



Supporting Information

Supplementary methods and results

**This appendix was part of the submitted manuscript and has been peer reviewed.
It is posted as supplied by the authors.**

Appendix to: Judd J, Pilkington RM, Malvaso C, et al. Mental health-related hospitalisations of adolescents and their contact with child protection services to age 11 years, South Australia: a whole-of-population descriptive study. *Med J Aust* 2024; doi: 10.5694/mja2.52489.

Table 1. ICD-10-AM codes used for mental health-related hospitalisations

Condition/category of conditions	ICD-10-AM codes
Mental and behavioural disorders due to psychoactive substance use	F10-F19
Schizophrenia, schizotypal and delusional disorders	F20-F29
Mood disorders (e.g. depression)	F30-F39
Neurotic, stress-related and somatoform disorders	F40-F48
Behavioural syndromes associated with physiological disturbances and physical factors (e.g. sleep disorders and eating disorders)	F50-F59, G47.0-G47.2, G47.8, G47.9
Disorders of adult personality and behaviour	F60-F69
Disorders of psychological development (e.g. autism)	F80-F89
Behavioural and emotional disorders with onset usually occurring in childhood and adolescence	F90-F98
Signs and symptoms involving emotional state (e.g. nervousness, demoralisation and apathy)	R45
Intentional self-harm ¹	X60-X84, Y87.0
Other ²	F70-F79, O99.3, R44, F99

ICD-10-AM = International Statistical Classification of Diseases and Related Health Problems, 10th revision, Australian modification.

1. External cause codes.

2. Includes mental retardation, mental disorders in pregnancy, childbirth and puerperium, symptoms and signs involving general sensations and perceptions (e.g. hallucinations) and unspecified mental disorders.

Table 2. Mental health-related hospitalisations of adolescents (aged 12–17 years) born in South Australia during 1991–1999, by highest level of contact with child protection services while aged 0–11 years and diagnosis code category

Characteristic	Highest level of child protection contact (0-11 years): number, proportion (95% CI)						
	No contact	Notification	Screened-in notification	Investigation	Substantiation	Out-of-home care	All
Total number of adolescents	147,912	6,645	7,699	6,330	5,338	1,191	175,115
No mental health-related hospitalisation	144,546 97.7% (97.6–97.8%)	6,247 94.0% (93.4–94.6%)	7,096 92.2% (91.5–92.7%)	5,800 91.6% (90.9–92.3%)	4,798 89.9% (89.0–90.7%)	982 82.5% (80.2–84.5%)	169,469 96.8% (96.7–96.9%)
At least one mental health-related hospitalisation	3,366 2.3% (2.2–2.4%)	398 6.0% (5.4–6.6%)	603 7.8% (7.3–8.5%)	530 8.4% (7.7–9.1%)	540 10.1% (9.3–11.0%)	209 17.5% (15.5–19.8%)	5,646 3.2% (3.1–3.3%)
Specific mental health hospitalisation ¹							
Neurotic, stress-related disorders (F40-F48)	1,177 0.8% (0.8–0.8%)	158 2.4% (2.0–2.8%)	237 3.1% (2.7–3.5%)	193 3.0% (2.7–3.5%)	214 4.0% (3.5–4.6%)	80 6.7% (5.4–8.3%)	2,059 1.2% (1.1–1.2%)
Mental and behavioural disorders due to substance use (F10-F19)	1,144 0.8% (0.7–0.8%)	128 1.9% (1.6–2.3%)	212 2.8% (2.4–3.1%)	212 3.3% (2.9–3.8%)	218 4.1% (3.6–4.6%)	114 9.6% (8.0–11.4%)	2,028 1.2% (1.1–1.2%)
Self-harm (X60-X84, Y87.0)	1,030 0.7% (0.6–0.7%)	141 2.1% (1.8–2.5%)	191 2.5% (2.2–2.9%)	167 2.6% (2.3–3.1%)	184 3.5% (3.0–4.0%)	69 5.8% (4.6–7.3%)	1,782 1.0% (1.0–1.1%)
Mood disorders (F30-F39)	928 0.6% (0.6–0.7%)	111 1.7% (1.4–2.0%)	153 2.0% (1.7–2.3%)	138 2.2% (1.8–2.6%)	129 2.4% (2.0–2.69%)	45 3.8% (2.8–5.0%)	1,504 0.9% (0.8–0.9%)
Symptoms and signs involving emotional state (including suicidal ideation%) (R45)	774 0.5% (0.5–0.6%)	114 1.7% (1.4–2.1%)	179 2.3% (2.0–2.7%)	167 2.6% (2.3–3.1%)	153 2.9% (2.5–3.3%)	67 5.6% (4.5–7.1%)	1,454 0.8% (0.8–0.9%)
Behavioural syndromes associated with physiological disturbances and physical factors (F50-F59, G47.0-G47.2, G47.8, G47.9)	316 0.2% (0.2–0.2%)	23 0.3% (0.2–0.5%)	32 0.4% (0.3–0.6%)	16 0.3% (0.2–0.4%)	19 0.4% (0.2–0.6%)	5 0.4% (0.2–1.0%)	411 0.2% (0.2–0.3%)
Behavioural and emotional disorders with onset usually occurring in childhood and adolescence (F90-F98)	230 0.2% (0.1–0.2%)	57 0.9% (0.7–1.1%)	69 0.9% (0.7–1.1%)	78 1.2% (1.0–1.5%)	71 1.3% (1.1–1.7%)	42 3.5% (2.6–4.7%)	547 0.3% (0.3–0.3%)
Disorders of psychological development (F80-F89)	172 0.1% (0.1–0.1%)	29 0.4% (0.3–0.6%)	42 0.5% (0.4–0.7%)	33 0.5% (0.4–0.7%)	24 0.4% (0.3–0.7%)	18 1.5% (1.0–2.4%)	318 0.2% (0.2–0.2%)
Disorders of adult personality and behaviour (F60-F69)	106 0.1% (0.1–0.1%)	15 0.2% (0.1–0.4%)	25 0.3% (0.2–0.5%)	29 0.5% (0.3–0.7%)	27 0.5% (0.3–0.7%)	15 1.3% (0.8–2.1%)	217 0.1% (0.1–0.1%)
Schizophrenia, schizotypal and delusional disorders (F20-F29)	82 0.1% (0.0–0.1%)	18 0.3% (0.2–0.4%)	9 0.1% (0.1–0.2%)	17 0.3% (0.2–0.4%)	27 0.5% (0.3–0.7%)	11 0.9% (0.5–1.6%)	164 0.1% (0.1–0.1%)
Other mental health-related hospitalisations ²	157 0.1% (0.1–0.1%)	15 0.2% (0.1–0.4%)	43 0.6% (0.4–0.8%)	56 0.9% (0.7–1.1%)	64 1.2% (0.9–1.5%)	30 2.5% (1.8–3.6%)	365 0.2% (0.2–0.2%)

CI = confidence interval.

1. Mental health reason in any primary or additional diagnosis code (or external cause code for self-harm).

2. Includes mental retardation (F70-F79), mental disorders in pregnancy, childbirth and puerperium (O99.3), symptoms and signs involving general sensations and perceptions (e.g. hallucinations) (R44) and unspecified mental disorders (F99).

An individual can be included in more than one diagnosis category.

Table 3. Type of transfer or referral of adolescents (12-17 years) for mental health-related hospitalisations, by level of child protection contact (0-11 years)

From where the patient was referred/transferred for admission to hospital	Highest level of child protection system contact						Overall
	No contact	Notification	Screened-in notification	Investigation	Substantiation	Out-of-home care	
Private medical practice	314 (5.4%)	36 (4.6%)	64 (5.7%)	65 (6.4%)	56 (4.4%)	13 (2.3%)	548 (5.2%)
Interhospital transfer	145 (2.5%)	30 (3.9%)	38 (3.4%)	30 (3.0%)	50 (3.9%)	14 (2.5%)	307 (2.9%)
Outpatient department	923 (15.8%)	76 (9.8%)	125 (11.0%)	77 (7.6%)	141 (11.0%)	47 (8.3%)	1389 (13.1%)
Casualty/emergency	4256 (72.7%)	608 (78.4%)	832 (73.5%)	798 (78.5%)	998 (77.7%)	473 (83.3%)	7965 (74.9%)
Other ¹	218 (3.7%)	26 (3.4%)	73 (6.4%)	46 (4.5%)	40 (3.1%)	21 (3.7%)	424 (4.0%)
Total	5856	776	1132	1016	1285	568	10633

1. Includes community health services, administrative admission, law enforcement agency, private psychiatric practice, retrieval and other

Table 4. Proportions of adolescents (aged 12–17 years) admitted to hospital at least once (any cause) who had been hospitalised with a mental health-related diagnosis, by age and highest level of contact with child protection services while aged 0–11 years, with prevalence ratios*

Highest level of child protection system contact	Adolescents with mental health-related hospitalisations/adolescents with hospitalisations (any cause)*						
	12 years	13 years	14 years	15 years	16 years	17 years	12–17 years
No contact	104/4857 (2.1%)	210/5064 (4.1%)	515/5900 (8.7%)	845/6747 (12.5%)	1052/7442 (14.1%)	1303/8309 (15.7%)	3366/28 629 (11.8%)
Prevalence ratio	1	1	1	1	1	1	1
Notification	12/317 (3.8%)	32/390 (8.2%)	57/411 (13.9%)	108/530 (20.4%)	145/608 (23.8%)	144/662 (21.8%)	398/2044 (19.5%)
Prevalence ratio	1.8	2.0	1.6	1.6	1.7	1.4	1.7
Screened-in notification	29/437 (6.6%)	49/468 (10.5%)	110/559 (19.7%)	165/665 (24.8%)	200/782 (25.6%)	222/891 (24.9%)	603/2522 (23.9%)
Prevalence ratio	3.1	2.6	2.3	2.0	1.8	1.6	2.0
Investigation	29/398 (7.3%)	63/392 (16.1%)	98/467 (21.0%)	151/574 (26.3%)	164/678 (24.2%)	192/761 (25.2%)	530/2130 (24.9%)
Prevalence ratio	3.5	3.9	2.4	2.1	1.7	1.6	2.1
Substantiation	33/342 (9.6%)	67/411 (16.3%)	104/477 (21.8%)	146/517 (28.2%)	189/649 (29.1%)	201/720 (27.9%)	540/1966 (27.5%)
Prevalence ratio	4.6	4.0	2.5	2.3	2.1	1.8	2.3
Out-of-home care	19/97 (20%)	23/112 (20.5%)	47/138 (34.1%)	58/143 (40.6%)	92/184 (50.0%)	68/186 (36.6%)	209/534 (39.1%)
Prevalence ratio	9.3	5.0	3.9	3.2	3.5	2.3	3.3

* Individual people can be included more than once because of hospitalisations at different ages.

Table 5. Proportions of hospitalisations of adolescents (aged 12–17 years) admitted to hospital at least once (any cause) that were mental health-related, by age and highest level of contact with child protection services while aged 0–11 years

	Mental health-related hospitalisations/all-cause hospitalisations						
Highest level of child protection system contact	12 years	13 years	14 years	15 years	16 years	17 years	12–17 years
No contact	128/6607 (1.9%)	301/6943 (4.3%)	721/8310 (8.7%)	1235/9490 (13.0%)	1565/11 045 (14.2%)	1906/12 346 (15.4%)	5856/54 741 (10.7%)
Prevalence ratio	1	1	1	1	1	1	1
Notification	15/418 (3.6%)	39/527 (7.4%)	78/585 (13.3%)	156/748 (20.9%)	219/926 (23.7%)	269/1063 (25.3%)	776/4267 (18.2%)
Prevalence ratio	1.9	1.7	1.5	1.6	1.7	1.6	1.7
Screened-in notification	33/638 (5.2%)	74/690 (10.7%)	173/826 (20.9%)	223/958 (23.3%)	276/1146 (24.1%)	353/1424 (24.8%)	1132/5682 (19.9%)
Prevalence ratio	2.7	2.5	2.4	1.8	1.7	1.6	1.9
Investigation	42/600 (7.0%)	87/583 (14.9%)	132/765 (17.3%)	204/921 (22.2%)	237/1046 (22.7%)	314/1205 (26.1%)	1016/5120 (19.8%)
Prevalence ratio	3.7	3.5	2.0	1.7	1.6	1.7	1.9
Substantiation	47/488 (9.6%)	93/564 (16.5%)	193/710 (27.2%)	265/788 (33.6%)	327/1053 (31.1%)	360/1195 (30.1%)	1285/4798 (26.8%)
Prevalence ratio	5.1	3.8	3.1	2.6	2.2	2.0	2.5
Out-of-home care	23/131 (17.6%)	34/170 (20.0%)	90/221 (40.7%)	137/286 (47.9%)	156/317 (49.2%)	128/312 (41.0%)	568/1437 (39.5%)
Prevalence ratio	9.3	4.7	4.7	3.7	3.5	2.7	3.7

Table 6. Sex and Index of Relative Socio-Economic Advantage and Disadvantage (IRSAD) quintiles for adolescents (12-17 years) with at least one mental health-related hospitalisation, by highest level of contact with child protection services (0-11 years)*

	Highest level of child protection contact (0-11 years)						Overall
	No contact	Notification	Screened-in notification	Investigation	Substantiation	Out-of-home care	
Adolescents with at least one mental health-related hospitalisation	3,366	398	603	530	540	209	5,646
Sex							
Boys	1303 (38.7%)	166 (44.7%)	226 (37.5%)	207 (39.1%)	203 (37.6%)	89 (42.6%)	2194 (38.9%)
Girls	2063 (61.3%)	232 (58.3%)	377 (62.5%)	323 (60.9%)	337 (62.4%)	120 (57.4%)	3452 (61.1%)
IRSAD quintile							
1 (most disadvantaged)	773 (23.0%)	140 (35.2%)	238 (39.5%)	237 (44.7%)	267 (49.4%)	102 (48.8%)	1757 (31.1%)
2	772 (22.9%)	109 (27.4%)	173 (28.7%)	142 (26.8%)	131 (24.3%)	40 (19.1%)	1367 (24.2%)
3	592 (17.6%)	77 (19.4%)	81 (13.4%)	67 (12.6%)	65 (12.0%)	30 (14.4%)	912 (16.2%)
4	664 (19.7%)	42 (10.6%)	<5	<5	<5	<5	899 (15.9%)
5 (least disadvantaged)	552 (16.4%)	30 (7.5%)	35 (5.8%)	21 (4.0%)	37 (6.9%)	12 (5.7%)	687 (12.2%)

IRSAD = Index of Relative Socio-Economic Advantage and Disadvantage

* As recorded at the time of the first mental health-related hospitalisation. Some proportions do not sum to 100% because of missing IRSAD data (<1% missing postcode, or postcode not assigned to IRSAD quintile).