

A population level study into health vulnerabilities of mothers and fathers involved in public law care proceedings in Wales, UK between 2011 and 2019

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Abstract

Introduction

Under section 31 of the Children Act 1989, public law care proceedings can be issued if there is concern a child is subject to, or at risk of significant harm, which can lead to removal of a child from parents. Appropriate and effective health and social support are required to potentially prevent some of the need for these proceedings. More comprehensive evidence of the health needs and vulnerabilities of parents will enable enhanced response from family courts and integrated other services.

Objective

To examine health vulnerabilities of parents involved in care proceedings in the two-year period prior to involvement.

Methods

Family court data provided by Cafcass Cymru were linked to population-based health records held within the Secure Anonymised Information Linkage Databank. Linked data were available for 8,821 parents of children involved in care proceedings between 2011 and 2019. Findings were benchmarked with reference to a comparison group of parents matched on sex, age, and deprivation ($n = 32,006$), not subject to care proceedings. Demographic characteristics, overall health service use, and health profiles of parents were examined. Descriptive and statistical tests of independence were used.

Results

Nearly half of cohort parents (47.6%) resided in the most deprived quintile. They had higher levels of healthcare use compared to the comparison group across multiple healthcare settings, with the most pronounced differences for emergency department attendances (59.3% vs 37.0%). Health conditions with the largest variation between groups were related to mental health (43.6% vs 16.0%), substance use (19.4% vs 1.6%) and injuries (41.5% vs 23.6%).

Conclusion

This study highlights the heightened socioeconomic and health vulnerabilities of parents who experience care proceedings concerning a child. Better understanding of the needs and vulnerabilities of this population may provide opportunities to improve a range of support and preventative interventions that respond to crises in the community.

Keywords

family justice; data linkage; vulnerable populations; mental health; substance-related disorders; wounds and injuries

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Introduction

Under section 31 (s.31) of the Children Act 1989, (public law) care proceedings can be issued if there is concern a child is subject to, or at risk of significant harm, which can lead to removal of a child from their parents. Previous analysis of infants and newborn babies subject to care proceedings in Wales revealed the scale and rising number of families involved and recommended the need for preventative action [1]. Characteristics of mothers of infants involved in such proceedings have also been examined, including mental health needs [2–4]. We aim to extend this work by examining a broader range of parental vulnerabilities for both mothers and fathers of children of any age involved in care proceedings.

Appropriate and effective health and social support are required to potentially prevent some of the need for care proceedings [5, 6]. However, a joined-up health and children's social care response to parents requires far greater knowledge about parents' healthcare needs and their interaction with health, and social care services. This study aims to advance the evidence base regarding interaction with health services by focusing on parents in care proceedings and providing completely new evidence, which will enable services to be more effectively tailored.

Combinations of domestic violence, parental mental health issues and/or learning disability, and parental alcohol and/or drug misuse have received considerable attention in relation to risk of child abuse and neglect [7, 8]. Skinner and colleagues [9] have recently called for a better understanding of wider factors impacting on families involved with child protection services. More comprehensive evidence of health needs and vulnerabilities, including more in-depth exploration of specific health conditions of parents entering care proceedings and their use of different types of healthcare provision (routine; emergency), will also enable enhanced response from the family courts and other services.

This study sought to address such evidence gaps with a view to aiding assessment of current policy and its future development. Population-level data collected routinely by Cafcass Cymru (a Welsh Government organisation that represents children's best interests in family justice proceedings in Wales) for mothers and fathers was linked to electronic health records, to examine demographic characteristics of parents, overall health service use, and health profiles.

Methods

Study design and data sources

A population-level cohort study with a matched comparison group, with the group of interest being parents involved in public law care proceedings.

Data sources and linkage

Data were accessed via the SAIL (Secure Anonymised Information Linkage) Databank [10–12], a trusted research environment (TRE) that hosts extensive individual-level anonymised health and administrative data for the population of Wales. During the anonymisation process of data sources

within the SAIL Databank, individuals are assigned unique identifier fields – Anonymous Linking Field (ALF) and Residential Anonymous Linking Field (RALF) [13, 14] – to link data at individual and residential levels respectively.

The primary source of family justice data was electronic case management data routinely produced and maintained by Cafcass Cymru. All instances of s.31 care proceedings initiated between January 2011 and December 2019 were included. Further detail on Cafcass data are available elsewhere [15, 16].

Demographic information for parents was obtained using the Welsh Demographic Service Dataset (WSDS), which provides demographic characteristics of people registered with a general practice (GP).

Health records from the Patient Episode Database for Wales (PEDW), Emergency Department Data Set (EDDS), Outpatient Data Set Wales (OPDW) and Welsh Longitudinal General Practice (WLGP) were analysed for two years pre care proceedings. These records contain attendance and diagnosis data on inpatient activity, emergency admissions, outpatient appointments, and GP appointments respectively.

Study population

Parents of children involved in s.31 care proceedings in Wales between January 2011 and December 2019 were included in the study ($n=11,349$). Of these, 9,269 were successfully matched and assigned an ALF. Only parents with valid demographic information of sex, age and deprivation were included. The final cohort consisted of 8,821 parents (Figure 1).

An existing method was used [17] to create a list of all parents with children in Wales at a fixed date of 1st July 2015 (study period mid-point) and who were not involved in care proceedings. A comparison group of parents was selected from this list using frequency matching (matched on area-level income domain deprivation quintiles, sex, and parent age band (≤ 25 , 26–35, and ≥ 36) at index date). The final matched comparison group consisted of 32,006 parents.

Index dates for the cohort were set at the earliest court date, and study mid-point for the comparisons. The baseline period for health data coverage was set as two years preceding an individual's index date.

Measures

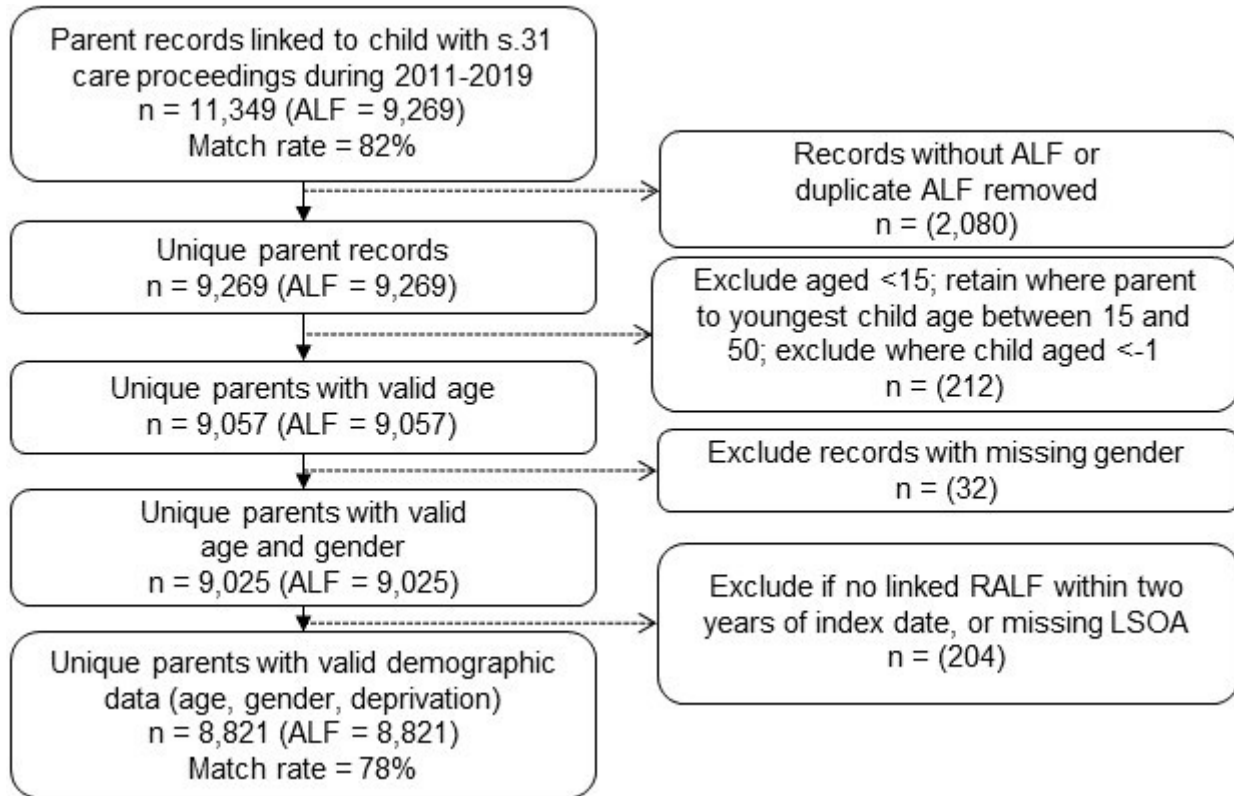
Demographic characteristics

Demographic characteristics of sex, parental age and youngest child age were derived from Cafcass Cymru and WSDS at index date. The income domain from the 2014 version of the Welsh Index of Multiple Deprivation (WIMD) was used as area level deprivation, taken at or within two years of index date and grouped into quintiles.

Overall healthcare use

Healthcare interactions within the baseline period were analysed for any hospital admission, new emergency department attendances (excluding follow-up), new outpatient appointment attendance and any GP record. Hospital admissions were categorised into emergency, elective or

Figure 1: Flow diagram of study participants



maternity; and emergency department attendances were classified as urgent and non-urgent based on triage classifications (urgent included '1-immediate', '2-very urgent', or '3-urgent').

General health conditions

We provide a broad categorisation of health conditions grouped according to the chapter level of the International Statistical Classification of Diseases (ICD-10) [18]. For emergency hospital admissions, all diagnostic codes in primary or secondary diagnostic code positions were included. As a high proportion of mothers would have had routine pregnancy and birth related admissions we excluded ICD-10 chapter 15 (pregnancy related). Any primary care diagnoses codes within the GP Read classification system were included with codes mapped to approximations of ICD-10 chapters (excluding pregnancy related chapters) (Supplementary Table 1).

Mental health and substance use conditions

Parents' primary care (GP) and hospital records were examined for the presence of clinical codes indicating mental health contacts or admissions. If an individual had one or more mental health-related contact or admission code recorded during the baseline period, they were categorised as having a mental health outcome. Code lists developed and provided by the Adolescent Mental Health Data Platform [19] were used and included common mental disorders e.g. depression and anxiety; severe mental illness; eating disorders; neurodevelopmental disorders e.g. attention deficit hyperactivity disorder, autistic spectrum disorder; and conduct disorders [20].

Health records were also analysed for clinical codes indicating substance use indicative of problem, harmful or hazardous use of alcohol and/or illicit drugs [20]. If an individual had any such code recorded during the baseline period, they were classified as having a substance use contact or admission.

Injuries

Emergency department attendances were analysed for the presence of injury-related clinical codes during the baseline period, using the attendance group variable for accidents, assault, and self-harm [21].

Data analysis

Descriptive analyses were conducted to characterise the cohort and comparison groups. Proportions of parents with the measures of interest were calculated during the two-year period prior to the index date; outcomes were not required to be mutually exclusive. One-way analysis of variance tests were computed to compare means between cohort and comparison groups for continuous variables. Chi-squared analyses was used to investigate differences between groups for categorical variables. Data processing and analyses were carried out using SQL and R [22].

Results

Demographic characteristics

Mothers accounted for 57.4% of the cohort. Nearly three quarters (73.0%) of cohort parents lived within the two most

Table 1: Demographic characteristics for the cohort (n = 8,821) and comparison group (n = 32,006)

Variable		Cohort n (%)	Comparison n (%)	p-value
(Chi-squared)				
Sex	Female	5062 (57.4)	18369 (57.4)	1.000
	Male	3759 (42.6)	13637 (42.6)	
Deprivation at index date	Quintile 1: Most deprived	4199 (47.6)	15241 (47.6)	1.000
	Quintile 2	2240 (25.4)	8129 (25.4)	
	Quintile 3	1311 (14.9)	4756 (14.9)	
	Quintile 4	701 (7.9)	2541 (7.9)	
	Quintile 5: Least deprived	370 (4.2)	1339 (4.2)	
Parental age at index date	15-19	744 (8.4)	413 (1.3)	<0.001
	20-24	1771 (20.1)	7116 (22.2)	
	25-29	1873 (21.2)	7019 (21.9)	
	30-34	1768 (20.0)	7211 (22.5)	
	35-39	1248 (14.1)	3730 (11.7)	
	40-44	763 (8.6)	2779 (8.7)	
	>45	654 (7.4)	3738 (11.7)	
(One-way ANOVA)				
Mother's age at index date (mean (SD))	Age in years	29.2 (8.2)	30.6 (8.2)	<0.001
Father's age at index date (mean (SD))	Age in years	32.3 (9.1)	33.8 (9.4)	<0.001
Age of youngest child at index date (mean (SD))	Age in years	3.2 (4.3)	4.7 (4.7)	<0.001
Age of youngest child at index date (median (IQR))	Age in years	1 (5)	3 (6)	<0.001

*Given the matched comparison design there were no significant differences between cohort and comparison for sex and deprivation. For all other variables shown in this table p-values were >0.001.

deprived quintiles (Table 1). The mean age of cohort mothers (29.2 years) was around three years younger than fathers (32.3 years). There was a notable difference in the proportions of younger parents (<20 years) between the groups, with 8.4% of cohort parents aged 15-19 years compared to 1.3% of the comparison group. The mean age of the youngest child was 1.5 years younger in the cohort, compared to the comparison group.

Health measures

Overall healthcare use

Both cohort mothers and fathers experienced higher healthcare use across all measured healthcare settings apart from elective hospital admissions in the two years prior to care proceedings (Figure 2, Supplementary Table 2). Differences between the groups were generally more pronounced for mothers than fathers.

The largest differences between groups were 'reactive' type health services, such as emergency admissions and attendances. Within the cohort, a third of mothers (33.6%) and nearly a fifth (18.5%) of fathers had at least one emergency hospital admission compared to 15.3% and 7.8% in the comparison respectively. Cohort mothers (62.7%) and fathers (54.9%) had higher emergency attendances than comparisons (37.2% for mothers and 36.8% for fathers). Cohort parents were also more likely to have higher severity emergency attendances (27.7% compared to 12.3% for comparisons), based on attendances triaged as 'immediate', 'very urgent', or 'urgent'.

Since a greater proportion of cohort mothers had infants at the index date compared to the comparisons, this may have influenced the maternity hospital admissions.

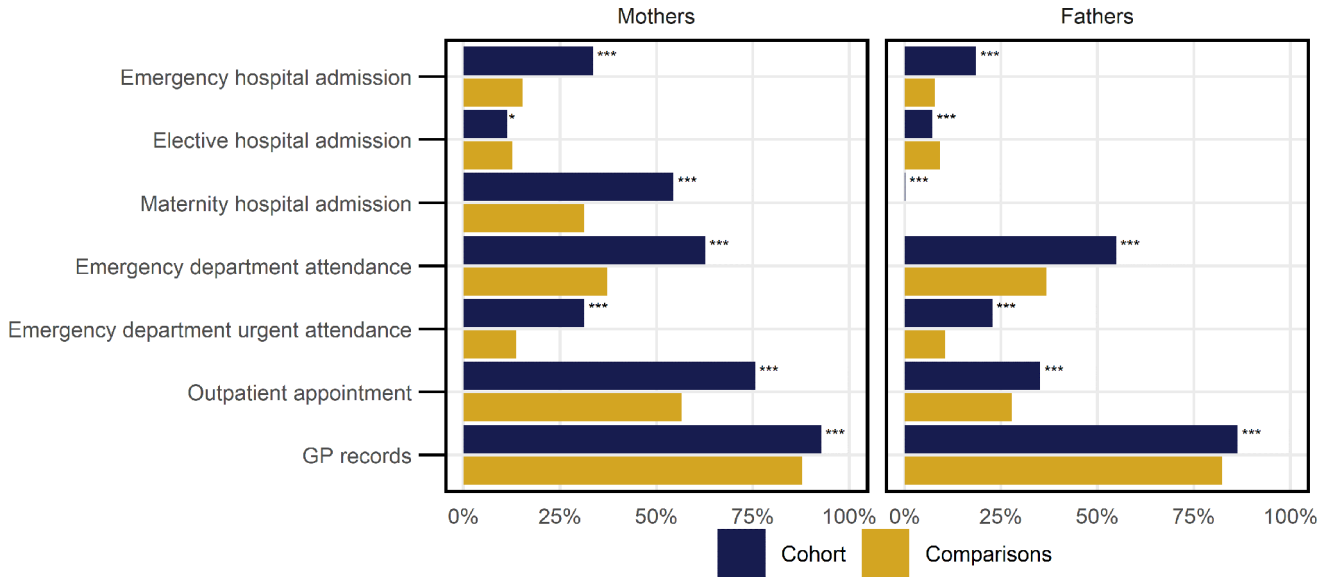
Health conditions

There were also higher levels of emergency admissions in the cohort than comparison group for both parents (Figure 2), with reasons for these admissions shown in Figure 3 and Supplementary Table 3. The most common conditions in the cohort also had the largest variation compared to the comparison group, which included mental and behavioural disorders (13.4% mothers and 8.5% fathers), external causes of morbidity and mortality (7.9% mothers and 5.9% fathers), and injury, poisoning and other consequences of external causes (6.9% mothers and 5.7% fathers).

Significant differences were found between groups for both mothers and fathers ($p < 0.001$) except for neoplasms, eye diseases, ear diseases, congenital conditions, and genitourinary system diseases for fathers.

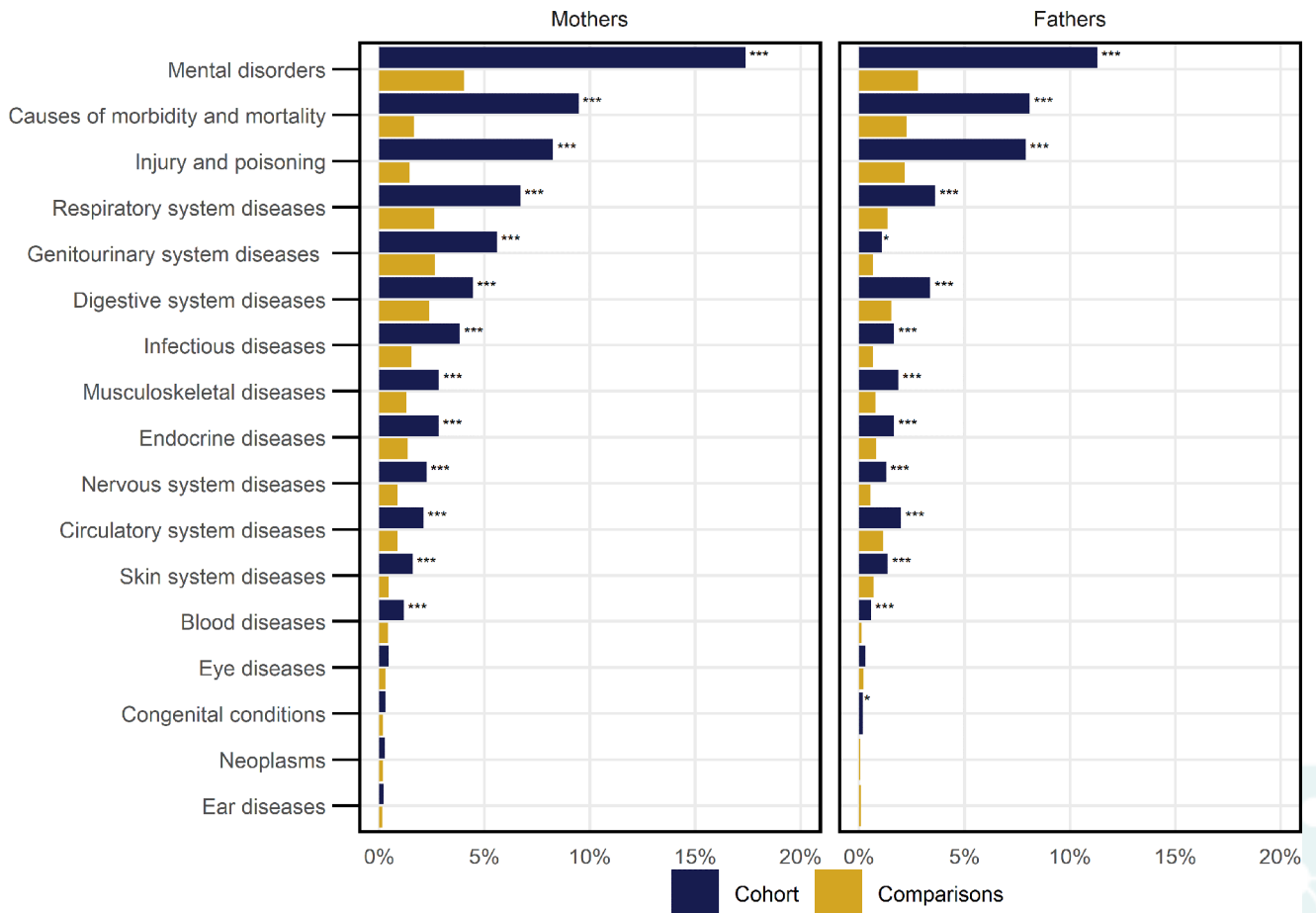
The conditions with large relative differences between the study groups in primary care diagnosis records were mental disorders, 'injury and poisoning', causes of injury and poisoning (for example, accidents, assault, and self-harm) and causes of morbidity and mortality (Figure 4, Supplementary Table 4). These were in common with emergency hospital admission conditions. The conditions with the largest relative differences in emergency hospital admissions and GP records are assessed in more detail in Supplementary Tables 3, 4.

Figure 2: Proportion of individuals within study groups by type of healthcare use for two years prior to care proceedings



P-values: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Figure 3: Proportion of individuals within study groups by health condition (ICD-10 chapter grouping for emergency hospital admissions) for two years prior to care proceedings



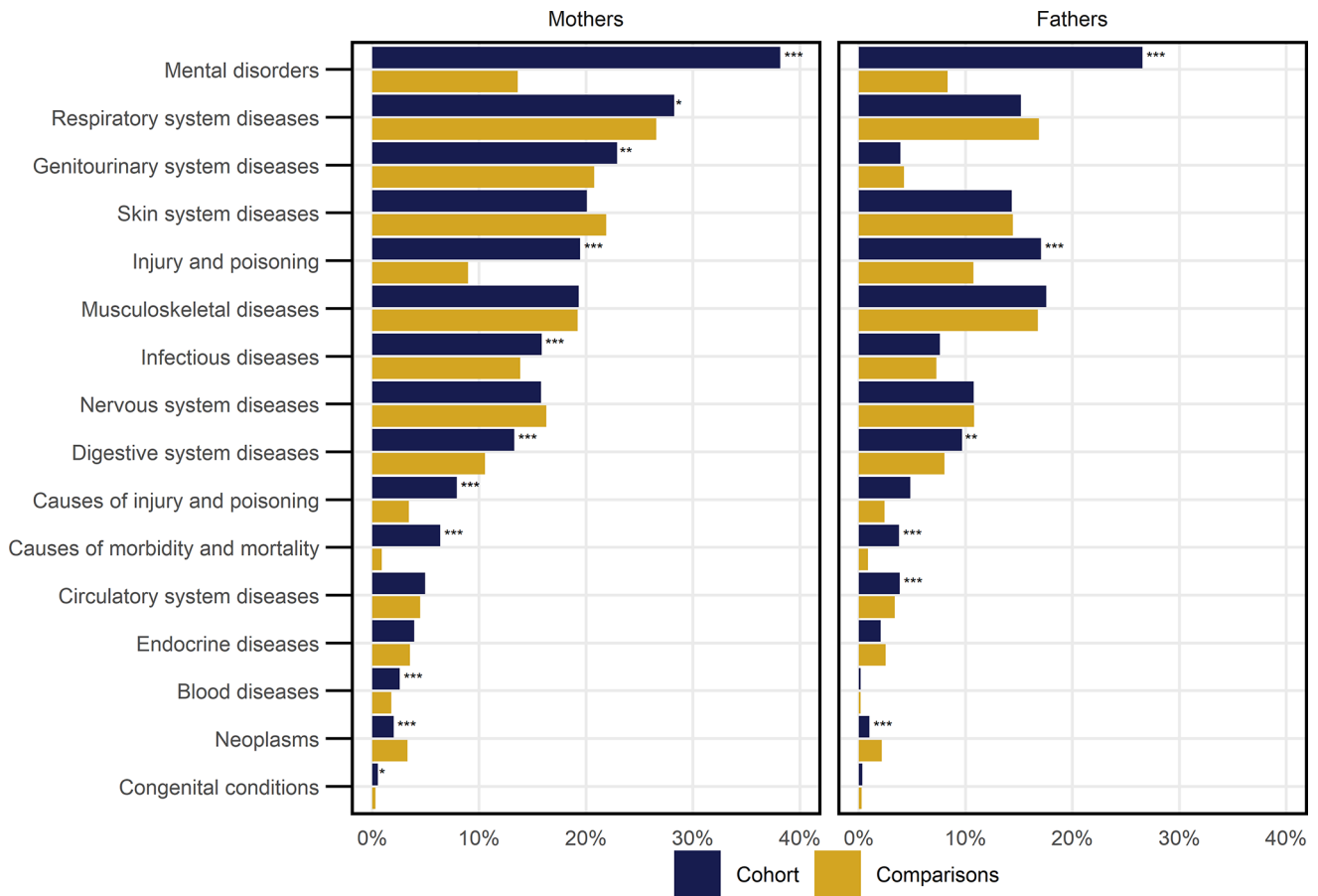
P-values: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Mental health and substance use conditions

Mental disorders were by far the most common recorded health condition for individuals in the cohort (53.2% for mothers

and 30.6% for fathers), over 2.5 and 3 times higher than for comparison mothers and fathers respectively (Table 2). The most common type of mental health condition was depression. The relative differences of severe mental illnesses (including

Figure 4: Proportion of individuals within study groups by health condition (ICD-10 chapter grouping for GP diagnosis records) for two years prior to care proceedings



P-values: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

schizophrenia and bipolar disorders) were 11 times higher for mothers in the cohort group and 7 times higher for fathers. Conditions such as developmental disorders, attention deficit hyperactivity disorders, eating disorders and autism were all also considerably more prevalent in the cohort group.

Substance use was recorded for around one in five parents. Parents in the cohort were around 14 and 10 times more likely to have drug and alcohol related substance use conditions recorded respectively.

Injuries

The cohort group had increased levels of accident and emergency attendances for overall injury and all injury sub-categories (Table 3). Accident-related injuries were 1.5 times more likely in the cohort. Cohort mothers were nearly 10 times more likely to have an assault related attendance; cohort fathers were 5 times as likely. Cohort mothers and fathers were 14 and 10 times more likely respectively to have an attendance for self-harm than the comparison group.

Discussion

Summary of main findings

The most pronounced difference between the cohort parents and the comparison group was found in emergency type

health services. Differences between the study groups were particularly pronounced with regards the use of services for mental health need, substance use and injuries/injury and poisoning. Although overall healthcare use across healthcare settings was higher for mothers in the study cohort than fathers, the differences between the cohort parents and the comparison groups were similar. Common mental health conditions were around three times more likely in cohort parents. Although overall only a small proportion of parents had severe mental illness diagnoses (under 5%), the levels were far greater for cohort parents, than comparison parents (9 times higher). It is evident that for a proportion of parents, vulnerabilities include both mental health need and problems of substance use. The elevated level of assault or self-harm for the cohort parents is also notable, with a stark difference between parents involved in care proceedings and our comparison group.

Study strengths and limitations

To our knowledge, this is the first study to examine parental vulnerabilities of both mothers and fathers involved in care proceedings in the UK, and as such allows comparisons between parent type within the cohort, but also against a comparison group of parents matched on age and deprivation. This paper builds on previous work by the same lead authors of the Family Justice Data Partnership [23] first published as

Table 2: Numbers and proportions of individuals with hospital admissions or GP records indicating mental health conditions or substance use disorders for two years prior to court proceedings

Variable	Mothers, n (%)			Fathers, n (%)		
	Cohort	Comparison	p-value	Cohort	Comparison	p-value
Mental Health						
Any mental health condition	2693 (53.2)	3752 (20.4)	<0.001	1151 (30.6)	1359 (10.0)	<0.001
Depression	2214 (43.7)	2804 (15.3)	<0.001	887 (23.6)	956 (7.0)	<0.001
Anxiety	1215 (24.0)	1764 (9.6)	<0.001	573 (15.2)	667 (4.9)	<0.001
Severe mental illness	216 (4.3)	79 (0.4)	<0.001	78 (2.1)	40 (0.3)	<0.001
Developmental disorder	119 (2.4)	16 (0.1)	<0.001	12 (0.3)	6 (0.0)	<0.001
Attention deficit hyperactivity disorder	61 (1.2)	15 (0.1)	<0.001	39 (1.0)	18 (0.1)	<0.001
Eating disorder	45 (0.9)	45 (0.2)	<0.001	6 (0.2)	<5 (0.0)	0.010
Autism spectrum disorder	18 (0.4)	7 (0.0)	<0.001	9 (0.2)	7 (0.1)	0.002
Conduct disorder	8 (0.2)	<5 (0.0)	<0.001	6 (0.2)	<5 (0.0)	0.001
Substance use						
Any substance use	1042 (20.6)	214 (1.2)	<0.001	665 (17.7)	313 (2.3)	<0.001
Substance use: drugs	801 (15.8)	134 (0.7)	<0.001	489 (13.0)	186 (1.4)	<0.001
Substance use: alcohol	434 (8.6)	101 (0.5)	<0.001	309 (8.2)	160 (1.2)	<0.001

*p-values indicate differences between cohort and comparison groups by parent type.

Table 3: Numbers and proportions of individuals with injury-related emergency department attendances for two years prior to court proceedings

Variable	Mothers, n (%)			Fathers, n (%)		
	Cohort	Comparison	p-value	Cohort	Comparison	p-value
Any injury	2124 (42.0)	3969 (21.6)	<0.001	1538 (40.9)	3585 (26.3)	<0.001
Accident	1391 (27.5)	3206 (17.5)	<0.001	1141 (30.4)	2987 (21.9)	<0.001
Assault	439 (8.7)	163 (0.9)	<0.001	254 (6.8)	176 (1.3)	<0.001
Self-harm	313 (6.2)	83 (0.5)	<0.001	191 (5.1)	66 (0.5)	<0.001

*p-values indicate differences between cohort and comparison groups by parent type.

a descriptive funder report [24]. For this publication we have added further academic rigour through addition of statistical testing for all health care use outcomes.

Better understanding of the needs and vulnerabilities of these parents may provide opportunities to improve a range of support and preventative intervention for these families. This work covers wide range of measures, providing a broad picture of health service use and underlying conditions, and by linking health and family justice data at population level for fathers, builds on the evidence base [25, 26] for this group as well - a group often excluded from such research and policy work [27, 28].

Studies based on administrative data are necessarily limited by the scope and quality of available data and are collected primarily for non-research purposes. Specific strengths and limitations of Cafcass Cymru data are reported elsewhere [15, 16]. Cohort parents had more children aged under 1 year at the index date compared to comparisons, which may have influenced levels of healthcare use for mothers – for example, for pre- and post-natal appointments. The earliest application date within the study period for each parent was also used, as a proxy measure to represent the first occurrence within care proceedings. We recommend future work aims to account for any bias resulting from recurrent care proceedings [29].

The SAIL Databank contains data from around 80% of general practitioner (GP) practices in Wales; as such, data for GP-based measures was available for the majority, but not all individuals; GP measures were not adjusted for the reduced coverage, which we recognise is a study limitation.

We compared cohort findings against a matched comparison group (using age, deprivation, sex, and parent-type); this study design choice was made to allow more meaningful comparisons to be drawn between study groups. Factors such as deprivation are known to adversely affect health outcomes [30, 31] and as we matched on deprivation readers should be aware that results are likely to underestimate effects in comparison to the general population. As our comparison group selection method used category matching using age bands this resulted in imbalances in ages between groups as noted in Table 1; this choice was made to increase the size of the comparison group, however, further studies should consider matching on more closely aligned ages.

It should be noted that match rates in the cohort were 82% (Figure 1), whilst this is in line with previous work [16] we have no further information to understand if there are differences between the matched and non-matched parents. It could be hypothesised that the non-matched parents are more vulnerable and as such could result in under reporting

of health care use. It would be worthwhile for agencies such as Cafcass Cymru to aim to improve data quality to improve future match rates and research design.

Comparison of research findings with previous literature

Uniquely, this study examined both mothers and fathers interaction with healthcare services prior to court proceedings. However, there is an important body of related international research on the mental health needs and co-morbid substance use, for parents involved with child welfare services [32–37], and children in care [38–40]. Although the research we report is specific to parents who are involved in formal family court proceedings, our findings are consistent with the broader published research in reporting elevated rates of mental health need often co-occurring with substance use. Notable in the published literature, is the work of Wall-Wiehler and colleagues in Canada (2017) who reported elevated rates of mental health diagnoses, treatment use and social factors for mothers, both 2 years prior to and 2 years after children were taken into care. In addition to the extant knowledge, the findings we report draw fathers clearly into view, a group whose needs are often marginal to discussions about the family justice system [41].

By differentiating health service utilisation, we have also uncovered the higher use of accident and emergency health services among parents with problems of mental health and substance use in this particular population [42, 43]. A key finding in the international literature is that parents with problems of mental health and substance use are more likely to require emergency healthcare on account of accidents, injury, or self-harm, or because they have not sought help with health conditions at a timely point from primary care providers. However, this is the first-time emergency health care use has been evidenced for mothers and fathers in care proceedings. Looking ahead it will be important to understand causal factors implicated in elevated use of high-cost emergency health care. Drawing on the broader literature, a range of explanations have been proffered, which include that same-day GP appointments can be difficult to obtain [44], that there are significant waiting lists for mental health and drug and alcohol services, and that these gaps in provision result in parents' turning to emergency healthcare [45]. The same can be said, where community-based crisis services are unavailable [46]. Further research to probe reasons behind high rates of emergency care use are important, given problems of access to health care have been exacerbated by the COVID-19 pandemic [47].

Recommendations for policy and practice

The findings presented highlight the elevated health needs of both mothers and fathers prior to involvement in care proceedings in Wales. Higher levels of mental health needs, substance use and injury related conditions, compared to a comparison group are particularly noteworthy. The study suggests considerable healthcare costs for parents involved in public law care proceedings, however, this would require further substantiation through separate analysis of health and social care utilisation over a longer period. High use of emergency healthcare services strongly suggests the potential

failure in provision of—or access to—support services at an earlier point to prevent or manage crisis. Elevated rates of self-harm are very concerning, for example. Given pressures on emergency healthcare provision, the evidence is that emergency departments are unable to offer treatment over and above attending to immediate physical healthcare needs [48]. However, this work indicates that proactively connecting parents with relevant support services, such as for mental health, is an important factor for those providing emergency healthcare services, which may help reduce demand in the longer term. This point is not new, and there is substantial literature that calls for better management of patient journeys through healthcare services, and far greater integration of health and social care provision (both within child and adult social services). This conclusion, which calls for improved and more tailored mental health care provision [49] is particularly relevant for parents in care proceedings, where services need to be attuned to parents histories of adversity and trauma [50].

Further work

International literature suggests such vulnerable populations experience higher rates of repeat emergency hospital use; a hypothesis that warrants testing through further research, as a particular service response is required in relation to frequent users of emergency services [51, 52].

Further work is required to provide more detailed findings to understand how healthcare use varies depending on a multitude of factors including: protected characteristics (for example, race, age, sex) and heritage; household-based factors (for example, age and number of children, family structure, parental relationship and presence of domestic violence); and factors related to family court (for example, type of court order). In the context of established awareness of the relationship between inequality and health need [30] it is critical that parents in care proceedings are not simply treated as a simple homogenous group. For example, future research should consider the intersectionality of characteristics such as gender or race with healthcare needs [53, 54].

In this work we concentrated on the period preceding care proceedings. Significant life events, such as having a child removed, can lead to immediate psychosocial crisis prompting a deterioration in health conditions, especially mental health-related issues including suicidal ideation, along with worsened socioeconomic conditions [55]. It is therefore important to also consider further work to understand health conditions, and patterns of healthcare use over the lifetime of involvement in care proceedings and beyond. This may indicate periods of highest health service demand and highlight when services are most required to support parents and families.

Such work should also consider other significant life events, such as incarceration. Linkage of datasets from across the justice system via the Data First programme [56] will provide future ability to investigate levels of incarceration for this population using SAIL.

Finally, the potential multiple and long-term effects of such experiences for the children and young people involved in the family justice system should be examined. This may further enforce the need for increased advocacy services within health and social care to support vulnerable children and families as laid out in the Well-being of Future Generations

(Wales) Act (2015), and the Welsh Government Programme for Government [57].

Conclusion

Both mothers and fathers in care proceedings in Wales experienced greater levels of health vulnerabilities during the two-year period prior to court proceedings compared to a comparison group of parents matched on deprivation, sex, and age. The higher use of emergency healthcare is particularly noteworthy and indicates considerable crisis health need among parents. Elevated mental health, substance use, and injury-related conditions are coupled with higher use of emergency services. Better understanding of the needs and vulnerabilities of this population, including the reasons why parents are making greater use of emergency healthcare may provide opportunities to improve a range of support and preventative interventions that respond to crises in the community.

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Statement on conflicts of interest

None to declare.

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Nuffield Family Justice Observatory (Nuffield FJO) aims to support the best possible decisions for children by improving the use of data and research evidence in the family justice system in England and Wales. Covering both public and private law, Nuffield FJO provides accessible analysis and research for professionals working in the family courts.

Nuffield FJO was established by the Nuffield Foundation, an independent charitable trust with a mission to advance social well-being. The Foundation funds research that informs social policy, primarily in education, welfare, and justice. It also funds student programmes for young people to develop skills and confidence in quantitative and scientific methods. The Nuffield Foundation is the founder and co-founder of the Ada Lovelace Institute and the Nuffield Council on Bioethics.

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Authors' contributions

RDJ and LJG contributed to the conception. RDJ designed and performed the analysis, with RDJ and LJG interpreting the results. RDJ, LJG, LN and KB drafted the first iteration of the manuscript. All authors critically reviewed the manuscript, provided important intellectual input, approved the final version and agreed to be accountable for their contributions. KB and DF acquired the study funding.

Ethics statement

The project proposal was reviewed by an independent Information Governance Review Panel (IGRP) at Swansea University. This panel ensures that work complies with information governance principles and represents an appropriate use of data in the public interest. The IGRP includes representatives of professional and regulatory bodies, data providers and the general public. Approval for the project was granted by the IGRP under SAIL project 0990. Cafcass Cymru (the data owner of the family courts data) also approved use of the data for this project. The agency considered the public interest value of the study, benefits to the agency itself, as well as general standards for safe use of administrative data.

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Abbreviations

GP: General practice
ICD: International Classification of Diseases
SAIL: Secure Anonymised Information Linkage
TRE: Trusted Research Environment



Supplementary Table 1: ICD-10 chapter to Read Diagnosis code chapter descriptions and mapping

ICD-10 Chapter	ICD-10 description	ICD codes (inclusive)	Read diagnosis chapter description	Read diagnosis chapter code (first character)
1	Certain infectious and parasitic diseases	A00–B99	Infectious and parasitic diseases	A
2	Neoplasms	C00–D48	Neoplasms	B
3	Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	D50–D89	Diseases of the blood and blood-forming organs	D
4	Endocrine, nutritional and metabolic diseases	E00–E90	Endocrine, nutritional and metabolic diseases	C
5	Mental and behavioural disorders	F00–F99	Mental disorders	E
6	Diseases of the nervous system	G00–G99	Nervous system and sense organ diseases	F
7	Diseases of the eye and adnexa	H00–H59	Nervous system and sense organ diseases	F
8	Diseases of the ear and mastoid process	H60–H95	Nervous system and sense organ diseases	F
9	Diseases of the circulatory system	I00–I99	Circulatory system diseases	G
10	Diseases of the respiratory system	J00–J99	Respiratory system diseases	H
11	Diseases of the digestive system	K00–K93	Digestive system diseases	J
12	Diseases of the skin and subcutaneous tissue	L00–L99	Skin and subcutaneous tissue diseases	M
13	Diseases of the musculoskeletal system and connective tissue	M00–M99	Musculoskeletal and connective tissue diseases	N
14	Diseases of the genitourinary system	N00–N99	Genitourinary system diseases	K
17	Congenital malformations, deformations and chromosomal abnormalities	Q00–Q99	Congenital anomalies	P
19	Injury, poisoning and certain other consequences of external causes	S00–T98	Injury and poisoning	S
20	External causes of morbidity and mortality	V01–Y98	External causes of morbidity and mortality	U

Supplementary Table 2: Type of healthcare interaction two years prior to care proceedings by study group and parental type

Variable	Mothers, n (%)			Fathers, n (%)		
	Cohort	Comparison	p-value	Cohort	Comparison	p-value
Emergency hospital admission	1699 (33.6)	2817 (15.3)	<0.001	696 (18.5)	1070 (7.8)	<0.001
Elective hospital admission	575 (11.4)	2314 (12.6)	0.019	273 (7.3)	1259 (9.2)	<0.001
Maternity hospital admission	2757 (54.5)	5758 (31.3)	<0.001	7 (0.2)	0 (0.0)	<0.001
Emergency department attendance	3172 (62.7)	6836 (37.2)	<0.001	2062 (54.9)	5016 (36.8)	<0.001
Emergency department urgent attendance	1586 (31.3)	2505 (13.6)	<0.001	855 (22.7)	1429 (10.5)	<0.001
Outpatient appointment	3825 (75.6)	10385 (56.5)	<0.001	1321 (35.1)	3794 (27.8)	<0.001
GP records	4694 (92.7)	16123 (87.8)	<0.001	3246 (86.4)	11233 (82.4)	<0.001

*p-values indicate differences between cohort and comparison groups by parent type.

Supplementary Table 3: Emergency hospital admissions health conditions by study group and parental type

Variable	Mothers, n (%)			Fathers, n (%)		
	Cohort	Comparison	p-value	Cohort	Comparison	p-value
Infectious diseases	194 (3.8)	279 (1.5)	<0.001	62 (1.6)	87 (0.6)	<0.001
Neoplasms	13 (0.3)	37 (0.2)	0.559	<5 (0.1)	7 (0.1)	0.794
Blood diseases	59 (1.2)	78 (0.4)	<0.001	21 (0.6)	15 (0.1)	<0.001
Endocrine diseases	143 (2.8)	248 (1.4)	<0.001	62 (1.6)	109 (0.8)	<0.001
Mental disorders	880 (17.4)	739 (4.0)	<0.001	425 (11.3)	380 (2.8)	<0.001
Nervous system diseases	114 (2.3)	161 (0.9)	<0.001	48 (1.3)	71 (0.5)	<0.001
Eye diseases	23 (0.5)	55 (0.3)	0.120	11 (0.3)	28 (0.2)	0.419
Ear diseases	11 (0.2)	27 (0.1)	0.366	<5 (0.1)	12 (0.1)	0.979
Circulatory system diseases	107 (2.1)	161 (0.9)	<0.001	75 (2.0)	152 (1.1)	<0.001
Respiratory system diseases	339 (6.7)	478 (2.6)	<0.001	136 (3.6)	183 (1.3)	<0.001
Digestive system diseases	225 (4.4)	433 (2.4)	<0.001	127 (3.4)	208 (1.5)	<0.001
Skin system diseases	81 (1.6)	84 (0.5)	<0.001	51 (1.4)	92 (0.7)	<0.001
Musculoskeletal diseases	144 (2.8)	241 (1.3)	<0.001	70 (1.9)	105 (0.8)	<0.001
Genitourinary system diseases	283 (5.6)	488 (2.7)	<0.001	40 (1.1)	88 (0.6)	0.011
Congenital conditions	16 (0.3)	36 (0.2)	0.150	6 (0.2)	5 (0.0)	0.022
Injury and poisoning	418 (8.3)	266 (1.4)	<0.001	297 (7.9)	294 (2.2)	<0.001
Causes of morbidity and mortality	479 (9.5)	303 (1.6)	<0.001	304 (8.1)	306 (2.2)	<0.001

*p-values indicate differences between cohort and comparison groups by parent type.

Supplementary Table 4: GP diagnosis health conditions by study group and parental type

Variable	Mothers, n (%)			Fathers, n (%)		
	Cohort	Comparison	p-value	Cohort	Comparison	p-value
Infectious diseases	802 (15.8)	2541 (13.8)	<0.001	286 (7.6)	991 (7.3)	0.499
Neoplasms	101 (2.0)	603 (3.3)	<0.001	38 (1.0)	295 (2.2)	<0.001
Blood diseases	131 (2.6)	325 (1.8)	<0.001	7 (0.2)	23 (0.2)	0.994
Endocrine diseases	198 (3.9)	645 (3.5)	0.190	77 (2.0)	344 (2.5)	0.106
Mental disorders	1932 (38.2)	2503 (13.6)	<0.001	998 (26.5)	1136 (8.3)	<0.001
Nervous system diseases	799 (15.8)	2989 (16.3)	0.416	405 (10.8)	1470 (10.8)	1.000
Circulatory system diseases	250 (4.9)	825 (4.5)	0.190	144 (3.8)	459 (3.4)	0.184
Respiratory system diseases	1430 (28.2)	4883 (26.6)	0.019	570 (15.2)	2299 (16.9)	0.014
Digestive system diseases	672 (13.3)	1940 (10.6)	<0.001	364 (9.7)	1094 (8.0)	0.001
Skin system diseases	1016 (20.1)	4019 (21.9)	0.006	538 (14.3)	1967 (14.4)	0.884
Musculoskeletal diseases	978 (19.3)	3527 (19.2)	0.864	660 (17.6)	2284 (16.7)	0.251
Genitourinary system diseases	1160 (22.9)	3814 (20.8)	0.001	147 (3.9)	575 (4.2)	0.432
Congenital conditions	26 (0.5)	57 (0.3)	0.043	13 (0.3)	37 (0.3)	0.560
Injury and poisoning	985 (19.5)	1649 (9.0)	<0.001	641 (17.1)	1464 (10.7)	<0.001
Causes of injury and poisoning	400 (7.9)	627 (3.4)	<0.001	182 (4.8)	329 (2.4)	<0.001
Causes of morbidity and mortality	322 (6.4)	165 (0.9)	<0.001	142 (3.8)	117 (0.9)	<0.001

*p-values indicate differences between cohort and comparison groups by parent type.