

Adversity profiles of children receiving care and support from social services:

A Latent-class analysis of school-aged children in Wales

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Abstract

Background: Children receive care and support from social services due to risk of harm or impeded development, or because of disability. This study aimed to identify typologies of adversity experienced by children receiving care and support from social services, and to explore how typologies differ by sociodemographic characteristics.

Methods: A cross-sectional study of 'Children Receiving Care and Support' ($N = 12,792$) during 2017/18 in Wales, UK. We sought to: 1) examine the prevalence of household adversities experienced by children in receipt of care and support from social services; 2) identify typologies of household adversities; and 3) explore how typologies of household adversities differ by family characteristics (demographics, measures of social disadvantage, perinatal and care factors).

Results: We found evidence for multiple risk factor constellations. The 4-class solution suggested four distinct classes of adversities: child disability (50.0%), low adversities (20.3%), family poor health (6.7%), and multiple risks (23.0%). Children in the 'multiple risk' class were significantly more likely to be younger, more deprived and be 'looked after' by the local authority compared to those in the 'low adversities' class.

Conclusions: Given the presence of different constellations of household adversities, policies and interventions which address multiple risk factors simultaneously may be more effective and have longer-lasting benefits.

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Adverse childhood experiences (ACEs) represent early and sometimes chronic stressors, which can interfere with the development of healthy neural, immune and hormonal systems, as well as problematic psychological coping strategies, for a review see (Sheffler, Stanley, & Sachs-Ericsson, 2020). Numerous studies show a strong association between ‘adverse childhood experiences’ and poorer physical, social, mental health and educational outcomes during childhood (Evans et al., 2019; Felitti et al., 1998; Lowthian et al., 2021; Oh et al., 2018; Paranjothy et al., 2018) and later life (Hughes et al., 2017; Hughes et al., 2021; Nelson, Bhutta, Burke Harris, Danese, & Samara, 2020). Although the direction and nature of causality remains debated, studies reveal amplified rates of adversities for children who have experienced care (Lester, Khatwa, & Sutcliffe, 2020; Turney & Wildeman, 2017), or been adopted from care (Anthony, Paine, & Shelton, 2019). Recent research showed that many children who receive care and support from social services have complex histories of exposure to adversity (Conners-Burrow et al., 2013), and requiring care and support even briefly, is associated with substantially poorer educational outcomes (Berridge et al., 2020).

In Wales, where this study is based, for the year 2020, 2.6% of children were in receipt of care and support from social services (Welsh Government, 2021b), with similar rates (3.2%) classified as ‘in need’ in England (UK Government, 2021). The primary reason for children receiving care and support from social services is the risk of, or experience of, abuse or neglect, or because of family dysfunction. In line with the majority of countries, social services in the UK have the legal power to remove children from their parental home if there is a significant risk of harm that cannot be mitigated by providing support. Of the

16,580 children receiving care and support in Wales in March 2020, 6,935 (41.8%) were ‘looked after’ by local authorities and 2,310 (13.9%) were on the Child Protection Register i.e., identified as being at significant risk of harm.

In the last two decades there has been an exponential increase in studies investigating adversity from a cumulative risk approach, as well as examining the constellation of adversities (Barboza, 2018). Some constellations (such as poverty and parental mental illness) have been shown to be associated with poorer outcomes (Lanier, Maguire-Jack, Lombardi, Frey, & Rose, 2018). Whilst a number of studies have investigated the comorbidity of adversities experienced by children in out-of-home care (R. Anthony, Paine, Westlake, Lowthian, & Shelton, 2020; Baldwin et al., 2019; Keller, Cusick, & Courtney, 2007; Pears, Kim, & Fisher, 2008; Petrenko, Friend, Garrido, Taussig, & Culhane, 2012; Warmingham, Handley, Rogosch, Manly, & Cicchetti, 2019), the wider group of children who receive care and support from social services for a range of reasons have received very little attention. Examining household adversities experienced by the wider group of children in receipt of care and support from social services can help with planning services based on families’ needs, and inform tailoring of existing interventions and future intervention development to help lessen the impact of early and prolonged stressful experiences.

The present study aimed to: 1) examine the prevalence of household adversities experienced by children in receipt of care and support from social services; 2) explore typologies of adversities; and 3) examine how typologies differ by family characteristics (including demographics, measures of social disadvantage, perinatal and care factors).

Method

Design and Data sources

Aims one and two use secondary data from the ‘Children Receiving Care and Support’ Census (CRCS), an administrative dataset of children (under the age of 18) in Wales UK identified as requiring care and support. This includes all children with a “care and support plan” in place for 3 months or more on the 31st March each year. The CRCS includes all children receiving support financed from children’s social services budgets (see Figure 1). We accessed CRCS datasets through the Secure Anonymised Information Linkage databank at X University, UK (Ford et al., 2009). For aim three, which explored how typologies of adversities differ by family characteristics, the CRCS census was anonymously linked to the Wales Electronic Cohort for Children (WECC) (Hyatt, Rodgers, Paranjothy, Fone, & Lyons, 2011). The WECC has records for approximately one million children born between 1990 and 2012, for a child or mother resident in Wales with information held in the Wales Demographic Service Dataset (a Wales-wide administrative register for all individuals with a general practitioner [GP]) (Paranjothy, 2018). WECC is derived by record-linking deidentified routinely collected health and social data sets using a unique Anonymised Linking Field (ALF) for each individual (Lyons et al., 2009). *INSERT ETHICAL APPROVAL AND PERMISSIONS STATEMENT IF ACCEPTED.*

Variables

To examine the prevalence and typologies of adversities experienced by our population of interest, we included 7 binary variables recorded in the CRCS census to closely match the original ‘Adverse Childhood Experiences’ (Felitti et al., 1998). These were: indicators of the child experiencing or being at risk of experiencing abuse (on the CPR register); domestic abuse; parental mental ill health (any mental health problems diagnosed by a medical practitioner; self-reported problems; and parents receiving services from the

Community Mental Health Team); and parental substance abuse. Additional adversities included: the child having a recorded disability, as a recent report suggested that the ‘Adverse Childhood Experiences’ framework ignores other sources of adversity, including disability (Welsh Government, 2021a); and parental learning difficulties, associated with lower child wellbeing (Neil, Morciano, Young, & Hartley, 2020). See table 1 for adversity definitions. Family characteristic variables from the WECC include child age at the start of the census period, gender, congenital anomalies, child entitlement to free school meals during key stage one and maternal age. See table 2 for information.

Study sample

To examine the prevalence and typologies of adversity, all children included in the most recent (2017/18) CRCS census available within the Secure Anonymised Information Linkage databank were included ($N = 12,792$). Our sample includes children who receive ‘short breaks’ i.e. the provision of day, evening, overnight and weekend activities for the child or young person. This group of children are often excluded from studies of children ‘looked after’, however, as this study is interested in the wider category of children receiving any care and support, we took the decision not to exclude them. Aim three (to explore how typologies differ by family characteristics), which linked the CRCS dataset to WECC, included 9,960 participants, as 22.1% ($n = 2,832$) were not able to be matched with an ALF. See online figure 2 sample details.

Statistical Analysis

Stata version 16.0 was used to conduct descriptive statistics and perform latent class analysis using gsem (StataCorp, 2019). A three-step approach was used to conduct the analysis. First, we tested the fit of two to five latent classes by comparing fit indices (Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC) and entropy values across number of classes. Lower AIC and BIC values indicate a better fit, whereas an entropy value

closer to 1 indicates a clearer delineation of classes. Second, once the optimal solution had been identified, participants were classified into latent classes according to the maximum posterior probability. Third, multinomial logistic regression predicted membership in latent classes relative to the ‘lower risk of measured adversities’ class (reference group) based on socio-demographic, perinatal and care variables.

Results

Aim 1) Prevalence of adversities

Adversities experienced by children in the CRCS are reported in Table 1. Within this sample 13.3% ($n = 1,197$) were on the child protection register (CPR) and 37.4% ($n = 3,382$) were currently ‘looked after’ by the local authority. Over a quarter (29.0%, $n = 2,623$) were recorded as being disabled. In terms of household adversities, 26.2% ($n = 2,362$) lived with a parent who abused substances, 30.8% ($n = 2,780$) lived with a parent with mental health problems, 23.2% ($n = 2,091$) lived in a home where there was domestic abuse, 12.2% ($n = 1,101$) lived with a parent with physical health problems, and 6.2% ($n = 558$) had parents with a learning disability. With regard to abuse and neglect, 13.3% ($n = 1,197$) were on the Child Protection Register. A small number of children were recorded as seeking asylum (0.1%, $n = 11$), this variable was excluded from the analysis as numbers were too small.

Aim 2: Typologies of adversity

The four-class solution had the lowest AIC and BIC values, as well as the highest entropy levels (See table 3), based on these results we chose the model with four classes. The 4-class solution suggested four distinct classes of adversities, which we named: child disability (50.0%), low adversity (20.3%), family poor health (6.7%), and multiple adversities (23.0%). See figure 1 for item response probabilities and table 4 for item response probabilities and cumulative number of adversities across class membership.

Class One: Child disability

This class made up of half the sample (50.0%, $n = 6,402$). It was characterized by the highest probabilities of the child experiencing disability and low probability of any other measured adversities. Most of the disabled children, were assigned to this class ($n = 2,454$, 38.33%); 5.3% ($n = 339$) lived with a parent with physical health issues. This class experienced the lowest level of cumulative adversities, $M = 0.63$ ($SD = 0.68$), ranging from experiencing zero to three.

Class Two: low adversity

This class formed 20.3% ($n = 2,592$) of the sample and was made up of children with low probabilities of exposure to adversities, compared to other classes. The most prominent adversities were substance misuse, nearly 1 in 4 of the children in this class (18.36%, $n = 476$) lived with a parent with a substance misuse problem, 22.38% ($n = 580$) lived with a parent with mental health issues, and 16.28% ($n = 422$) lived with domestic abuse. This class has the highest proportion of children on the CPR register (25.93%; $n = 672$). On average, this class experienced one adversity ($M = 1.16$, $SD = 0.37$, Range 1 to 3).

Class Three: Family poor health

This smallest class, which formed just 6.7% ($n = 858$) of the sample were distinguished by child *and* parent poor health. Most of the children (73.66%, $n = 632$) experienced a parent with mental health problems. Over half the sample experienced a parent with physical health problems (56.18%, $n = 482$) and 41.14% ($n = 353$) were disabled themselves. Around a third (30.54%, $n = 262$) experienced a parent with a learning disability, 13.05% ($n = 112$) experienced parental substance misuse, 19% ($n = 163$) experienced domestic abuse and 8.51% ($n = 73$) were on the CPR. This class experienced the highest level of cumulative adversities, $M = 2.96$ ($SD = 0.76$), ranging from two through to 7. In contrast to class 1 “child disability”, which had high proportion of disabled children but low risk of

other factors, this class is characterised by a high proportion of child disability alongside other adversities mostly related to parental health.

Class Four: Multiple adversities

This class formed 23.0% ($n = 2,940$) of the sample. The multiple adversities class was characterised of children with high probabilities of living with parents who misused substances, had mental health problems and experienced domestic abuse. Within this group 64.70% ($n = 1,902$) lived with a parent experiencing substance misuse problems, over half (54.05%, $n = 1,589$) lived with a parent with mental health issues and 53.98% ($n = 1,587$) experienced domestic abuse. Some (14.01%, $n = 412$) experienced a parent with a physical health condition and 4.97% ($n = 146$) had a parent with a learning disability. This class had the second highest proportion of children on the child protection register (15.85%, $n = 466$). A small proportion of children (3.81%, $n = 112$) were disabled. This class also experienced high levels of cumulative adversities, $M = 2.86$ ($SD = 0.87$), ranging from experiencing two adversities through to 6.

Aim 3: How typologies of adversities differ by family characteristics

Table 2 shows the demographic details of children included in this sample. The mean age was 11.54 years ($SD 0.33$). Online Table 1 shows the sociodemographic, perinatal and care descriptives, by class membership. Table 5 shows the relative risk ratios (and 95% confidence intervals) from the multinomial logistic regression models.

Children in class one ‘child disability’ were significantly more likely to be older, a boy, have major and minor congenital anomalies, and have a mother aged over 18 at birth, compared to class two, the ‘low adversity’ reference group. This class were also less likely to receive free school meals and less likely to be ‘looked after’ by the local authority. Children in class 3 ‘family poor health’ were significantly more likely to be older children, a boy, to have a mother aged over 18 at birth, and to have major congenital anomalies compared to the

low adversity reference class. They were also more likely to be ‘looked after’ by the local authority. Children in group 4, the ‘multiple adversities’ class were younger, more likely to experience deprivation (i.e. receive free school meals) and be ‘looked after’ by the local authority compared to the ‘lower adversity’ reference group.

Discussion

This study provides an insight into the social conditions experienced by families in receipt of social care and support in Wales. A recent review (Skinner et al., 2021) and research study (Hood et al., 2021) have questioned the evidence base for the association between child maltreatment and co-occurring domestic abuse, parental substance misuse and mental health problems. The (Hood et al., 2021) study created demand typologies in social care using latent class analysis to explore child episodes where a social services assessment was undertaken – i.e., a wider group than children receiving care and support - in six English local authorities (Hood et al., 2021). They found evidence for seven classes including three single factor classes and four classes made up of combinations of stressors including child maltreatment, child/parent disability, mental health, domestic violence and substance abuse. Our study supports these findings that family circumstances are complex and go beyond simply the co-occurrence of domestic violence, substance abuse and parent mental health, and international studies using latent class analysis to examine risk profiles (Browne, Wade, Prime, & Jenkins, 2018). However, the high probability of co-existence of these three adversities in one of our classes, which comprised 23% of the sample, does suggest the importance of this scenario for a minority of children who receive care and support in Wales – a minority who are more likely to be looked after by their local authority. At the very least, this finding suggests that social care practice continues to acknowledge this kind of family situation.

The presence of a ‘family poor health’ class reflects previous research which showed that in addition to elevated exposure to early adversity, children involved with child welfare were also more likely to experience complex health challenges, including physical, developmental and mental health problems (Rienks, Phillips, McCrae, Bender, & Brown, 2017; Stein et al., 2013). Additionally, given that our study included children who receive ‘short breaks’, i.e., the provision of day, evening, overnight and weekend activities’, and we included child disability as an adversity variable, it is not surprising that there was a large class of children who were disabled alongside very low probabilities of experiencing any other adversities. It is important to note the size of this group and plan the resources to support these families. The presence of a low adversity class is interesting and perhaps contrary to expectations. One possible interpretation is that the system is over-intervening. Rates of children looked after have been rising since the early 1990s (Thomas, 2018) and the cumulative incidence of referral to children’s services is extremely high. Jay et al.’s (Jay, (in press)) research using administrative data found that 25% of all children in England were classed as ‘in need’ between birth and age 16, with 43% referred to social care over the same period. It is, however, also possible that our dataset does not capture a wide enough array of risk factors to fully understand their experiences and the reasons for receiving care and support. Future research should explore this aspect further to understand why these families are receiving care and support and the type of support received.

Extensive research has documented the relationship between deprivation and social services involvement; children living in low-income families and deprived neighbourhoods are disproportionately represented within the care system (Elliott, 2020; Rebbe, Nurius, Ahrens, & Courtney, 2017; Turney & Wildeman, 2017). The results from our study suggest that deprivation is relevant not just to child protection cases but to the wider category of children who need care and support from social services. Half of children in our sample were

eligible for free school meals (compared to 17% in the Welsh population (Welsh Government, 2018)) and this eligibility was especially concentrated in the family poor health and the multiple exposures classes. These findings align with previous studies which found that poverty was strongly related to both individual adversities and specific clustering of adversities (Lacey, Howe, Kelly-Irving, Bartley, & Kelly, 2022). These findings also speak of the importance of joining up children's and adults' social services, so that support for parents with (e.g.) mental health problems or substance misuse is better integrated with intervention that is focused on child welfare, and the experience and expertise of practitioners with these different specialisms is pooled. Such integration has been attempted in Wales in Integrated Family Support Services which tackle parental substance misuse where children are at high risk of becoming looked after but not elsewhere in the system. Better joint working of social and health services is also very much needed to respond to complex child and family needs (Afzelius, Östman, Råstam, & Priebe, 2018; Van Dongen, Sabbe, & Glazemakers, 2018). There are institutional barriers, but if these could be overcome, the benefits could be considerable (Children's commissioner for Wales, 2020).

Strengths and Limitations

The use of routine data has excellent opportunities, including large sample sizes and the ability to consider aspects such as individual-level deprivation. Whilst latent class analysis has been highlighted as a method for social workers to understand in order to best study prevention (Lippold, Kainz, & Sabatine, 2017), the typologies created are limited by the available data (Petersen, Qualter, & Humphrey, 2019), which only included household adversities recorded within the CRCS census and will inevitably miss information about a child's life (Farmer & Dance, 2016). Studies have found that including wider ACEs at the community level such as poverty, neighbourhood cohesion and experiencing discrimination can add to our understanding of the impact of chronic stressors (Cronholm et al., 2015; Lacey

et al., 2022). In addition, a three-step rather than a one-step approach was used for the analysis due to software restrictions which can lead to biased estimates (Bolck, Croon, & Hagnaars, 2004).

Within the CRCS census the eligibility criterion that children must have a care and support plan on the census date of 31 March (of any given year) that must have been in place for the previous three months means that the total number of children included in the CRCS Census is less than the actual number of children receiving care and support. Furthermore, the data available in SAIL contain only those children with a Unique Pupil Number (UPN) to allow anonymous matching of children with the National Pupil Database (NPD). Therefore, data are missing for children who have not yet entered school. This is important as children on the child protection register were generally younger than other children receiving care and support, with 37 per cent aged under 5 (Welsh Government, 2019), thus some variables may be underestimated by the absence of the youngest children.

Conclusion

Given the association between risk of experiencing clusters of adversity and deprivation, we suggest that preventing the need for social services interventions in the first place through upstream actions to address common causes of underlying risk factors, such as child poverty, is needed. Alongside this, interventions which match appropriate care and support to the specific constellation of family-level factors in unison may bolster their effectiveness, and have more substantial and long-lasting benefits (Fals-Stewart, Fincham, & Kelley, 2004).

Key Messages

1. Family circumstances are complex and go beyond simply the co-occurrence of domestic violence, substance abuse and parent mental health problems
2. The presence of a group of children classified as 'low adversity' may suggest the system is over-intervening
3. Half the children in our sample experienced deprivation, and this was more concentrated for children experiencing multiple adversities
4. Preventing the need for social services interventions through upstream actions to address common causes of underlying risk factors, such as child poverty, is needed.
5. Interventions which match appropriate care and support to the specific constellation of family-level factors in unison may bolster their effectiveness, and have more substantial and long-lasting benefits

Tables

Table 1

Key variables as defined in The Children Receiving Care and Support' Census

Variable type/name	Description
Potential adversities	
Asylum seeker	A true/false field to indicate whether or not a child has been an asylum-seeking child i.e. an application has been made for protection on the basis of the Refugee Convention or Article 3 of the European Convention on Human Rights and who is awaiting a decision on that application at any point during the period 1 January to 31 March within the year of the return.
Child disability	A True/False field indicating whether the child was disabled on 31 March 20XX. For the purposes of this item, the definition of disabled follows that of Section 6 of the Equality Act 2010, which states that: "A person (P) has a disability if (a) P has a physical or mental impairment AND (b) the impairment has a substantial and long-term adverse effect on P's ability to carry out normal day-to-day activities." Disability type includes: autistic spectrum disorder; continence; ability to lift, carry or otherwise move everyday objects; manual dexterity; memory; mobility; perception of the risk of physical danger; physical co-ordination; speech, hearing and eyesight.
Domestic abuse	A True/False field indicating whether domestic abuse, was present on 31 March 20XX. Counted as true if one or more of the child's parents or carers has domestic abuse problems. Domestic abuse is physical, sexual, psychological or financial intimidation, violence or threats of violence that take place within an intimate or family-type relationship and that form a pattern of coercive and controlling behaviour. This can include forced marriage and so-called 'honour crimes'.
Parental learning disability	A True/False field indicating whether the parental <i>learning disability</i> was present on 31 March 20XX. Counted as true if one or more of the child's parents or carers has domestic abuse problems. Counted as true if one or more of the parents or carers has an impairment of intellectual function that significantly affects their development and leads to difficulties in understanding and using information, learning new skills and managing to live independently. 1 = True; 0 = False.
Parental mental ill health	A True/False field indicating whether the parental <i>mental ill health</i> was present on 31 March 20XX. Counted as true if one or more of the parents or carers has a mental health problem. Include mental health problems diagnosed by a medical practitioner; self reported problems; and parents receiving services from the Community Mental Health Team. Include depression; self harming; and eating disorders. Exclude substance misuse, and Autistic Spectrum disorders and other learning disabilities.
Parental physical ill health	A True/False field indicating whether the parental <i>physical ill health</i> were present on 31 March 20XX. Counted as true if one or more of the child's

parents or carers has physical health problems that impair their ability to care for the child.

Parental
substance/alcohol
misuse

A True/False field indicating whether the *substance/alcohol misuse* were present on 31 March 20XX. Counted as true if one or more of the parents or carers has a substance misuse problem i.e. 'intoxication by – or regular excessive consumption of and/or dependence on – psychoactive substances, leading to social, psychological, physical or legal problems. It includes problematic use of both legal and illegal drugs (including alcohol when used in combination with other substances). In this guidance document, the term 'drug' is used to refer to any psychotropic substance, including illegal drugs, illicit use of prescription drugs and volatile substances.

Table 2.

Descriptive Statistics

Sociodemographic variables (N = 9,960)		
Sex	N	%
Females	3,648	36.6%
Males	4,667	46.9%
Missing data	1,645	16.5%
Age (range 5 to 18)	M =11.54	SD = .033
Age category (developmental period)		
Early childhood (5 to 8)	2,670	26.8%
Middle childhood (9 to 12)	3,519	35.3%
Adolescence (13 to 18)	3,771	37.9%
Missing	8	0.1%
Congenital anomalies		
None	8,770	88.1%
Major	1,037	10.4%
Minor	153	1.5%
Maternal age at birth		
<18	505	6.1%
18+	7,790	78.2%
Missing data	1,665	16.7%
Free school meal eligibility during KS1		
No	4,339	43.6%
Yes	4,872	48.9%
missing data	749	7.5%
Childhood adversities (during census period) N = 12,792		
Disability	2,623	29.0%
Seeking asylum	11	0.1%
Parental substance misuse	2,362	26.2%
Parental learning disabilities	558	6.2%
Parental mental ill health	2,780	30.8%
Parental physical ill health	1,101	12.2%
Domestic abuse	2,091	23.2%
Child protection register (CPR)	1,197	13.3%
'Looked after' by local authority	3,382	37.4%

Table 3.

Fit Indices for Latent Class Analysis of current potential life stressors

	AIC*	BIC	Entropy value
1-Class	85235.97	85288.16	-
2-Class	79680.88	79792.73	0.914
3-Class	79007.33	79178.83	0.898
4-Class	78558.76	78789.91	0.963
5-Class	60460.31	60734.15	0.896

Note - *AIC = Akaike information criterion, BIC = Bayesian information criterion

Table 4.

Item response probabilities, cumulative number of adversities, and class membership proportions for the 4-class solution

	Class 1 ‘child disability’	Class 2 ‘low adversities’	Class 3 ‘Family poor health’	Class 4 ‘Multiple adversities’
Child disability	0.57	0.02	0.37	0.06
Parental substance misuse	0.02	0.18	0.22	0.82
Parental learning disabilities	0.04	0.01	0.23	0.07
Parental mental ill health	0.08	0.18	0.78	0.68
Parental physical ill health	0.07	0.03	0.50	0.15
Parental domestic abuse	0.02	0.20	0.21	0.70
Child protection register	0.01	0.25	0.12	0.23
Cumulative number of adversities (Mean (SD), range)	0.63 (0.68) Range 0 to 3	1.16 (0.37) Range 1 to 3	2.96 (0.76) Range 2 to 7	2.86 (0.87) Range 2 to 6
Class proportions	50.0% (n = 6,402)	20.3% (n = 2,592)	6.7% (n = 858)	23.0% (n = 2,940)

*Note – item response probabilities over 0.3 have been bolded to illustrate the adversities most pertinent to each class.

Table 5.

Multinomial logistic regression results of sociodemographic, perinatal and care predictors of latent class membership (N = 7,784)

	Group 1: Low risk and child disability			Group 3: Family poor health			Group 4: ‘Multiple exposures’		
Family characteristics	RRR (SE)	95% CI	<i>p</i>	RRR (SE)	95% CI	<i>p</i>	RRR (SE)	95% CI	<i>p</i>
Child age									
Middle childhood	1.38 (0.10)	1.20 – 1.60	0.000	1.58 (0.20)	1.23 – 2.03	0.000	1.02 (0.09)	0.87 – 1.21	0.780
Adolescence	1.84 (0.14)	1.58 - 2.15	0.000	1.90 (0.35)	1.46 – 2.46	0.000	0.88 (0.08)	0.73 – 1.05	0.149
Gender - male	1.39 (0.08)	1.23 – 1.57	0.000	1.38 (0.14)	1.13 – 1.69	0.002	1.07 (0.08)	0.93 – 1.24	0.321
Free school meals	0.52 (0.03)	0.46 – 0.59	0.000	1.08 (0.11)	0.88 – 1.33	0.467	1.22 (0.09)	1.06 – 1.42	0.007
Maternal age (18+)	1.47 (0.18)	1.15 – 1.87	0.002	2.01 (0.48)	1.25 – 3.22	0.004	1.01 (0.14)	0.77 – 1.32	0.951
Congenital anomalies									
Major	5.49 (0.83)	4.08 – 7.39	0.000	5.53 (1.06)	3.80 – 8.05	0.000	1.38 (0.26)	0.94 – 2.00	0.097
Minor	2.77 (0.84)	1.53 – 4.50	0.001	1.78 (0.85)	0.70 – 4.52	0.222	1.20 (0.45)	0.58 – 2.49	0.625
Looked after child	1.04 (0.17)	0.72 – 1.39	0.539	1.82 (0.19)	0.03 – 0.09	0.000	2.18 (0.16)	1.88 – 2.52	0.000

Note. Ref class: Class 2 (lower risk group)

References

- Afzelius, M., Östman, M., Råstam, M., & Priebe, G. (2018). Parents in adult psychiatric care and their children: a call for more interagency collaboration with social services and child and adolescent psychiatry. *Nordic Journal of Psychiatry, 72*(1), 31-38. doi:10.1080/08039488.2017.1377287
- Anthony, Paine, & Shelton. (2019). Adverse childhood experiences of children adopted from care: The importance of adoptive parental warmth for future child adjustment. *International Journal of Environmental Research and Public Health, 16*(12), 2212.
- Anthony, R., Paine, A., Westlake, M., Lowthian, E., & Shelton, K. (2020). Patterns of adversity and post-traumatic stress among children adopted from care. *Child Abuse & Neglect, 104*795.
- Baldwin, H., Biehal, N., Cusworth, L., Wade, J., Allgar, V., & Vostanis, P. (2019). Disentangling the effect of out-of-home care on child mental health. *Child Abuse & Neglect, 88*, 189-200. doi:<https://doi.org/10.1016/j.chiabu.2018.11.011>
- Barboza, G. E. (2018). Latent Classes and Cumulative Impacts of Adverse Childhood Experiences. *Child Maltreatment, 23*(2), 111-125. doi:10.1177/1077559517736628
- Berridge, D., Luke, N., Sebba, J., Strand, S., Cartwright, M., Staples, E., . . . O'Higgins, A. (2020). Children in need and children in care: Educational attainment and progress. *University of Bristol, University of Oxford*.
- Bolck, A., Croon, M., & Hagenars, J. (2004). Estimating Latent Structure Models with Categorical Variables: One-Step Versus Three-Step Estimators. *Political Analysis, 12*(1), 3-27. Retrieved from <http://www.jstor.org/stable/25791751>
- Browne, D. T., Wade, M., Prime, H., & Jenkins, J. M. (2018). School readiness amongst urban Canadian families: Risk profiles and family mediation. *Journal of Educational Psychology, 110*, 133-146. doi:10.1037/edu0000202
- Children's commissioner for Wales. (2020). *No Wrong Door: bringing services together to meet children's needs*. Retrieved from Wales, UK: <https://www.childcomwales.org.uk/publications/no-wrong-door-bringing-services-together-to-meet-childrens-needs/>
- Connors-Burrow, N. A., Kramer, T. L., Sigel, B. A., Helpenstill, K., Sievers, C., & McKelvey, L. (2013). Trauma-informed care training in a child welfare system: Moving it to the front line. *Children and Youth Services Review, 35*(11), 1830-1835.
- Cronholm, P. F., Forke, C. M., Wade, R., Bair-Merritt, M. H., Davis, M., Harkins-Schwarz, M., . . . Fein, J. A. (2015). Adverse Childhood Experiences: Expanding the Concept of Adversity. *American Journal of Preventive Medicine, 49*(3), 354-361. doi:<https://doi.org/10.1016/j.amepre.2015.02.001>
- Elliott, M. (2020). Child Welfare Inequalities in a Time of Rising Numbers of Children Entering Out-of-Home Care. *The British Journal of Social Work, 50*(2), 581-597. doi:10.1093/bjsw/bcz154
- Evans, A., Dunstan, F., Fone, D. L., Bandyopadhyay, A., Schofield, B., Demmler, J. C., . . . Paranjothy, S. (2019). The role of health and social factors in education outcome: a record-linked electronic birth cohort analysis. *PLoS One, 14*(8), e0220771.
- Fals-Stewart, W., Fincham, F. D., & Kelley, M. L. (2004). Substance-abusing parents' attitudes toward allowing their custodial children to participate in treatment: a comparison of mothers versus fathers. *Journal of Family Psychology, 18*(4), 666.

- Farmer, E., & Dance, C. (2016). Family Finding and Matching in Adoption: What Helps to Make a Good Match? *British Journal of Social Work*, 46(4), 974-992. doi:10.1093/bjsw/bcv003
- Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., . . . Marks, J. S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults - The adverse childhood experiences (ACE) study. *American Journal of Preventive Medicine*, 14(4), 245-258. doi:10.1016/S0749-3797(98)00017-8
- Ford, D. V., Jones, K. H., Verplancke, J. P., Lyons, R. A., John, G., Brown, G., . . . Leake, K. (2009). The SAIL Databank: Building a national architecture for e-health research and evaluation. *BMC Health Services Research*, 9. doi:10.1186/1472-6963-9-157
- Hood, R., Goldacre, A., Webb, C., Bywaters, P., Gorin, S., & Clements, K. (2021). Beyond the Toxic Trio: Exploring Demand Typologies in Children's Social Care. *The British Journal of Social Work*. doi:10.1093/bjsw/bcab058
- Hughes, Bellis, M. A., Hardcastle, K. A., Sethi, D., Butchart, A., Mikton, C., . . . Dunne, M. P. (2017). The effect of multiple adverse childhood experiences on health: a systematic review and meta-analysis. *Lancet Public Health*, 2(8), E356-E366. Retrieved from <Go to ISI>://WOS:000425587900011
- Hughes, Ford, K., Bellis, M. A., Glendinning, F., Harrison, E., & Passmore, J. (2021). Health and financial costs of adverse childhood experiences in 28 European countries: a systematic review and meta-analysis. *The Lancet Public Health*, 6(11), e848-e857. doi:[https://doi.org/10.1016/S2468-2667\(21\)00232-2](https://doi.org/10.1016/S2468-2667(21)00232-2)
- Hyatt, M., Rodgers, S. E., Paranjothy, S., Fone, D., & Lyons, R. A. (2011). The wales electronic cohort for children (WECC) study. *Archives of Disease in Childhood - Fetal and Neonatal Edition*, 96(Suppl 1), Fa18-Fa18. doi:10.1136/archdischild.2011.300164.6
- Jay, m. A., Stavola, B., Dorsett, R., Thomson, D., Gilbert, R. . ((in press)). Model estimates of cumulative incidence of children in need status and referral to children's social care from incomplete administrative data (pre-print). *OSFPREPRINTS*. Retrieved from <https://osf.io/dvgpf/>
- Keller, T. E., Cusick, G. R., & Courtney, M. E. (2007). Approaching the transition to adulthood: Distinctive profiles of adolescents aging out of the child welfare system. *Social Service Review*, 81(3), 453-484.
- Lacey, R. E., Howe, L. D., Kelly-Irving, M., Bartley, M., & Kelly, Y. (2022). The Clustering of Adverse Childhood Experiences in the Avon Longitudinal Study of Parents and Children: Are Gender and Poverty Important? *Journal of Interpersonal Violence*, 37(5-6), 2218-2241. doi:10.1177/0886260520935096
- Lanier, P., Maguire-Jack, K., Lombardi, B., Frey, J., & Rose, R. A. (2018). Adverse Childhood Experiences and Child Health Outcomes: Comparing Cumulative Risk and Latent Class Approaches. *Matern Child Health J*, 22(3), 288-297. doi:10.1007/s10995-017-2365-1
- Lester, S., Khatwa, M., & Sutcliffe, K. (2020). Service needs of young people affected by adverse childhood experiences (ACEs): A systematic review of UK qualitative evidence. *Children and Youth Services Review*, 118, 105429. doi:<https://doi.org/10.1016/j.childyouth.2020.105429>
- Lippold, M. A., Kainz, K., & Sabatine, E. (2017). Using Advanced Quantitative Methods to Study the Prevention of Social Problems. *The British Journal of Social Work*, 47(8), 2238-2255. doi:10.1093/bjsw/bcw172
- Lowthian, E., Anthony, R., Evans, A., Daniel, R., Long, S., Bandyopadhyay, A., . . . Paranjothy, S. (2021). Adverse childhood experiences and child mental health: an

- electronic birth cohort study. *BMC Medicine*, 19(1), 172. doi:10.1186/s12916-021-02045-x
- Lyons, R. A., Jones, K. H., John, G., Brooks, C. J., Verplancke, J. P., Ford, D. V., . . . Leake, K. (2009). The SAIL databank: linking multiple health and social care datasets. *BMC Med Inform Decis Mak*, 9, 3. doi:10.1186/1472-6947-9-3
- Neil, E., Morciano, M., Young, J., & Hartley, L. (2020). Exploring links between early adversities and later outcomes for children adopted from care: Implications for planning post adoption support. *Developmental Child Welfare*, 2(1), 52-71. doi:10.1177/2516103220908043
- Nelson, C. A., Bhutta, Z. A., Burke Harris, N., Danese, A., & Samara, M. (2020). Adversity in childhood is linked to mental and physical health throughout life. *BMJ*, 371, m3048. doi:10.1136/bmj.m3048
- Oh, D. L., Jerman, P., Silverio Marques, S., Koita, K., Purewal Boparai, S. K., Burke Harris, N., & Bucci, M. (2018). Systematic review of pediatric health outcomes associated with childhood adversity. *BMC Pediatr*, 18(1), 83. doi:10.1186/s12887-018-1037-7
- Paranjothy, S., Evans, A., Bandyopadhyay, A., Fone, D., Schofield, B., John, A., . . . Long, S. J. (2018). Risk of emergency hospital admission in children associated with mental disorders and alcohol misuse in the household: an electronic birth cohort study. *The Lancet Public Health*, 3(6), e279-e288.
- Pears, K. C., Kim, H. K., & Fisher, P. A. (2008). Psychosocial and cognitive functioning of children with specific profiles of maltreatment. *Child Abuse & Neglect*, 32(10), 958-971.
- Petersen, K. J., Qualter, P., & Humphrey, N. (2019). The Application of Latent Class Analysis for Investigating Population Child Mental Health: A Systematic Review. *Frontiers in Psychology*, 10. doi:10.3389/fpsyg.2019.01214
- Petrenko, C. L., Friend, A., Garrido, E. F., Taussig, H. N., & Culhane, S. E. (2012). Does subtype matter? Assessing the effects of maltreatment on functioning in preadolescent youth in out-of-home care. *Child Abuse & Neglect*, 36(9), 633-644.
- Rebbe, R., Nurius, P. S., Ahrens, K. R., & Courtney, M. E. (2017). Adverse childhood experiences among youth aging out of foster care: A latent class analysis. *Children and Youth Services Review*, 74, 108-116. doi:10.1016/j.chilyouth.2017.02.004
- Rienks, S., Phillips, J., McCrae, J., Bender, K., & Brown, S. (2017). Complex health concerns among child welfare populations and the benefit of pediatric medical homes. *Child Abuse Negl*, 65, 212-225. doi:10.1016/j.chiabu.2017.01.021
- Sheffler, J. L., Stanley, I., & Sachs-Ericsson, N. (2020). Chapter 4 - ACEs and mental health outcomes. In G. J. G. Asmundson & T. O. Afifi (Eds.), *Adverse Childhood Experiences* (pp. 47-69): Academic Press.
- Skinner, G. C. M., Bywaters, P. W. B., Bilson, A., Duschinsky, R., Clements, K., & Hutchinson, D. (2021). The ‘toxic trio’ (domestic violence, substance misuse and mental ill-health): How good is the evidence base? *Children and Youth Services Review*, 120, 105678. doi:<https://doi.org/10.1016/j.chilyouth.2020.105678>
- StataCorp. (2019). Stata Statistical Software: Release 16. . College Station, TX: StataCorp LLC.
- Stein, R. E., Hurlburt, M. S., Heneghan, A. M., Zhang, J., Rolls-Reutz, J., Silver, E. J., . . . Horwitz, S. M. (2013). Chronic conditions among children investigated by child welfare: a national sample. *Pediatrics*, 131(3), 455-462. doi:10.1542/peds.2012-1774
- Thomas, C. (2018). The Care Crisis Review: Factors contributing to national increases in numbers of looked after children and applications for care orders. *London: Family Rights Group*.

- Turney, K., & Wildeman, C. (2017). Adverse childhood experiences among children placed in and adopted from foster care: Evidence from a nationally representative survey. *Child Abuse & Neglect, 64*, 117-129.
- UK Government. (2021). Characteristics of children in need. Retrieved from <https://explore-education-statistics.service.gov.uk/find-statistics/characteristics-of-children-in-need>
- Van Dongen, T., Sabbe, B., & Glazemakers, I. (2018). A protocol for interagency collaboration and family participation: Practitioners' perspectives on the Client Network Consultation. *Journal of Interprofessional Care, 32*(1), 14-23. doi:10.1080/13561820.2017.1379961
- Warmingham, J. M., Handley, E. D., Rogosch, F. A., Manly, J. T., & Cicchetti, D. (2019). Identifying maltreatment subgroups with patterns of maltreatment subtype and chronicity: A latent class analysis approach. *Child Abuse & Neglect, 87*, 28-39.
- Welsh Government. (2018). *School Census Results, 2018*. Cardiff, UK: StatsWales Retrieved from <https://gov.wales/sites/default/files/statistics-and-research/2018-12/180725-school-census-results-2018-en.pdf>
- Welsh Government. (2019). *Wales Children Receiving Care and Support Census, 2018 (Experimental Statistics)*. Welsh Government, Retrieved from https://gov.wales/sites/default/files/statistics-and-research/2019-02/wales-children-receiving-care-and-support-census-2018-experimental-statistics_1.pdf
- Welsh Government. (2021a). *Review of Adverse Childhood Experiences (ACE) policy: report*, . Welsh Government, Retrieved from <https://gov.wales/review-adverse-childhood-experiences-ace-policy-report-html>
- Welsh Government. (2021b). *Wales Children Receiving Care and Support Census*. Welsh Government, Retrieved from <https://gov.wales/wales-children-receiving-care-and-support-census>

Appendices

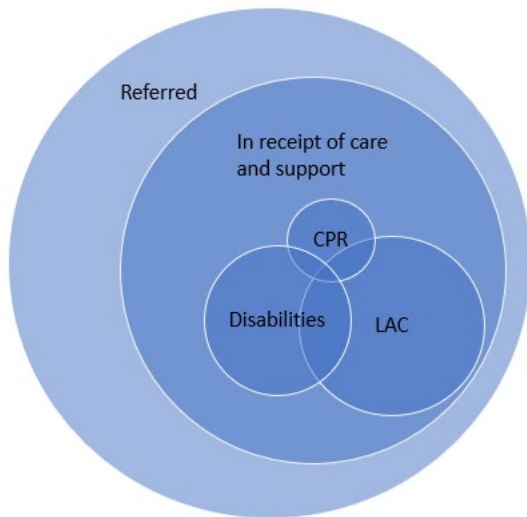
Online table 1

Sociodemographic, perinatal and care descriptives, by class membership

	Class 1 ‘Low risk and child disability’	Class 2 ‘Lower risk of measured adversities’	Class 3 ‘Family poor health’	Class 4 ‘Multiple risk’
Gender				
Female	1,772 (40.6%)	774 (48.9%)	242 (42.2%)	860 (48.0%)
Male	2,594 (59.4%)	809 (51.1%)	332 (57.8%)	932 (52.0%)
Age category				
Early childhood	1,232 (23.7%)	603 (31.8%)	149 (21.2%)	686 (31.6%)
Middle childhood	1,796 (34.6%)	676 (35.7%)	263 (37.5%)	784 (36.1%)
Adolescence	2,162 (41.7%)	616 (32.5%)	290 (41.3%)	703 (32.4%)
Free school meals				
No	2,709 (56.4%)	683 (38.9%)	256 (40.0%)	691 (34.4%)
Yes	2,093 (43.6%)	1,075 (61.2%)	384 (60.0%)	1,320 (65.6%)
Maternal age				
Under 18	225 (5.2%)	118 (7.5%)	25 (4.4%)	137 (7.7%)
18+	4,129 (94.8%)	1,461 (92.5%)	548 (95.6%)	1,652 (92.3%)
Birth abnormalities				
None	4,282 (82.5%)	1,822 (96.2%)	591 (84.2%)	2,075 (95.5%)
Minor	105 (2.0%)	14 (0.7%)	13 (1.9%)	21 (1.0%)
Major	803 (15.5%)	59 (3.1%)	98 (14.0%)	77 (3.5%)
Child 'looked after'				
No	3,447 (66.4%)	1,254 (66.2%)	379 (54.0%)	1,052 (48.4%)
Yes	1,743 (33.6%)	641 (33.8%)	323 (46.0%)	1,121 (51.6%)

Online Figure 1.

Venn diagram to represent children included in the 'Children in Receipt of Care and Support' census dataset



Online Figure 2.

Study sample

