

The **Networked Data Lab Wales:** Children and Young People's Mental Health Methodology

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Funded by the Health Foundation

The Networked Data Lab Wales is funded by the Health Foundation. The Health Foundation is an independent charity committed to bringing about better health and health care for people in the UK.

This study makes use of anonymised data held in the Secure Anonymised Information Linkage (SAIL) Databank. We would like to acknowledge all the data providers who make anonymised data available for research.

30th June 2022

Version 2.0

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Datasets

Dataset	Description	Refresh date
Welsh Ambulance Service Trust (WAST)	Call details and responses to all ambulance calls in Wales	17/9/2021
Emergency Department Data Set (EDDS)	All emergency department attendances in Wales	1/10/2021
Patient Episode Database Wales (PEDW)	All inpatient admissions in Wales	4/7/2021
Substance Misuse Data Set (SMDS)	All NHS Wales substance misuse service attendances and referrals (over 50 treatment providers in Wales ¹)	28/6/2021
Welsh Demographic Service Dataset (WDSD)	Contains linkable data on demographics of the Welsh population from the Census	4/7/2021
Annual District Death Extract	From Office for National Statistics (ONS) mortality register, containing data on all deaths in Wales within the study period	28/6/2021
Wales Longitudinal General Practice (WLGP)	Patients' GP events in Wales	1/6/2021

All data sources described above are routinely collected by the NHS and local authority services for the whole population in Wales (≈ 3.1 million), except the WLGP dataset in the SAIL Databank which includes a representative sample of GP practices covering 80-85% of the Welsh population². All data are available and cover the study period 2016-2020.

Study population

Criteria

Individuals were included in the cohort for any period(s) between 1/1/2016 and 31/12/2020 where they met the following criteria:

- Aged between 11 and 24 years old
- Known sex ('male' or 'female')
- Living in Wales
- Had a valid anonymised linkage field (ALF) to enable the linkage across acute care system health records³

Demographics

Demographic characteristics of the study population were calculated per year as defined below:

- Sex: as recorded in data set (M/F)
- Age Group: calculated as calendar year (i.e. year - year of birth)
- Deprivation (Welsh Index of Multiple Deprivation): the Welsh Government's official measure of relative deprivation for small areas in Wales, based on lower super output area on 1st January (or date of entry into cohort) for each year
- RUC (rural urban classification): based on lower super output area on 1st January (or date of entry into cohort) for each year

- Substance misuse service (SMS) history: SMS referral or assessment in the 5 years prior to crisis event, based on the first crisis event of the year.

Statistical analysis

Rates

Annual mental health crisis event rates and 95% confidence intervals were calculated per 1,000 person years at risk (PYAR), i.e. event count / PYAR * 1,000.

Person years at risk (PYAR)

PYAR represent the cumulative time contributed from each individual in the population to the study, based on time where study population criteria were met. To calculate PYAR for SMS history, those without a mental health crisis event needed to be identified as having SMS history/no SMS history. To determine the SMS history of individuals with no mental health crisis event in a given year, they were given a 'pseudo-event date' by randomly allocating them a date from the list of real crisis dates that year. SMS history was then determined based on this pseudo-event date.

Incident rate ratio (IRR)

Poisson regression was used to examine the association between demographic characteristics, substance misuse history and MH crisis presentation, taking into consideration year of presentation. Incident rate ratios (IRR) and their standard errors, together with the 95% confidence intervals were calculated. Analysis was conducted in R version 4.1.2.

Mental health crisis events

A mental health crisis event was identified through clinical code lists specific to each acute health care service: ambulance (WAST), emergency department (ED) and emergency hospital admissions. We took a broad definition of mental health crisis events, which included self-harm, suicide attempt, overdose, psychosis, and other serious mental illness requiring emergency care. The mental health crisis event criteria were developed based on previous research⁴⁻⁶ and discussions with clinicians, a WAST informatician, and Child and Adolescent Mental Health Service (CAMHS) leads.

To avoid counting a MH crisis event multiple times across the acute health care system, MH crises which occurred within consecutive calendar days between 1/1/2016 and 31/12/2020 were considered a single event.

WAST

- In WAST data, MH related codes could be obtained from the Patient Clinical Record (PCR) data, which is completed by the ambulance crew, or from the Advanced Medical Priority Dispatch System (AMPDS) code in the Computer Aided Dispatch (CAD) data, which is recorded by the call taker at dispatch. Due to issues surrounding the completeness of PCR data and variability in data quality⁷, AMPDS codes were used to identify MH crisis events in WAST data. This approach was more likely to result in robust figures, however, AMPDS codes are for prioritisation of ambulance dispatch and not for clinical diagnosis purposes. AMPDS codes are reliant on information provided by callers, therefore may be inaccurate.

- CAD data was linked to PCR records (allowing identification of the patient) and corresponding incident call recorded by AMPDS as mental health or self-harm (from 'overdose/poisoning' or 'Psychiatric behaviour' categories).

AMPDS code	Description
09E30	Hanging
17D02J	Falls, long fall (=?>?6?ft./2?m)
17D03J	Falls, unconscious or not alert <U+0096> Jumper
23B00	Override
23B01	OVERDOSE (without priority symptoms)
23B01I	OVERDOSE (without priority symptoms) - Intentional
23B01V	OVERDOSE (without priority symptoms) - Violent or combative
23B01W	OVERDOSE (without priority symptoms) - Weapons
23C00I	Override - Intentional
23C00V	Override - Violent or combative
23C01	Not alert
23C01I	Not alert - Intentional
23C01V	Not alert - Violent or combative
23C01W	Not alert - Weapons
23C02	Abnormal breathing
23C02I	Abnormal breathing - Intentional
23C02V	Abnormal breathing - Violent or combative
23C02W	Abnormal breathing - Weapons
23C03	Antidepressants (tricyclic)
23C03I	Antidepressants (tricyclic) - Intentional
23C03V	Antidepressants (tricyclic) - Violent or combative
23C03W	Antidepressants (tricyclic) - Weapons
23C04	Cocaine, methamphetamine (or derivatives)
23C04I	Cocaine, methamphetamine (or derivatives) - Intentional
23C04V	Cocaine, methamphetamine (or derivatives) - Violent or combative
23C04W	Cocaine, methamphetamine (or derivatives) - Weapons
23C05	Narcotics (heroin, tramadol, methadone, (dihydro)codeine, etc.)
23C05I	Narcotics (heroin, tramadol, methadone, (dihydro)codeine, etc.) - Intentional
23C05V	Narcotics (heroin, tramadol, methadone, (dihydro)codeine, etc.) - Violent or combative
23C05W	Narcotics (heroin, tramadol, methadone, (dihydro)codeine, etc.) - Weapons
23C06	Acid or alkali (lye)
23C06I	Acid or alkali (lye) - Intentional
23C06V	Acid or alkali (lye) - Violent or combative
23C06W	Acid or alkali (lye) - Weapons
23C07	Unknown status/Other codes not applicable
23C07I	Unknown status/Other codes not applicable - Intentional
23C07V	Unknown status/Other codes not applicable - Violent or combative
23C07W	Unknown status/Other codes not applicable - Weapons
23C08	Poison Control request for response
23C08I	Poison Control request for response - Intentional
23C08V	Poison Control request for response - Violent or combative

23C08W	Poison Control request for response - Weapons
23D00	Override
23D00I	Override - Intentional
23D00V	Override - Violent or combative
23D01	Unconscious
23D01I	Unconscious - Intentional
23D01V	Unconscious - Violent or combative
23D01W	Unconscious - Weapons
23D02	CHANGING COLOUR
23D02I	CHANGING COLOUR - Intentional
23D02V	CHANGING COLOUR - Violent or combative
23D02W	CHANGING COLOUR - Weapons
23O01	POISONING (without priority symptoms)
23O01I	POISONING (without priority symptoms) - Intentional
23O01V	POISONING (without priority symptoms) - Violent or combative
25A00	Override
25A01	Non-suicidal without 1st party verification (alert and awake)
25A01B	Non-suicidal without 1st party verification (alert and awake) - Both Violent and Weapons
25A01V	Non-suicidal without 1st party verification (alert and awake) - Violent
25A01W	Non-suicidal without 1st party verification (alert and awake) - Weapons
25A02	Suicidal (not threatening) without 1st party verification (alert and awake)
25A02B	Suicidal (not threatening) without 1st party verification (alert and awake) - Both Violent and Weapons
25A02V	Suicidal (not threatening) without 1st party verification (alert and awake) - Violent
25A02W	Suicidal (not threatening) without 1st party verification (alert and awake) - Weapons
25B00	Override
25B00V	Override - Violent
25B01	SERIOUS haemorrhage
25B01B	SERIOUS haemorrhage - Both Violent and Weapons
25B01V	SERIOUS haemorrhage - Violent
25B01W	SERIOUS haemorrhage - Weapons
25B02	Non-SERIOUS or MINOR haemorrhage
25B02B	Non-SERIOUS or MINOR haemorrhage - Both Violent and Weapons
25B02V	Non-SERIOUS or MINOR haemorrhage - Violent
25B02W	Non-SERIOUS or MINOR haemorrhage - Weapons
25B03	THREATENING SUICIDE
25B03B	THREATENING SUICIDE - Both Violent and Weapons
25B03V	THREATENING SUICIDE - Violent
25B03W	THREATENING SUICIDE - Weapons
25B04	Jumper (threatening)
25B04B	Jumper (threatening) - Both Violent and Weapons
25B04V	Jumper (threatening) - Violent
25B04W	Jumper (threatening) - Weapons
25B05	Near hanging, strangulation, or suffocation (alert without difficulty breathing)

25B05B	Near hanging, strangulation, or suffocation (alert without difficulty breathing) - Both Violent and Weapons
25B05V	Near hanging, strangulation, or suffocation (alert without difficulty breathing) - Violent
25B05W	Near hanging, strangulation, or suffocation (alert without difficulty breathing) - Weapons
25B06	Unknown status/Other codes not applicable
25B06B	Unknown status/Other codes not applicable - Both Violent and Weapons
25B06V	Unknown status/Other codes not applicable - Violent
25B06W	Unknown status/Other codes not applicable - Weapons
25D00	Override
25D00B	Override - Both Violent and Weapons
25D00V	Override - Violent
25D00W	Override - Weapons
25D01	Not alert
25D01B	Not alert - Both Violent and Weapons
25D01V	Not alert - Violent
25D01W	Not alert - Weapons
25D02	DANGEROUS haemorrhage
25D02B	DANGEROUS haemorrhage - Both Violent and Weapons
25D02V	DANGEROUS haemorrhage - Violent
25D02W	DANGEROUS haemorrhage - Weapons
25D03	Near hanging, strangulation, or suffocation (alert with difficulty breathing)
25D03B	Near hanging, strangulation, or suffocation (alert with difficulty breathing) - Both Violent and Weapons
25D03V	Near hanging, strangulation, or suffocation (alert with difficulty breathing) - Violent
25D03W	Near hanging, strangulation, or suffocation (alert with difficulty breathing) - Weapons
25O01	Non-suicidal with 1st party verification (alert and awake)
25O01V	Non-suicidal with 1st party verification (alert and awake) - Violent
25O01W	Non-suicidal with 1st party verification (alert and awake) - Weapons
25O02	Suicidal (not threatening) with 1st party verification (alert and awake)
25O02V	Suicidal (not threatening) with 1st party verification (alert and awake) - Violent

Emergency department

- An EDDS attendance recorded as self-harm (value 13 in attendance group) / accidents (method of injury=self)/ or *psychiatric* / *Psychological conditions* diagnosis code (21Z)⁸.

Emergency admission

- All emergency admissions in PEDW with a psychiatric consultancy code during the person spell, or an ICD-10 diagnosis code referring to a mental or behavioural disorder (Chapter F), undetermined intent (Y10-Y34), or self-harm (X60-X84) within the first three codes of the first episode of the person spell.

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