-74	5,902	31	2,168	41	503	19	892	36	116	23
75-84	2,151	11	1,808	34	109	4	346	14	197	39
85+	456	2	521	10	23	1	78	3	114	23
Household income										
<$20,000	2,093	11	1,626	31	175	7	641	26	134	27
$20,000 to $39,999	2,263	12	903	17	233	9	393	16	59	12
$40,000 to $69,999	3,380	18	678	13	495	19	354	14	68	14
$70,000 or more	7,678	40	546	10	1,258	47	526	21	88	18
Won't disclose	3,671	19	1,547	29	512	19	574	23	154	31
Smoking status										
Never smoke	11,691	61	2,808	53	1,545	58	1,271	51	254	51
Ex-smoker	6,345	33	2,083	39	927	35	912	37	197	39
Current smoker	1,049	6	409	8	201	8	305	12	52	10
BMI category										
Underweight	1,841	10	686	13	297	11	270	11	78	16
Normal weight	7,085	37	1,720	33	1,004	38	822	33	193	38
Overweight	6,989	37	1,846	35	890	33	843	34	162	32
Obese	3,170	17	1,048	20	482	18	553	22	70	14
Health rate good+										
No	2,102	11	1,615	31	338	13	768	31	162	32
Yes	16,983	89	3,685	70	2,335	87	1,720	69	341	68
Quality of Life rate good+										
No	1,951	10	1,374	26	373	14	757	30	146	29
Yes	17,134	90	3,926	74	2,300	86	1,731	70	357	71
Number of chronic conditions										
Zero	10,913	57	1,574	30	1,252	47	498	20	185	37
One	5,966	31	1,983	37	1,025	38	1,051	42	199	40
Two	1,764	9	1,180	22	325	12	626	25	79	16
Three or more	442	2	563	11	71	3	313	13	40	8
Type of Self-reported Chronic condition										
Diabetes	1,229	6	680	13	113	4.2	267	10.7	60	12
Depression/anxiety	1,557	8	1,170	22	754	28.2	1,436	57.7	36	7.2
Cancer	2,461	13	1,129	21	301	11.3	391	15.7	113	22.5
Heart disease/Stroke	1,982	10	1,338	25	204	7.6	399	16	134	26.6
Arthritis/Osteoporosis	1,594	8	1,222	23	197	7.4	463	18.6	88	17.5
Asthma	2,091	11	653	12	326	12.2	399	16	56	11.1

*Based on a Chapter 5 (F0-F99) ICD10 code anywhere within principle or other diagnosis fields; details of variable provided in Appendix 3.

Proportion of deaths within each group

Table's 2a-2c present the number and proportion of deaths by age group within each of the groups. The age-specific proportion of deaths is also presented graphically within Figure 2. These data show that each of the mental health groups have a slightly higher proportion who have died within each group compared to the no mental health flag group with the hospitalised group having the highest death rate. This analysis is age-specific and not adjusted for any other factors and is likely to be partly explained by the fact that those who are hospitalised have generally poorer health.

Among the groups identified through MBS or PBS claims, the PBS only group had the highest proportion of deaths followed by MBS and PBS and then MBS only. This fits with the general profile of those within each group.

Table 2a: Mental Health group by age

Total in cohort	**Age group at baseline survey**				
Source of MH flag	**45-59**	**60-74**	**75-84**	**85+**	**Total**
No Mental Health Flag	10,576	5,902	2,151	456	19,085
MBS only	2,038	503	109	23	2,673
PBS only	803	2168	1,808	521	5,300
MBS & PBS	1,172	892	346	78	2,488
Hospitalised but no MBS or PBS	76	116	197	114	503
Total with flag in Hospitalisations	399	444	688	350	1,881
Total with flag in MBS or PBS	4,013	3,563	2,263	622	10,461
Total with flag in MBS, PBS, Hospital	4,089	3,679	2,460	736	10,964
Total CES	**14,665**	**9,581**	**4,611**	**1,192**	**30,049**

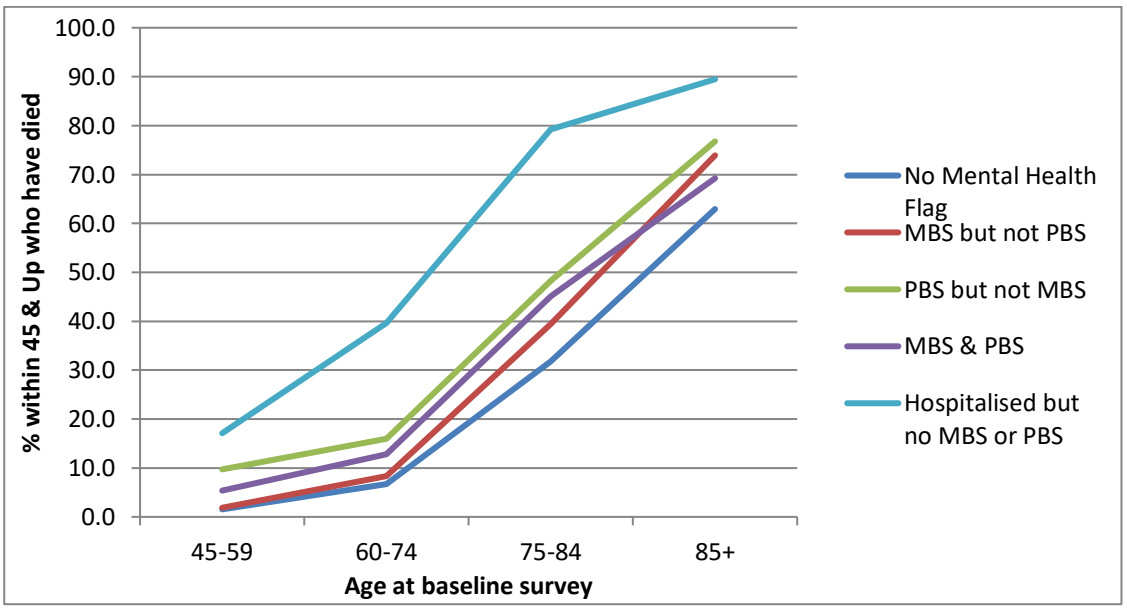
Table 2b: Number of deaths within each Mental Health group by age

Number who have died	**Age group at baseline survey**				
Source of MH flag	**45-59**	**60-74**	**75-84**	**85+**	**Total**
No Mental Health Flag	163	396	684	287	1,530
MBS only	38	42	43	17	140
PBS only	78	347	872	400	1,697
MBS & PBS	63	114	156	54	387
Hospitalised but no MBS or PBS	13	46	156	102	317
Total with flag in APDC	72	191	517	302	1,082
Total with flag in MBS or PBS	179	503	1,071	471	2,224
Total with flag in MBS, PBS, Hospital	192	549	1,227	573	2,541
Total CES	**355**	**945**	**1,911**	**860**	**4,071**

Table 2c: Percentage of deaths within each Mental Health group by age

% who have died	Age group at baseline survey				
Source of MH flag	**45-59**	**60-74**	**75-84**	**85+**	**Total**
No Mental Health Flag	1.5	6.7	31.8	62.9	8.0
MBS only	1.9	8.3	39.4	73.9	5.2
PBS only	9.7	16.0	48.2	76.8	32.0
MBS & PBS	5.4	12.8	45.1	69.2	15.6
Hospitalised but no MBS or PBS	17.1	39.7	79.2	89.5	63.0
Total with flag in APDC	18.0	43.0	75.1	86.3	57.5
Total with flag in MBS or PBS	4.5	14.1	47.3	75.7	21.3
Total with flag in MBS, PBS, Hospital	4.7	14.9	49.9	77.9	23.2
Total CES	2.4	9.9	41.4	72.1	13.5

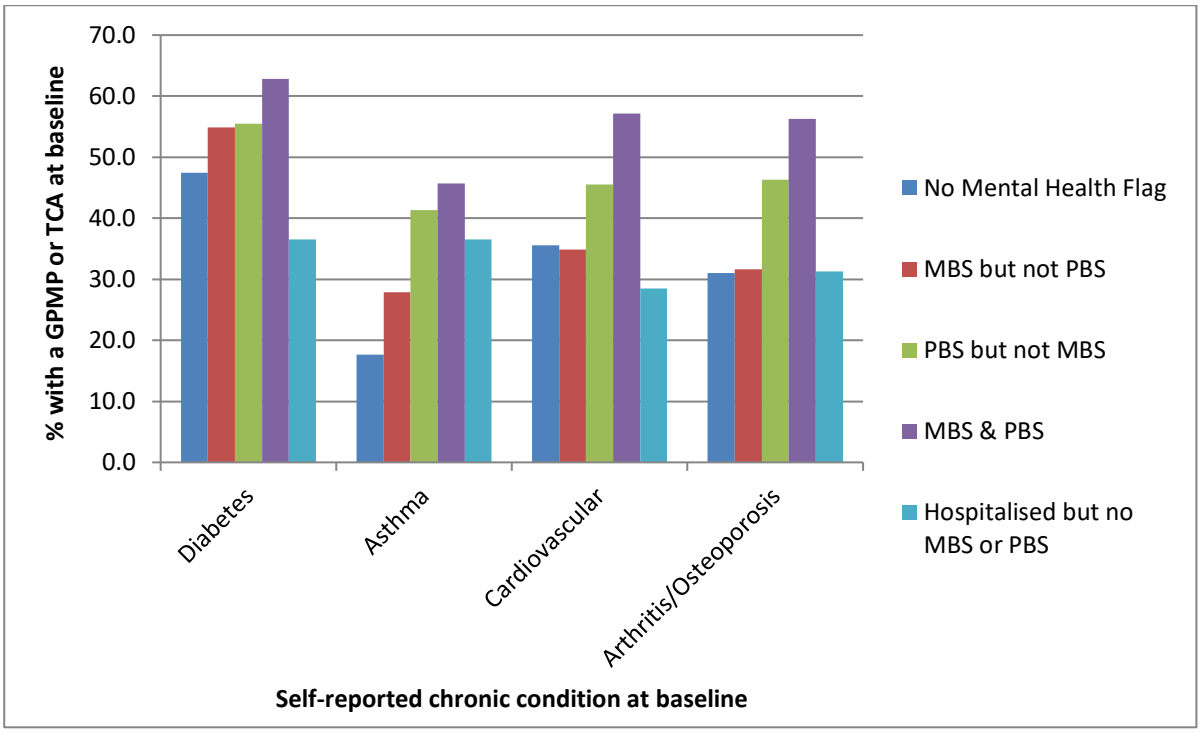
Figure 2: Proportion of deaths within each mental health group by Age



Chronic disease management

Figure 3 shows the proportion accessing a General Practice Management Plan or Team Care Arrangement (GPMP/TCA) within two years of baseline by four selected chronic condition and by each mental health group. In general, those within the MBS and PBS group were most likely to have had a GPMP/TCA prepared. Those in the hospitalised group were least likely with the exception of those with Asthma where those in the no mental health flag group were least likely.

Figure 3: Proportion of those with a mental health problem and chronic disease who access chronic disease management items



Discussion/ Way forward

This brief report provides a summary of four different groups identified within the CES. They all identify groups with mental health related concerns but comprise slightly different populations with different characteristics. In terms of which group to select for further research, this is likely to depend on the focus of the research question. The most inclusive approach would be to include all four groups, whereas the MBS and PBS group may be a good choice if the question requires more of a focus on chronic disease given that this group had high proportions with chronic conditions. Those with a hospital flag but without MBS or PBS may be of interest in terms of a potentially under-identified mental health group, but further investigation of this group is likely to be required to determine the types of mental health conditions represented within this group. It should also be noted that this group is small, and expansion to a wider geographic area such as Sydney Metro may be warranted.

This project has provided the basis for several potential further lines of enquiry. These include:

1) Further examination of chronic disease management within those with mental health conditions. This may include examining further the characteristics of those who do receive GPMP/TCA compared to those who do not within the mental health cohort. It could also include examination of other processes of care within a specific disease type such as diabetes or asthma. Subsequent hospitalisations ED visits and other (non-mental health related) GP patterns of use could be investigated.
2) Further examination of those being hospitalised with mental health-related conditions. This preliminary work has highlighted a small group who were hospitalised with a Mental Health flag but who did not access any other MBS or PBS related services. This could represent a group missing out on mental health services within primary care. Full investigation of the nature of hospitalisations and linkage to mental health ambulatory care data would be needed to investigate this further.
3) Examine the healthcare utilisation trajectories in the lead up to death among those people who died with a mental illness and compare to those who died but did not have a mental health condition.

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Appendix 1 — MBS Subsidised Mental Health Related Services

Provider	Item group	MBS Group & Subgroup	MBS item numbers
Psychiatrists	Initial consultation new patient(a)	Group A8	296, 297, 299
	Patient attendances—consulting room	Group A8	291(a), 293(a), 300, 302, 304, 306, 308, 310, 312, 314, 316, 318, 319
	Patient attendances—hospital	Group A8	320, 322, 324, 326, 328
	Patient attendances—other locations	Group A8	330, 332, 334, 336, 338
	Group psychotherapy	Group A8	342, 344, 346
	Interview with non-patient	Group A8	348, 350, 352
	Telepsychiatry	Group A8	353, 355, 356, 357, 358, 359(b), 361(b), 364, 366, 367, 369, 370
	Case conferencing		855, 857, 858, 861, 864, 866
	Electroconvulsive therapy(c)	Group T1, Subgroup 13	14224
	Referred consultation for assessment, diagnosis and development of a treatment and management plan for autism or any other pervasive developmental disorder (PDD)(d)	Group A8	289
General Practitioners	GP Mental Health Treatment Plan—accredited	Group A20, Subgroup 1	2710(a)(f), 2715(g), 2717(g)
	GP Mental Health Treatment Plan—non-accredited (a)	Group A20, Subgroup 1	2700(g), 2701(g), 2702(g)
	GP Mental Health Treatment Plan—other	Group A20, Subgroup 1	2712(a), 2713(a), 2719(g)(h)
	Focussed Psychological Strategies	Group A20, Subgroup 2	2721, 2723, 2725, 2727
	Family Group Therapy	Group A6	170, 171, 172
	Electroconvulsive therapy(i)	Group T10	20104
	3 Step Mental Health Process—GP(j)	Group A18, Subgroup 4	2574, 2575, 2577, 2578
	3 Step Mental Health Process—other medical professional(j)	Group A19, Subgroup 4	2704, 2705, 2707, 2708
Clinical Psychologists	Psychological Therapy Services(a)	Group M6	80000, 80005, 80010, 80015, 80020
Other Psychologists	Enhanced Primary Care	Group M3	10968
	Focussed Psychological Strategies (Allied Mental Health) (a)	Group M7	80100, 80105, 80110, 80115, 80120
	Assessment and treatment of PDD(c)	Group A10	82000, 82015
	Follow-up allied health service for Indigenous Australians(k)	Group M11	81355
Other Allied Health Providers	Enhanced Primary Care—mental health worker	Group M3	10956
	Focussed Psychological Strategies (Allied Mental Health)—occupational therapist(a)	Group M7	80125, 80130, 80135, 80140, 80145
	Focussed Psychological Strategies (Allied Mental Health)—social worker(a)	Group M	80150, 80155, 80160, 80165, 80170
	Follow-up allied health services for Indigenous Australians—mental health worker(k)	Group M11	81325

(a) Item introduced 1 November 2006.
(b) Item introduced 1 November 2007.
(c) Item may include services provided by medical practitioners other than psychiatrists.
(d) Item introduced 1 July 2008.
(e) Item introduced 1 January 2010.
(f) Item discontinued after 31 October 2011.
(g) Item introduced 1 November 2011.
(h) Item discontinued after 30 April 2012.
(i) Item is for the initiation of anaesthesia for electroconvulsive therapy and includes services provided by medical practitioners other than GPs.
(j) Item discontinued after 30 April 2007.
(k) Item introduced 1 November 2008.
Source: Australian Institute of Health and Welfare, 2014, 'Data Source' , *Medicare-subsidised mental health-related services,* viewed 13 August 2014, < https://mhsa.aihw.gov.au/services/medicare/data-source/

Appendix 2 — PBS Subsidised Mental Health Related Prescriptions

Code	Medication groups	Code	Medication subgroup
N05	**Psycholeptics - A group of drugs that tranquillises (central nervous system depressants)**		
N05A	Antipsychotics - drugs used to treat symptoms of psychosis (a severe mental disorder characterised by loss of contact with reality, delusions and hallucinations), common in conditions such as schizophrenia, mania and delusional disorder	N05AA N05AB N05AC N05AD N05AE N05AF N05AH N05AL N05AX	Phenothiazine's with aliphatic side-chain Phenothiazines with piperazine structure Phenothiazines with piperidine structure Butyrophenone derivatives Indole derivatives Thioxanthene derivatives Diazepines, oxazepines, thiazepines and oxepines Benzamides Other antipsychotics
N05B	Anxiolytics - drugs prescribed to treat symptoms of anxiety.	N05BA	Benzodiazepine derivatives
N05C	Hypnotics and sedatives - hypnotic drugs are used to induce sleep and treat severe insomnia. Sedative drugs are prescribed to reduce excitability or anxiety.	N05CD	Benzodiazepine derivatives
N06	**Psychoanaleptics - A group of drugs that stimulates the mood (central nervous system stimulants)**		
N06A	Antidepressants - drugs used to treat the symptoms of clinical depression.	N06AA N06AB N06AF N06AG N06AX	Non-selective monoamine reuptake inhibitors Selective serotonin reuptake inhibitors Monoamine oxidase inhibitors, non-selective Monoamine oxidase A inhibitors Other antidepressants
N06B	Psychostimulants, agents used for ADHD and nootropics - agents used for attention-deficit hyperactivity disorder and to improve impaired cognitive abilities (nootropics).	N06BA	Centrally acting sympathomimetics

Source: Australian Institute of Health and Welfare, 2014, 'Medicare-subsidised mental health-related prescriptions', viewed 13 August 2014, < https://mhsa.aihw.gov.au/services/medicare/>

Appendix 3 — Description of the variables used in the analysis

Characteristic	Description
Sociodemographic	
Age	Calculated based on self-report of DOB and the DateToday variable (i.e. date questionnaire completed)
Sex	Self-reported sex
Household Income	What is your usual yearly HOUSEHOLD income before tax, from all sources? Grouped into: <$20,000, $20,000-39,999, $40,000-69,999, $70,000 or more and Won't disclose
Risk and protective factors	
Smoking status	Smoking status at baseline: non-smoker; ex-smoker; current smoker
Body Mass Index (BMI)category	Based on self-reported height and weight. Categorised as underweight (<20); normal weight (20-25); overweight (25-30); obese (>30)
Psychological distress	Based on the Kessler 10 (K10) categories: low (score of 10-15), moderate (16-21), high (22-29) and very high (30-50) as well as not available
Health Conditions and Quality of Life	
Self-rated good quality of life	Based on self-rated quality of life question – classified as yes if responded as good; very good or excellent
Self-rated good quality of health	Based on self-rated quality of health question 'In general, how would you rate your overall health?' – classified as yes if responded as good; very good or excellent
Self-reported diabetes	Has a doctor EVER told you that you have diabetes?
Self-reported heart disease/stroke	Has a doctor EVER told you that you have heart disease/stroke?
Self-reported asthma	Has a doctor EVER told you that you have asthma?
Self-reported depression/anxiety	Has a doctor EVER told you that you have depression/anxiety?
Self-reported cancer	Has a doctor EVER told you that you have skin cancer, melanoma, breast cancer, prostate cancer or other cancer?
Self-reported arthritis/osteoporosis	In the last month have you been treated for Arthritis/Osteoporosis?