National Centre for Suicide Prevention and Self-Harm Research

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Paternal suicide in the 1001 Critical Days

(from pregnancy to age 2)

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1001 Critical Days FOUNDATION

The IPMHG PERINATAL MENTAL HEALTH MATTERS

Acknowledgements

This report was funded by the 1001 Critical Days Foundation and supported by the National Centre for Suicide Prevention and Self-Harm Research (funded by Health and Care Research Wales). Funders were not involved in the analysis or interpretation of findings.

Please cite this work as:

Amanda Marchant, Marcos Delpozobanos Nancy Meligy, Kim Dienes, Kate Ellis-Davies, Ann John. Paternal suicide in the 1001 Critical Days from pregnancy. 2025. National Centre for Suicide Prevention and Self-Harm Research.

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Key Messages

- Death of a parent by suicide can have profound impacts on a child's development and family across the first 1001 days (through pregnancy to age two), and beyond. Most studies focus on perinatal maternal suicide.

Rates of 1001 Critical Days paternal suicide

- This study provides the first United Kingdom population-level rate for paternal suicide in the 1001 critical days-from pregnancy to age 2.

- 107 fathers of babies born between 2002 and 2021 in Wales died by suicide during the 1001 Critical Days.

- 16 mothers of babies born between 2002 and 2021 in Wales. died by suicide during the 1001 critical days.

- Approximately 5 fathers of babies born between 2002 and 2021 died by suicide annually during the 1001 Critical Days, representing an estimated annual cost of over £7.2M to the Welsh economy. These costs are a **conservative estimate.**

- It is important to remember that these figures represent real lives lost. All suicides are potentially preventable.

- However, small numbers (from a statistical viewpoint) means that there is uncertainty around rates as shown by the relatively wide confidence intervals below. In these analyses any comparisons should be interpreted with caution and particular attention paid to overlapping confidence intervals where we cannot really say there is a 'true' difference.

- **The age standardised 1001 Critical Days paternal suicide rate was 12.4 (95% CI 4.9-19.8) suicide deaths per 100,000 fathers.**
- **The age standardised 1001 Critical Days paternal suicide rate for first-time fathers was 15.7 (95% CI 4.4-27.0) per 100,000 fathers.**
- **The crude 1001 Critical Days paternal suicide rate for fathers living in the most deprived areas was double those living in the least deprived areas.**

- During the first 1001 days from pregnancy, fathers show an approximately 60% lower risk of suicide than all men. Mothers show an approximately 70% lower risk than all women. **Standardised Mortality Ratios (SMRs)** are **not directly comparable to each other**. However, there is a signal that the reduction in risk of suicide associated with parenthood is similar for men and women.

Parenthood or what it represents is protective for suicide. This is consistent with Nordic register studies.

Policy Implications

- Parent inclusive approach is required.
- The **transition into fatherhood is a critical prevention window** and **first-time fathers should be prioritised**. This is regardless of living arrangements.
- **Father-inclusive family system perinatal mental health pathways** should be embedded into existing services including routine screening during pregnancy and postpartum with clear referral routes into mental health services for fathers.

- The number of fathers losing their lives and children losing a parent during the 1001 Critical Days to suicide has been **historically underreported. Improving routine recording and linkage of paternal data** across birth registration and health records would address this. Adding paternal data to perinatal datasets would allow us to capture family connections more accurately.
- The **addition of paternal suicide to routine national surveillance** of maternal deaths during pregnancy and up to one year after the end of pregnancy in the UK would allow policy to be informed by and responsive to a family-wide view of risk for a range of family structures and fathering groups.

- **Outreach and support for both expectant parents in more deprived areas** will likely have implications beyond suicide prevention. Prioritised outreach in high-deprivation areas, including proactive screening and navigation to mental health, substance misuse, housing, and financial support should be implemented and evaluated.

Research

- The dynamic algorithm developed for this study identifies fathers beyond those continuously resident with mothers reducing bias observed in previous work and capturing a wider range of family structures.

- There is an opportunity to capitalise on data infrastructure to research at-risk groups, disparities in outcomes, and preceding health service use.
- Research is needed into healthcare worker and public awareness of 1001 Critical Days paternal suicide, to evaluate the training gaps for those working with parents in the 1001 Critical Days and the accessibility and uptake of mental health services.

Contents

Background

Why parental suicide matters (impact on children & families)

The death of a parent by suicide can have profound impacts on the child and family system across the first 1001 days (through pregnancy, up to age two) and beyond.

- The **wide-ranging effects** of parental suicide on young children and the family system include: surviving parent's mental health and parenting, extended family wellbeing, and housing/economic stability [1, 2].
- Early-years effects can include **developmental regressions** and longer-term impacts on development and wellbeing [3].
- There is an **intergenerational risk**: children of a parent who died by suicide have higher risks of mental health conditions and suicide [4, 5].

Understanding Suicide Data

- It's important to remember that these figures represent real lives lost. All suicides are potentially preventable.
- **Where populations are small**, for example **where males and females are analysed separately** as presented here, rates can be unreliable since a small change in the number of suicides will have a large impact on rates. When this occurs, it is demonstrated by relatively wide confidence intervals (ranges in brackets).
- In these analyses any **comparisons should be interpreted with caution and particular attention paid to overlapping confidence intervals** where differences are then not statistically significant i.e. we cannot really say there is a 'true' difference.
- **Age standardised rates** have been standardised to the European population. This is because the age structure of a population impacts rates i.e., one population may contain a higher proportion of middle-aged men so rates would be higher, but this would be expected. Crude rates are not standardised in this way.
- **Standardised Mortality Ratios (SMRs)** provide an indication of whether the rate of suicide is comparable between a population of interest and a reference population (for example, in this report fathers compared with the population of males). SMRs for different populations (i.e., SMRs for fathers: males and SMRs for mothers: females) are **not comparable to each other**; they are only comparable to the chosen standard. **Males have higher suicide rates than females** independent of parenthood.

Epidemiology context (UK)

- **Suicide rates have been rising** in recent years for both men and women; rates for men in England & Wales in **2023 were the highest since 1999** [6]. Although delays in registrations may have impacted this.
- **Suicide in men accounts for 75% of all suicide deaths** in England & Wales.
- The highest rates of suicide in men were in those aged **45-64 years, closely followed by those aged 25-44 years**, common ages of fatherhood [6] .
- The perinatal period has been recognised in policy and healthcare as a risk period for mental health and suicide in females, with wide reaching impacts for children and their wider family systems. National reports show a **recent increase of maternal suicide** in the year following childbirth **[7]**. Suicide remains a **leading cause of perinatal maternal mortality [8]**.

Risk factors in fathers and their impacts

- Suicide rarely has a single cause. It is **complex** and influenced is a by several factors across a person's life, including risk, as well as protective factors.
- The link between suicide and mental health conditions (in particular, depression), substance use, and self-harm is well established. Although not all people who die by suicide have a diagnosable or diagnosed mental health condition.
- 8–13% of fathers experience **depression** [9, 10]; **anxiety and stress** rates are often higher [11].
- **PTSD after traumatic birth** is likely under-reported in fathers [12], and associated with adaptation to parenthood. **Paternal depression is associated with paternal parenting quality**, family wellbeing, childhood behavioural and emotional function as well as mental health diagnoses in children [13] .
- Paternal mental health is linked to **paternal sensitivity, positive affect, and play styles**, which underpin **early father–child attachment [14]**.
- Secure **father–child attachment** relates to **better social-emotional and academic outcomes**; paternal mental illness is associated with **poorer parenting quality, family wellbeing, attachment, and child outcomes [15]**.
- **Policies and interventions that support fathers' mental health** improve paternal parenting quality, couple relationship wellbeing, and child outcomes [16-18].
- Further risk factors for suicide include experience of loss, loneliness, relationship dispute and financial problems.

Surveillance & System gaps

- **No routine national surveillance** of 1001 Critical Days paternal suicide: paternal deaths by suicide are not reported in relation to pregnancy/early parenthood.

- **Parenthood is not automatically linked** to fathers' medical records, so paternal mental health and suicide in those 1001 Critical Days is **not systematically monitored**.
- **Access barriers** (limited specialised services for fathers, self/other stigma) reduce help-seeking, assessment, early diagnosis, management, and positive care experiences for mental health, thoughts of suicide and suicide behaviours.
- **Training and awareness** of healthcare staff, in contact with fathers in the 1001 Critical Days, of paternal mental health and suicide.

Comparative evidence (selection/protection)

- A Swedish register study found **lower suicide rates among fathers** (25–44 years) of children up to age of 18 years than among non-fathers, suggesting **selection into parenthood** may confer some protection; **three-quarters of parental suicides were in fathers [19]**.
- Lower risk of suicide has been observed in **men in long-term relationships** versus those not in relationships [20, 21]
- A Danish register study found lower risk of suicide for cohabiting fathers compared with non-fathers. Fathers were followed up until the child turned 18. Protective effects were greatest when the youngest child was aged less than two years This lower risk was not found in non-cohabiting fathers. [21].
- **Risk factors** among fathers who died by suicide included lower childhood socio-economic status, unemployment, lower education, benefit receipt, and prior psychiatric disorder or suicide attempt [19, 21].

Why is this study needed?

This will be the **first population-level estimate** focused specifically on **1001 Critical Days paternal suicide rate (pregnancy → 24 months).** Without this information to inform policy and practice, **services cannot tailor prevention and support** for at-risk fathers, and **healthcare professional training**, **public awareness, and help-seeking** in the 1001 Critical Days period will likely remain limited.

Methods

Study design

This was an e-cohort study utilising linked routinely collected administrative and healthcare data.

Data sources

The Suicide Information Database-Wales (SID-Cymru) is a population-based electronic cohort of individuals who died by suicide in Wales, based within the National Centre for Suicide Prevention and Self-Harm Research at Swansea University and hosted by the Secure Anonymised Information Linkage Databank

(www.saildatabank.com). The SAIL Databank is an expanding data repository of anonymised person-based linkable data from healthcare and public settings to support research [22, 23].

Suicide deaths were identified from ONS deaths registrations using a previously developed algorithm publicly available through the DATAMIND collection (available at https://phenotypes.healthdatagateway.org/; Concept number PH1109 [24]). A full list of datasets and measures used in this study are included in Appendix A.

Identification of parents

Fathers are not routinely linked with babies in health and administrative data in the UK. Previous work identified fathers as adult males aged within 10 years of the mothers' age, living in the same household as the mother for a minimum of 1 year before the birth of the child [25-27]. However, this method risks selecting more stable or traditional families (couples cohabiting for one year before birth). We developed a novel algorithm to identify fathers in varied family structures, such as when a couple moves in together after the baby's birth, cohabited with other adult males, or where a father changed address or died before the baby's birth (Appendix B).

Mothers were identified through a combination of NCCH data which links child and maternal records and through residency with the child at the time of birth (Appendix B).

Defining the 1001 Critical Days

Parents of babies (live births) born between 01.01.2002 and the 31.12.2021 were followed up for 1001 days from pregnancy to the babies second birthday (follow-up for suicide deaths until 31.12.2023). Gestational age from the child's birth records was used to calculate the start of pregnancy. Births with a gestational age of less than 24 weeks were excluded. Gestational ages of more than 45 weeks or where this value was missing were adjusted to 39 weeks (average gestational age of this cohort). Follow-up times ranged from 898 to 1046 days (average 1004 days).

Parents were required to have a minimum of one year's continuous residency and a minimum of 30 days during the 1001 Critical Days follow-up period in Wales.

Follow-up ended two years after the birth of the baby, date of leaving Wales, or date of death whichever was sooner.

Overlapping periods of follow-up (for example where a father had multiple children with less than two years between birth of one child and conception of another) were combined into one (i.e., maximum follow-up from conception of first child to second birthday of subsequent child(ren)). Fathers could contribute multiple periods of follow-up data (for example where children were born more than three years apart).

We identified mothers of babies born during the same study period using the same residency requirements and follow up was based on gestational age and birth of baby as described for fathers above (See Appendix B).

Analysis

Crude suicide rates per 100,000 fathers were calculated and stratified by age group and deprivation.

Age-standardised suicide rates were calculated using the European Standard Population 2013 (ESP2013 [28]) with age-standardised rates calculated separately for males and females. Age standardisation allows us to control for different age distributions among populations, or over time.

Crude and age-standardised rates were calculated separately for fathers and mothers in the 1001 critical days of all births during the study period and, for the birth of the first identified child separately.

Standardised mortality ratios (SMRS) for fathers were calculated using the population of males aged 17-56 and resident in Wales from 2002-2023 as a reference population.

SMRs for mothers were calculated using the population of females aged 17-46 resident in Wales from 2002-2023 as a reference population. The different reference populations mean these ratios are not comparable.

Confidence intervals of the SMRs were two-tail mid-P exact Cis assuming Poisson distribution for the observed deaths.

Annual cost for the Welsh economy of father suicides was estimated based on the reported average cost per suicide in Wales (£1,423,613) [29] and the computed average annual number of father suicides in Wales from 2002-2023. This value includes employment and other productivity losses, intangible costs, health care costs, coroner and legal costs, and family costs.

Ethical approval

Ethical approval for this study was granted by the Information Governance Review Panel (IGRP; approval number 0204).

Findings

We identified 294,856 fathers of 473,957 babies born between 01.01.2002 and 31.12.2021. Fathers were aged 18-54 at the time of the baby's birth (average age 32).

Suicide Deaths: Fathers

During the 1001 Critical Days from conception to babies second birthday there were 107 suicide deaths in fathers. Of these, 75 occurred during the follow-up time of the fathers first identified baby.

The annual average number of paternal suicides during the 1001 Critical Days was 5.35, with an estimated average annual cost to the Welsh economy of £7,616,330.

The age standardised rate of suicide for fathers during 1001 Critical Days was 12.4 (95% CI 4.9-19.8) per 100,000 fathers.

The age standardised rate of suicide for first-time fathers during 1001 Critical Days was 15.7 (95% CI 4.4-27.0) per 100,000 fathers.

The age standardised rate for the reference population of all males aged 17-56 resident in Wales between 01.01.2002 and 31.12.2023 was 16.4 (95% CI 15.8-17.0) per 100,000 males.

Crude rates show approximately double the rate of suicide for fathers in the most deprived (10.9 [95% CI 7.6-15.0] per 100,000 fathers) compared with the least deprived areas (4.6 [95% CI 2.4-8.0] per 100,000 fathers). This is consistent with suicide rates for the wider population of males (11.6 [95% CI 10.6-12.7] and 5.3 [95% CI 4.6-6.1] per 100,000 males in the most and least deprived areas respectively).

Suicide deaths: Mothers

We identified 294,327 mothers of 461,634 babies born between 01.01.2002 and 31.12.2021 in Wales. Mothers were aged 18-44 at the time of the baby's birth.

The age-standardised rate of suicide for mothers during follow-up was 1.2 (95% CI 0.4-2.0) per 100,000 mothers.

The age standardised rate for the reference population of females was 4.0 (95% CI 3.7-4.4) per 100,000 females.

Standardised Mortality Ratios: Fathers

Fathers in the 1001 Critical Days had around 60% lower suicide deaths than the wider population of males (Table 1), largely driven by a reduction in risk by fathers aged 25-44 years. For fathers aged 18-24 and 45 years and older suicide rates are comparable to the reference population.

Table 1 Standardised Mortality Ratios[a] (SMR[95% CI]) by age group

		Number of Deaths	SMR(95% CI)
Total		**107**	**0.4(0.4-0.5)**
Age group	18-24 years	12	0.8(0.6-1.5)
	25-44 years	80	0.4(0.3-0.5)
	45+	15	0.9(0.7-1.7)

a. Reference population of 1,589,187 males aged 17-56 and resident in Wales 2002-2023

Standardised Mortality Ratios: Mothers

Mothers in the 1001 Critical Days had around 70% lower suicide deaths than the wider population of females (SMR 0.3 [95% CI 0.2-0.4]). It was not possible to break this down by age group due to small numbers.

Implications

1) Surveillance and policy

- This study provides the first United Kingdom population-level rate for 1001 Critical Days paternal suicide: 12.4 per 100,000 overall and 15.7 per 100,000 for first-time fathers. This demonstrates use of routinely collected data for ongoing surveillance of trends and benchmarking alongside maternal indicators.
- During the 1,001 days, fathers show approximately 60 percent lower suicide risk than all males, and mothers show approximately 70 percent lower risk than all females, which is consistent with Nordic register studies that report a greater reduction for mothers [19, 21].
- **Action: Add 1001 Critical Days paternal suicide to routine national reporting and align with maternal surveillance to provide a family-wide view of risk.**

2) Targeted prevention and equity (deprivation)

- Suicide rates are approximately twice as high in the most deprived areas compared with the least deprived areas, mirroring wider patterns for self-harm, mental illness, and other adverse outcomes [30-33].
- **Action: Prioritise outreach in high-deprivation areas, including proactive screening and navigation to mental health, housing, and financial support, and evaluate impacts for both mothers and fathers over time.**

3) First-time fathers (high-priority group)

- There is a signal that first-time fathers may be at higher risk (however confidence intervals are wide). Approximately 70 percent (75 of 107) of paternal suicides occurred during follow-up for the first child, which aligns with evidence that protective factors strengthen with subsequent children. [19, 21]
- The transition to first-time fatherhood is a critical prevention window involving changes in biology (e.g., endocrinology) [34-36], relationships, finances, housing, roles and identity [37, 38].
- **Action: Offer anticipatory guidance, couple-relationship support, and father-tailored resources (e.g. as highlighted in the Supporting Good Parental Health Policy [39]), including for non-cohabiting parents.**

4) Clinical and service design (father-inclusive)

- Help-seeking barriers and under-recognition in fathers limit early intervention [40, 41].
- **Action: Embed father-inclusive 1001 Critical Days mental-health pathways** across midwifery, general practice, and health visiting. Routine screening and offers should be made to partners, with clear referral routes to mental health, addiction, housing, and peer support services [39, 41, 42]. Use existing touchpoints such as Making Every Contact Count to identify vulnerability and act early. Provide tailored information for fathers (for example related to financial planning and navigating health and social system [43]) and train staff to invite, acknowledge, and follow up with fathers directly [39].
- Bereavement services supporting children, surviving parents and broader family networks following 1001 Critical Days suicide should be available and accessible.

5) Cost to the Welsh economy

- Beyond the devastating loss to families and communities, paternal suicides during the 1001 Critical Days carry a significant economic burden for the Welsh economy. With an annual average cost of over £7.2 million, suicide prevention is not only a public health imperative but also an important economic investment.
- The financial impact on families can be particularly severe. Many families still rely on the father as the primary or sole earner particularly during the 1001 Critical Days [44, 45]. The loss of this income can push a family into poverty, creating a ripple effect of long-term economic, emotional and social costs for the family.

6) Parenting, leave, and caregiving

- Paternity or parental leave can be associated with better paternal wellbeing, stronger father–child relationships, improved couple quality, and potentially lower suicide risk [16-19]. The effects of parental leave are mixed and may vary by income [46, 47].
- Current UK paternal shared parental leave has low uptake, with uptake associated with deprivation.
- Evidence suggests that greater involvement in the home and childcare is associated with lower suicide rates in men [48], improvements in mental health for both parents and children [49-53], improved relationship quality and lower divorce rates [54].
- Action: Test and scale father-friendly leave and work-time policies, especially for lower-income families, and monitor effects on engagement, mental health, and suicide or self-harm in both parents.

7) Men aged 25 to 44 years (opportunity window)

- Despite high population suicide rates in middle-aged men, fathers aged 25 to 44 years show the lowest relative risk in this study, with a standardised mortality ratio of approximately 0.4 (95 percent confidence interval 0.3 to 0.5).
- This pattern may reflect selection into parenthood, including prior mental health status, economic stability and relationship status [19], alongside a protective effect of caregiving roles such as reduced loneliness and greater connectedness [55].
- **Action: Leverage this window with relationship-building, caregiving support, and targeted management of mental illness and substance misuse [42].**

8) Data infrastructure and identification of fathers

- The new dynamic algorithm identifies fathers beyond continuous co-residence, reducing bias observed in prior work and capturing a wider range of family structures.
- **Action: Next steps include improving routine linkage of birth registrations and health records, adding paternal fields to 1001 Critical Days datasets, and extending coverage to non-resident fathers, adoptive parents, parents by surrogacy, and same-sex couples. This enhancement would enable analysis of living arrangements, relationship status, and policy impacts on risk and protection.**

9) Research agenda

- Future analyses should include self-harm and diagnosed mental health conditions such as depression, anxiety, and post-traumatic stress disorder preceding 1001 Critical Days paternal suicide.
- Further work should examine relationship transitions, caregiving intensity, parental leave uptake, child complexity and needs, trauma at birth, preterm birth, and social care linkage to paternal suicide in the 1001 Critical Days.
- Research should identify modifiable protective factors, for example shared childcare, household labour, and social connectedness, and test scalable interventions.
- Evaluations should focus on first-time father interventions and equity-focused programmes and should track biological, social, cognitive, and behavioural markers of fathers', mothers', and children's wellbeing and development.

10) Implementation opportunities (healthcare touchpoints)

- Prior SID-Cymru findings indicate frequent healthcare contact in the year before suicide [32], and pregnancy adds additional contacts.
- Action: Configure alerts and protocols across 1001 Critical Days pathways to flag risk patterns and initiate supportive interventions for both parents. These should be evaluated.
- Action: Include screening for paternal mental health history during pregnancy and postpartum

Strengths and Limitations

Strengths

- This study provides, to our knowledge, the **first UK population-level 1001 Critical Days suicide rate for fathers** using linked administrative data.
- The father-identification method **extends previous work** (e.g [25]) by capturing a **wider range of relationship dynamics and living arrangements** than approaches that depend solely on stable co-residence.
- Suicide cases were identified via the **Suicide Information Database for Wales (SID-Cymru)**, which applies **publicly available validated algorithms** to ONS death records [24].
- The approach demonstrates the value of **population-level linkage** and establishes a foundation for **future cross-sector data integration** within the SAIL Databank (e.g., social care, family justice, census, education), alongside primary care, emergency department, hospital admissions, and outpatient data.

- The cohort includes **more than 200,000 fathers (approaching 300,000)**, enabling robust estimation of crude and age-standardised rates despite the rarity of suicide.

Limitations

- The dynamic identification algorithm **cannot capture all fathers** and will **under-ascertain** some groups; for example, **fathers who never live with the mother or baby** may not be identified.
- Because **suicide is a rare outcome**, we **could not meaningfully explore finer interactions**, such as detailed living arrangements, smaller age bands, or methods of suicide.
- The study was conducted in **Wales**, which has **higher deprivation and greater population sparsity** than some other UK nations [56]. These factors affect service access and mental-health outcomes, and **suicide rates are higher in Wales**, although **deprivation and age gradients align** with patterns observed elsewhere in the UK [6].
- The reported economic cost is based on the average cost per suicide across all demographics (sex and age), rather than being specific to paternal suicides. Because these fathers are typically in the prime of their working years and in many cases are the main financial provider for their families [44, 45], the actual economic cost to the Welsh economy is likely higher than estimated.
- As a **first step** using routinely collected data, we were **unable to fully examine** socio-economic, relationship, and mental-health pathways; **further research is needed** to explore these mechanisms in depth.
- The **use and linkage of routinely collected data** bring known constraints (e.g., missingness, misclassification, linkage error), which have been **reported elsewhere** [22, 23].

Conclusion

Paternal 1001 Critical Days mental health research and policy requires insights into the rates of 1001 Critical Days paternal suicide to drive evidence-based practice and policies. By establishing a data-driven rate of 1001 Critical Days paternal suicide, this project lays the foundation for transformative public health strategies and better outcomes for fathers, families, and children.

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Appendix A Datasets and Measures

We used multiple datasets linked at patient level: Welsh Demographic Service (WDS); Welsh Index of Multiple Deprivation (WIMD), containing deprivation scores for all lower super output areas in Wales [57]; National Community Child Health (NCCH) Database containing data on births connected with maternal records; Office of National Statistics (ONS) deaths registers. Full details of these datasets can be found at www.saildatabank.com

Births, gestational age and maternal records: Were taken from NCCH data.

Deprivation: Deprivation quintile based on LSOA on the week of birth of baby from WIMD

Demographic information of father including week of birth, sex, and identification of households with mother or baby: Identified using WDS data. To identify individuals occupying the same household and to infer the father figure linked to the child we used the Residential Anonymous Linking Field (RALF), an anonymised identifier assigned to each dwelling.

Suicide deaths: Identified from ONS deaths registrations using a previously developed algorithm publicly available through the DATAMIND collection (available at https://phenotypes.healthdatagateway.org/; Concept number PH1109 [24]).

Appendix B Identification of parents in routinely collected data