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Mortality analysis of mental health cohorts with co-morbid physical conditions in Australia

25 July 2023

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Agenda

1. Setting the Context
2. HMHB project and comparison to Equally Well
3. Life Expectancy Gap results to date

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Setting Context – Policy relevance

Improving the physical health and life expectancy for people living with mental health conditions is a focus area for both the:

- National Mental Health and Suicide Prevention Agreement and
- Fifth National Mental Health and Suicide Prevention Plan (Priority 5)

Analysis, which is under the HMHB project, will contribute to the evidence base to inform activities that are required under these government arrangements.

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Life Expectancy Gaps and Preventable Risks Project

- Work to date has focussed on HMHB objective 1
  - *What are the health and social outcomes of individuals that have co-morbid mental and physical health issues (for different diagnosis groups, compared to those without conditions)?*
  - To get a better understanding of the health and social outcomes, the aim of study is threefold:
    1. Quantify the life expectancy gap of individuals in Australia that have mental health conditions and the factors including physical comorbidities that contribute to premature mortality
    2. Identify the risks factors for mental health cohorts compared to those without conditions. Examples of factors investigated include smoking, diet, physical activity and alcohol consumption.
    3. Identify preventable hospitalisations and hospital re-admissions for both mental and physical health issues

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Comparison between HMHB and Equally Well Projects

- Both projects align with the 5th National Mental Health and Suicide Prevention Plan and the National Mental Health and Suicide Prevention Agreement.

- There are similarities with the types of analysis used (i.e. life expectancy and life expectancy gaps and risk factor analysis).

- HMHB can be viewed as an extension of the Equally Well project. HMHB will analyse specific mental health cohorts by physical conditions. In comparison, Equally Well will analyse those who use MBS/PBS Mental Health services in aggregate. It is primarily an update of work done by ABS in 2017 on 2011 data.

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Data

- Australian Institute of Health and Welfare's (AIHW) National Integrated Health Services Information Analysis Asset (NIHSI AA)
  - Data included from July 2010 to June 2017
  - Hospitalisation, Medicare Benefits Schedule (MBS), Pharmaceutical Benefits Scheme (PBS), Residential Aged Care, National Death Index
- Australian Bureau of Statistics' (ABS) Multi-Agency Data Integration Project (MADIP)
  - Data included from January 2011 to December 2020
  - MBS, PBS, National Death Index, Census/Demographics, Migration, Survey (National Health Survey and Survey of Disability, Ageing and Carers) and Income/Taxation data

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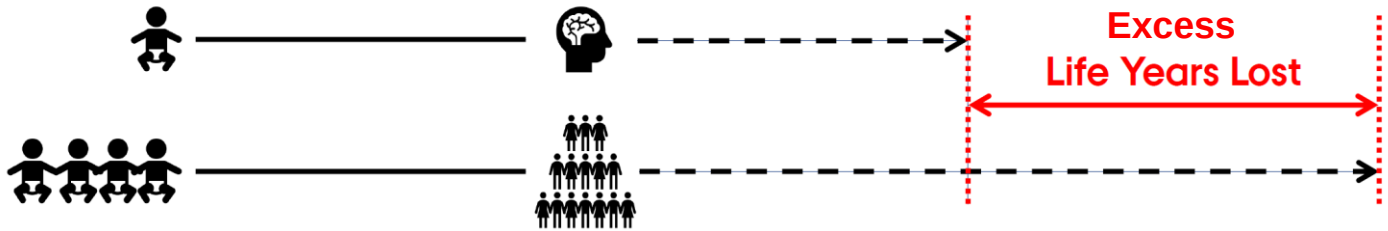
Methods

- Design: Population-based cohort study (Broad Mental Health and SMI)
- Mortality Rate Ratios (MRR): Poisson model adjusting for sex, age and calendar time
- Life expectancy: Period life table method
- Life Years Lost (LYL): Differences in life expectancy after disease onset
  - Only for SMI



Source: Plana-Ripoll (2022)

  - Weighted average excess Life-Years Lost: weighted average life years lost using age-of-onset distribution
- Health Expectancy: Sullivan method

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Life Expectancy Gaps – Exploratory analysis

	No. of people	Person-years	Deaths	Death rate	Reference*	Mortality rate ratio
Broad mental health cohort	7,436,074	15,501,773	273,861	17.7	10.8	1.6
Female	4,339,742	9,222,520	143,389	15.5	10.3	1.5
Male	3,096,332	6,279,253	130,472	20.8	10.8	1.9

	No. of people	Person-years	Deaths	Death rate	Reference*	Mortality rate ratio
SMI cohort	846,210	1,454,831	82,466	56.7	14.6	3.9
Female	426,133	731,866	43,446	59.4	16.5	3.6
Male	420,077	722,965	39,020	54.0	12.3	4.4

*Reference is the standardised death rate of the general Australian population to the age and gender distribution of the broad mental health and SMI cohorts

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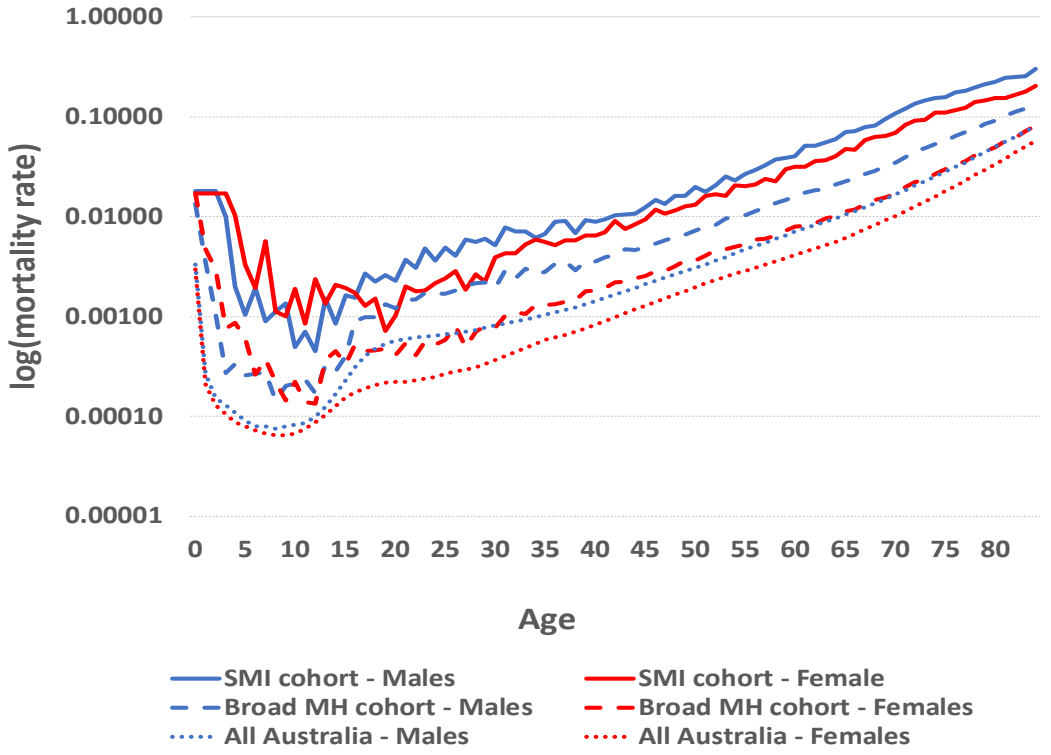
Life Expectancy Gaps – Exploratory analysis

- Mortality rate of broad mental health and SMI cohorts compared the general Australian population by gender

Graph: Mortality rate of broad mental health and SMI cohorts compared to the general Australian population (NIHSI AA)



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Life Expectancy Gaps – Preliminary results (Life Table)

Life expectancy of the general Australian population to the broad mental health cohort and SMI cohort

	Male					Female				
Age	0	15	45	65	85+	0	15	45	65	85+
All Australians*	80.4	65.8	37.1	19.5	4.7	84.5	69.9	40.6	22.3	5.3
Broad mental health cohort	70.0	56.4	29.2	13.6	0.5	75.3	62.4	33.8	16.4	0.5
SMI cohort	58.8	45.8	21.0	8.3	0.5	63.7	50.6	24.4	10.6	0.5
Life expectancy gap for Broad Mental Health cohort	10.4	9.4	7.9	5.9	4.2	9.2	7.5	6.8	5.9	4.8
Life expectancy gap for SMI cohort	21.6	20	16.1	11.2	4.2	20.8	19.3	16.2	11.7	4.8

**All Australians life expectancy was derived is using the ABS lifetable in 2015-2017*

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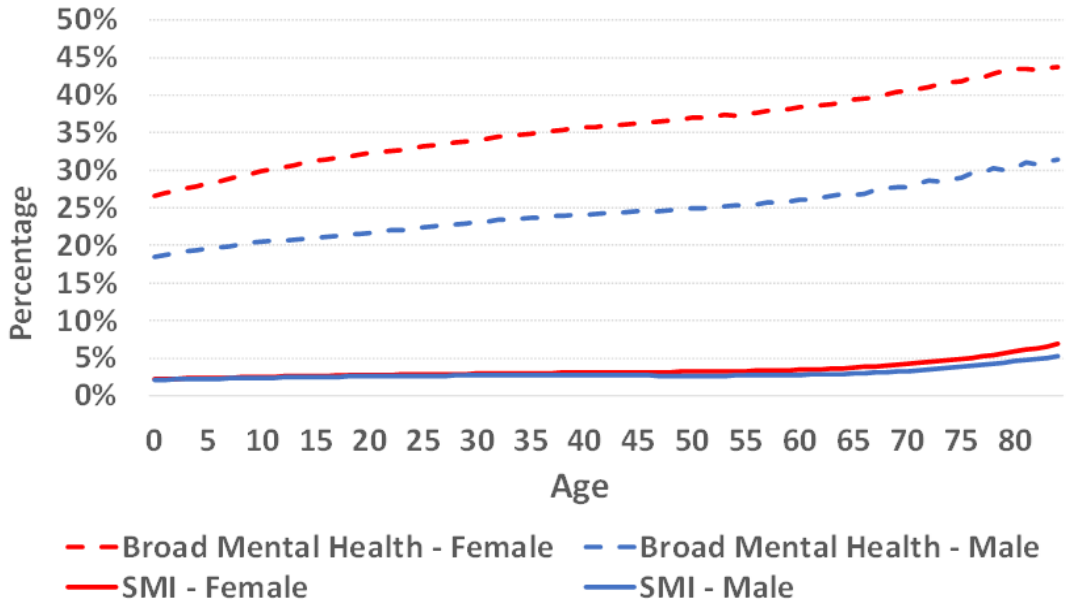
Health Expectancy – Preliminary results (Sullivan method)

Graph: Proportion of remaining life spent in disease state at each age (NIHSI AA)



- Broad mental health
  - Males: 19% to 31%
  - Females: 27% to 44%
- SMI
  - Males: 0% to 5%
  - Females: 0% to 7%

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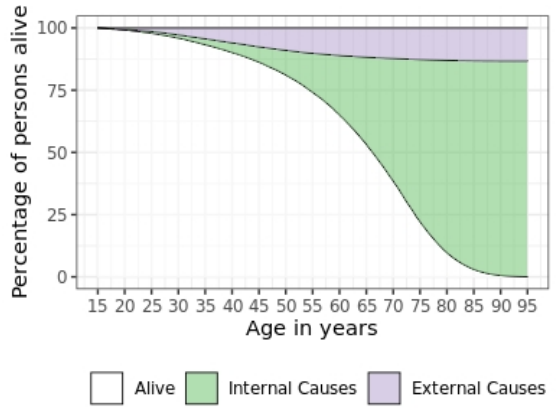
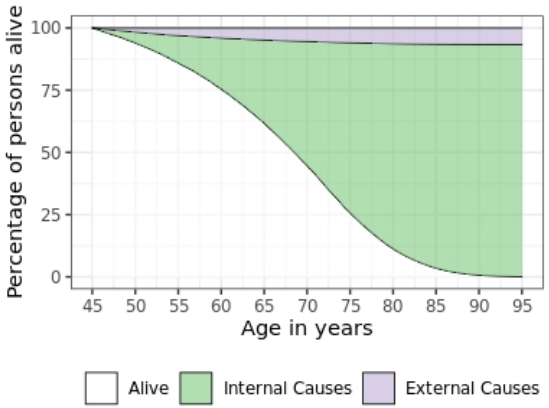
Life Expectancy Gaps – Preliminary results (Life-years lost)

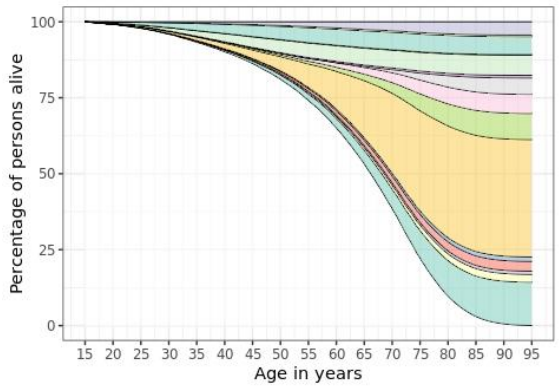
SMI – age 15



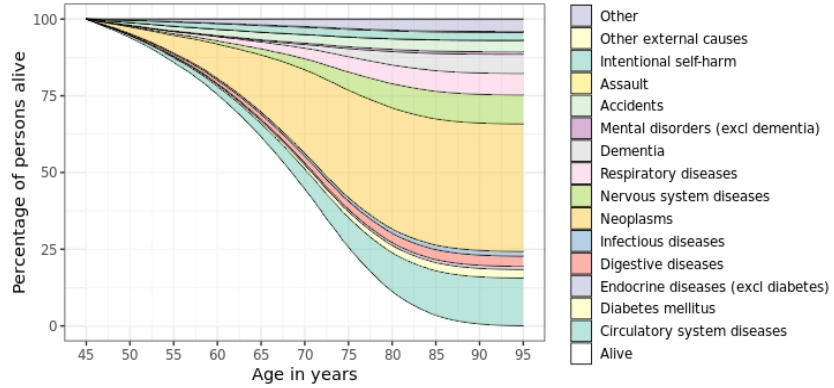
SMI – age 45



SMI – age 15



SMI – age 45



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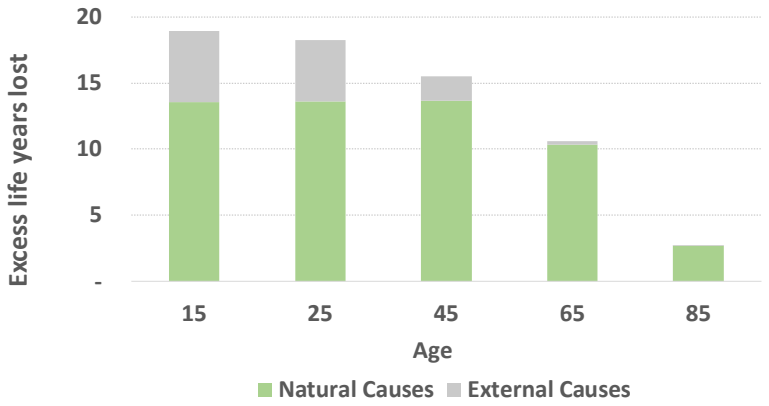
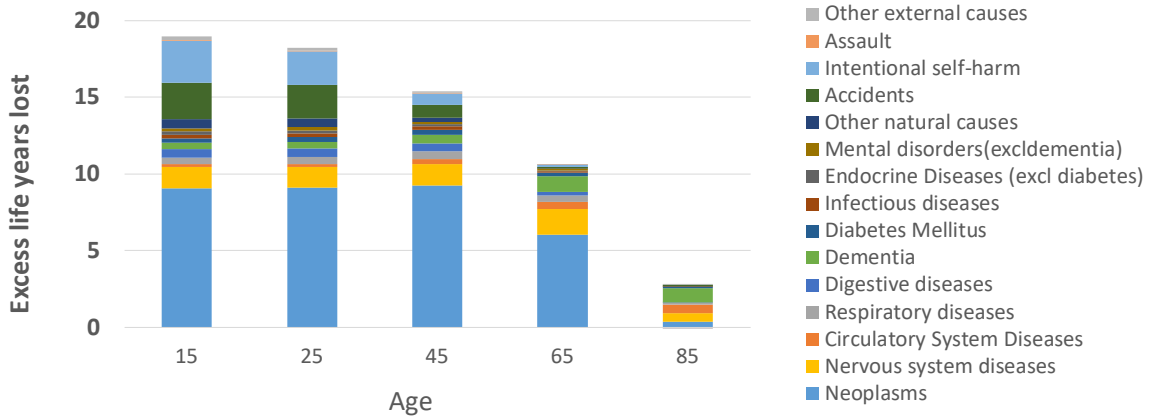
Life Expectancy Gaps – Preliminary results (Life-years lost)





**All Australian is using NIHSI data so won't match to ABS lifetable at this stage*

Onset distribution	Total average Excess Life-years lost	Internal causes	External Causes
New Cases – FY14FY17	12.13	10.17	1.95
New Cases – FY15FY17	**12.06**	**10.11**	**1.95**
New Cases – FY16FY17	12.07	10.10	1.96
New Cases – FY17	12.02	10.06	1.96

Onset distribution	Total average Excess Life-years lost	Neoplasms	Nervous system diseases	Intentional self-harm	Accidents	Dementia	Respiratory diseases	Other
New Cases – FY14FY17	12.13	6.29	1.24	0.92	0.92	0.69	0.38	1.69
New Cases – FY15FY17	**12.06**	6.24	1.24	0.92	0.92	0.69	0.38	1.67
New Cases – FY16FY17	12.07	6.23	1.24	0.92	0.93	0.69	0.37	1.69
New Cases – FY17	12.02	6.19	1.23	0.92	0.93	0.69	0.37	1.69

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Summary

- **Mortality rate ratio**
  - 1.6 times higher for broad mental health and 3.9 times higher for SMI
  - Broadly consistent with international studies
    - Plana-Ripoll et al. (2019): MRR range from 1.9 to 3.1 across all genders in Denmark
    - Pan et al. (2020): MRR range from 1.6 for depression, 2.4 for bipolar and 3.7 for schizophrenia across all genders in Taiwan
    - Krupchanka et al. (2018): MRR range from 1.6 (mood disorders), 2.3 (schizophrenia) and 3.5 (substance use disorders) in Czech Republic
    - Ajetunmobi et al. (2013): MRR range from 1.5 to 4.4 across all genders in Scotland

- **Life expectancy gap**
  - At age 15 (Broad Mental Health: 9.4 years – Males/7.5 years – Females; SMI: 20 years – Males/19.3 – Females)
    - Lawrence et al. (2013): 15.9 years for males and 12 years for females in 2005 for psychiatric patients in WA.
    - Nordentoft et al. (2013): 20 years for males and 15 years for females from 2000 to 2006 for patients with psychiatrist disorder

- **Excess life years lost** – weighted average was 11.6 years
  - Erlangsen et al. (2017): 10.2 years for males and 7.3 years for females across all mental disorders in Denmark
  - Plana-Ripoll et al. (2019): 12.1/9.4 for schizophrenia, 7.9/6.2 for mood disorders and 8.6/6.6 for neurotic disorders in Denmark

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Future research

- Further segmentation of mental health cohorts by different diagnosis groups and by gender
- Exploration on best methods to ensure the most accurate and practical excess mortality measures have been explored
- Further analysis into the association between mental health conditions and physical health conditions (Research Aim 2)
- Exploration of risk stratification tools (similar to that developed by Khanna et al. 2019) to help inform preventable hospitalisations and hospital re-admissions (Research Aim 3)

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Appendix – Broad mental health cohort definition

- Broad mental health cohort definition (based on AIHW)
  - **Hospital** primary diagnosis using ICD-10 Codes: F00 – F99
    - This includes F10-F19 (substance use disorders), F20-F29 (Schizophrenia), F30-F39 (Mood disorders), F40-F48 (Neurotic disorders), F50 (Eating disorders), F60 (Personality disorders), F70-F79 (Intellectual disabilities), F84 (Development disorders), F90-F98 (Behavioural disorders).
  - **MBS items** related to mental health services
    - Includes services provided psychiatrists (initial consultation, patient attendance, group psychotherapy, COVID-19 Services etc); GPS (mental health treatment plan, Eating disorders treatment plan, COVID-19 mental health telehealth services, focussed psychological strategies); Clinical psychologists (psychological treatment services, eating disorders psychological treatment, focussed psychological strategies, COVID-19); Psychologists including clinical psychologists (Enhanced primary care, Allied health services for Indigenous Australians); Other Allied Health providers (Enhanced primary care) etc.
  - **PBS items** (ATC codes) related to mental health services
    - antipsychotics (N05A), anxiolytics (N05B), hypnotics and sedatives (N05C), antidepressants (N06A), and psychostimulants, agents used for ADHD and nootropics (N06B)— prescribed by all medical practitioners (GPs, non-psychiatrist specialists and psychiatrists).

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Appendix – SMI cohort definition

- The SMI cohort has been defined as any individual who meets at least one of the following conditions for each financial year:

1. They were prescribed anti-psychotic medication. Anti-psychotic medication includes N05A excluding N05AB04; or
2. They were prescribed anticonvulsant/mood stabilising medication and they saw a psychologist or clinical psychologist more than 4 times. Anticonvulsant/mood stabilising medication includes sodium valproate N03AG01 or carbamazepine N03AF01 or lamotrigine N03AX09); or
3. They saw a psychiatrist more than 4 times; or
4. Were hospitalised with an ICD-10-AM primary diagnosis of Schizophrenia/Schizoaffective disorder (F20, F25 ICD-10-AM codes) or bipolar disorder (F31 ICD-10-AM code)

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Appendix – Possible age of onsets

Mental disorders ***Examples of diagnoses included in each group***	**Abbreviated name used in this study**	**ICD-10**	**ICD-8 equivalency**	**Earliest possible age at onset (years)**
Any mental disorder	Any disorder	F00 – F99	290 – 315	1
Organic, including symptomatic, mental disorders *Includes dementia in Alzheimer's disease, vascular dementia, etc.*	Organic disorders	F00 – F09	290·09, 290·10, 290·11, 290·18, 290·19, 292·x9, 293·x9, 294·x9, 309·x9	35
Mental and behavioral disorders due to psychoactive substance use *Includes use of alcohol, cannabis, cocaine, nicotine, opioids, sedatives, hypnotics, anxiolytics, etc.*	Substance use disorders	F10 – F19	291·x9, 294·39, 303·x9, 303·20, 303·28, 303·90, 304·x9	10
Schizophrenia and related disorders *Includes schizophrenia, schizotypal disorders, schizoaffective disorders and other psychotic disorders.*	Schizophrenia	F20 – F29	295·x9, 296·89, 297·x9, 298·29-298·99, 299·04, 299·05, 299·09, 301·83	10
Mood disorders *Includes bipolar disorder, depressive disorders, etc.*	Mood disorders	F30 – F39	296·x9 (excluding 296·89), 298·09, 298·19, 300·49, 301·19	10
Neurotic, stress-related, and somatoform disorders *Includes anxiety disorders, phobias, obsessive-compulsive disorders, etc.*	Neurotic disorders	F40 – F48	300·x9 (excluding 300·49), 305·x9, 305·68, 307·99	5
Eating disorders *Includes anorexia nervosa, bulimia nervosa, etc.*	Eating disorders	F50	305·60, 306·50, 306·58, 306·59	1

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Appendix – Possible age of onsets

Eating disorders *Includes anorexia nervosa, bulimia nervosa, etc.*	Eating disorders	F50	305·60, 306·50, 306·58, 306·59	1
Specific personality disorders	Personality disorders	F60	301·x9 (excluding 301·19), 301·80, 301·81, 301·82, 301·84	10
Intellectual disabilities	Intellectual disabilities	F70 – F79	311·xx, 312·xx, 313·xx, 314·xx, 315·xx	1
Pervasive developmental disorders *Includes autism spectrum disorder*	Developmental disorders	F84	299·00, 299·01, 299·02, 299·03	1
Behavioral and emotional disorders with onset usually occurring in childhood and adolescence *Includes attention-deficit hyperactivity disorder, conduct disorders, childhood emotional disorders, etc.*	Behavioral disorders	F90 – F98	306·x9, 308·0x	1

Source: Plana-Ripoll et al. (2019)