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2023-01-17

# Risk and predictors of out-of-home care placement among children and adolescents with parental mental illness : a population-based cohort study in Sweden (Study IV)

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http://hdl.handle.net/10616/48467

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*Proposed analysis plan*

# Risk and predictors of out-of-home care placement among children and adolescents with parental mental illness – a population-based cohort study in Sweden (Study IV)

Date : 27 July 2021

## Introduction

It is estimated that about a quarter of children and adolescents live in families where at least one parent has a mental illness (1). Our recent register-based nationwide study in Sweden found that, currently, 11% of children 0-17 years have a parent with mental illness severe enough to be treated within secondary care (2). The study also found that, even in the Swedish welfare context, children with parental mental illness are far more likely than other children to experience poverty and broad social adversity, including living separately from their parents (2).

Out-of-home care is a social intervention where a child is temporarily or permanently removed from the parents due to an adverse family situation or own antisocial behaviour and placed in family-based foster care or residential care. From society's point of view, the intention is to provide the child with significantly improved opportunities for growing and learning in those cases where the family of origin has failed. However, numerous studies have shown that children placed in out-of-home care have higher risks for negative health and social outcomes from childhood through adult life (3). Also, parents who have children in out-of-home care might experience an identity trauma and intense emotions, such as shame, anger, and loss, that may negatively affect their mental health and family life (4).

Previous studies have shown that children with parental mental illness are up to 20 times more likely to be placed in out-of-home care compared to other children (5–10), and the risk might be different for different parental mental illness categories (5,7,8,10). Some studies have found that children of mothers with schizophrenia had the highest risk of being placed in out-of-home care (5,10), while other studies have indicated that substance misuse (7), or anxiety disorders (8) might convey the highest risk. However, most previous studies have focused on mentally ill mothers only or included a few categories of mental illness. Detailed information on children's risk of exposure to out-of-home care by type of mother's or father's mental illness is lacking. Moreover, most of these studies only considered the first episode of out-of-home care, whereas it was not uncommon for these children to receive multiple placement episodes (11).

Although parental mental illness is an important predictor of out-of-home care placement among the children, other factors might also influence the risk. Having a single-parent mother and living in the cities have been associated with increased risk for out-of-home care for the children (7,9). Similarly, lower maternal education and maternal unemployment have also been associated with increased risk for out-of-home care placement for the children (5,6,8,9). As could be noted, most of the past studies have focused on mothers and information on how the fathers might play a role within this context is lacking. Most importantly, we have shown that parental mental illness strongly overlaps with socioeconomic adversity (2), meaning that any attempts to characterise risks for these children should consider the socioeconomic conditions of the family.

In Sweden, where the decision of out-of-home care placement is made at the municipal level, there might be added complexity in disentangling which factors might influence the risk of out-of-home care placement among children of mentally ill parents. Differences in the local praxis, available support to families and decision-making mechanisms within each municipality could potentially play a role, although to what extent such influences exist is currently unknown. Areal differences in the risk of placement in out-of-home care among children of mentally ill parents, if shown to exist, would indicate that factors outside the family could partly explain the risk. That, in turn, would imply that families with parental mental illness might be catered for with inequality, and attempts to improve decision making and/or support to these families might protect the rights of and improve outcomes for both children and parents.

Here, we propose a nationwide population-based study on predictors of out-of-home care placement among children of mentally ill parents, using rich information from Swedish national health and administrative registers. We aim to clarify both individual-level factors (children and parents), such as type and timing of parental mental illness, background factors of parents and socioeconomic conditions of the family, and area-level factors, such as the county of residence that might play a role in determining out-of-home care placement among children with parental mental illness within the Swedish context. More specifically, we aim to answer the following questions:

1. What is the risk of out-of-home care placement among children with parental mental illness? Is the risk varied by age and sex of the child and type of maternal or paternal mental illness?

2. What are the risk factors that confers the highest risk of out-of-home care placement among children with parental mental illness?

# Methods

## Study design and settings

Register-based longitudinal cohort study. The Total Population Register (available from 1968) will be used to identify the children (index person) and to obtain their demographics information. The Multi Generation Register (available from 1961) will be used to identify the parents. The information about the children and their parents will then be linked with the National Patient Register (complete coverage for psychiatric disorders since 1973, somatic disorders since 1987 and specialised outpatient care from 2001), as well as National Child Welfare Register (available from 1968). We will use the Longitudinal integrated database for health insurance and labour market studies (LISA, available from 1990) to obtain individual and family-level socioeconomic information.

## Study population

All children residing in Sweden who were born in 1991-2011, will be identified through the Total Population Register, along with their mothers and fathers, which will be linked using the Multi-Generation Register. We will exclude children with no known parents and children with identified adoptive parents. Children will be followed from their date of birth or 3 years after their or their parents' immigration to Sweden, whichever was latest. Children will be followed until date of emigration (either parent or child), death (either parent or child), age 18, or end of follow up, whichever was earliest.

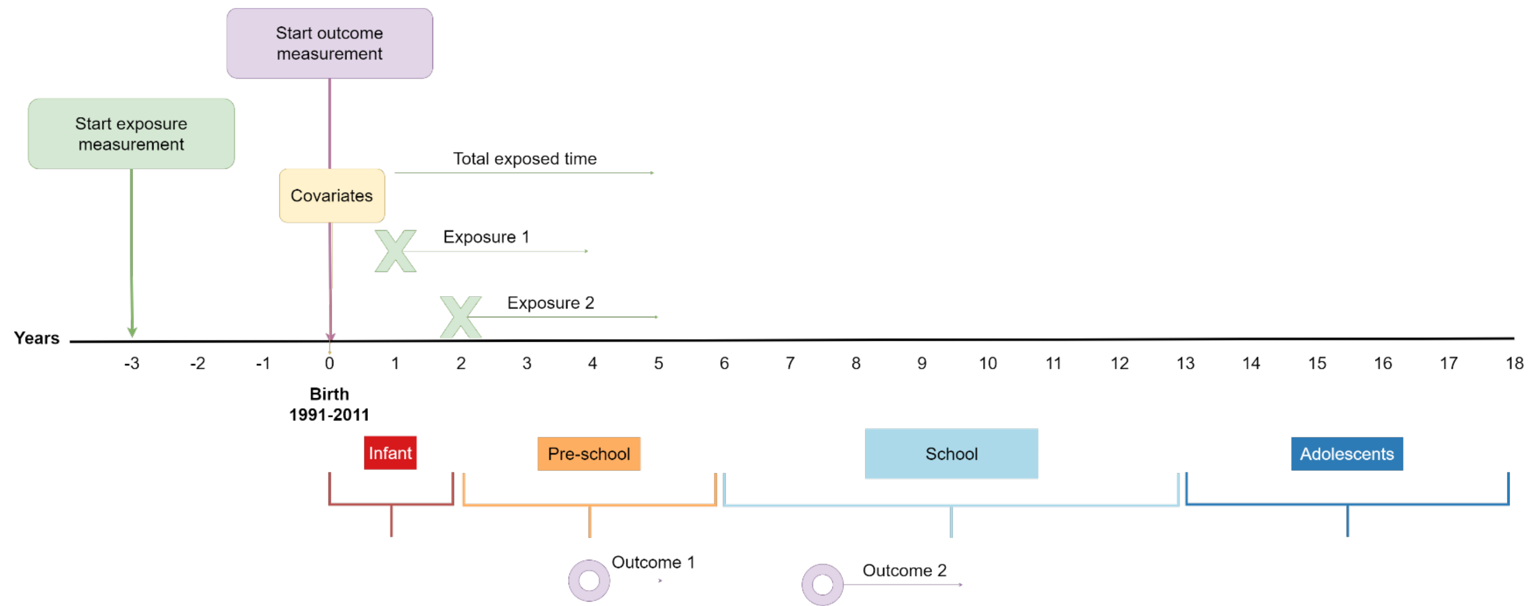



Figure 1. Exposure, outcome, covariates measurements schematic

## Exposure: Parental mental illness

Parental mental illness will be identified through ICD diagnostic codes in the National Patient Register as shown in Table 1 below. We will identify date of diagnosis for maternal or paternal mental illness from 3 years before the start of follow up. Children will be considered exposed to parental mental illness from the date of diagnosis up until 3 years afterwards. If the parents were diagnosed at multiple time points within the 3 years period, the period of exposure will be prolonged to reflect accumulated exposure period (Figure 1).

Table 1 Parental mental illness diagnosis and ICD codes

| Mental illness diagnosis | ICD-8 codes | ICD-9 codes | ICD-10 codes |
|---|---|---|---|
| Non-affective psychotic disorders | 295, 297, 298, excluding 29570, 29810 | 295, 297, 298, excluding 295H and 298B | F20-24, F28-29 |
| Affective psychotic disorders | 296, 29570, 29810 | 296, 295H, 298B | F25, F30-31, F32.3, F33.3 |
| Alcohol/drug misuse | 291, 29430, 303, 304, excluding 30300, 2919 | 291, 292, 303, 304, excluding 291E, 292X | F10–16, F18-19, excluding 4th digit .0 and .9 |
| Mood disorders, excluding those with psychotic symptoms | 30040 | 300E, 311 | F32-34, F38-39, excluding F32.3 and F33.3 |
| Anxiety and stress-related disorders | 300, 305, 3060, 3069, 307, excluding 30040, 30550 | 300A-D, 300F-H, 300W-X, 306, 307A, 308, 309 | F40-48 |
| Eating disorders | 30650, 30550 | 307B, 307F | F50 |
| Personality disorders | 301 | 301 | F60-63, F68-69 |
| Attention-deficit/hyperactivity disorder | 308 | 314 | F90 |
| Autism spectrum disorder | 299 | 299 | F84 |
| Intellectual disability | 311-315 | 317-319 | F70-79 |

## Outcome: Children's out-of-home care placement

We will identify the first date of out-of-home care placement episode from the National Child Welfare Register. We will also identify all subsequent episodes for out-of-home care placement, including start and end dates, to estimate the risk for recurrent out-of-home care placement.

## Covariates

1. Demographic characteristics
    a. Child's sex
    b. Child's birth year
    c. Child's country of birth (Sweden/other countries)
    d. Parental country of birth (Sweden/other countries)
    e. Parental age at birth

2. Parental socioeconomic position at the start of follow up
    a. Parental education (compulsory 0-9 years, secondary 10-12 years, university ≥13 years)
    b. Parental employment status (yes/no)
    c. Family receipt of social welfare benefits
    d. Family disposable income in quintiles

3. County of residence will be identified from the Total Population Register at the start of follow up. The following is the list of counties in Sweden: Stockholm, Västerbotten, Norrbotten, Uppsala, Södermanland, Östergötland, Jönköping, Kronoberg, Kalmar, Gotland, Blekinge, Skåne, Halland, Västra Götaland, Värmland, Örebro, Västmanland, Dalarna, Gävleborg, Västernorrland, Jämtland.

What variable do I actually have (as of 2021-08-02):

1. Sex
2. Birth year
3. County at birth
4. No siblings
5. Child psychopathology
6. Parental country of birth
7. Parental age at birth
8. Parental proxy for marital status
9. Parental education
10. Parental employment status
11. Household receipt of social welfare benefits
12. Household disposable income in quintiles
13. Parental OHC history (until childbirth)
14. 

If I have model, what should I use?

Model 1: sex, birth year, county of birth, no siblings, parental country of birth, parental age at birth, parental proxy for marital status

Model 2: +parental edu, employment status, socbidr, income

Model 3: +child psych

Model 4: +

## Statistical analysis

What I would like to do:

1. Find out rate (incidence rate for first episode?) for out-of-home care placement, by parental mental illness status, stratify by age groups where parental care is likely to differ (infancy (0, 6 months, 12 months), pre-school (2-5 years), school (6-12 years), and adolescence (13-17 years)? (Would it be possible to stratify by age groups? What about the recurrent events? How do people present descriptive data on multiple episodes – especially when duration of the episodes might not be equal? Should we just count number of days instead?)

2. Hazard ratios for first event of out-of-home care placement. Exposure: parental mental illness time-varying 3 years? How do we collapse the exposure period when there is overlapping periods? How do we split the dataset if the children can be exposed, unexposed, then exposed again? And also, (how do we do the splitting) if these results are to be presented by age groups?

3. Hazard ratios for recurrent out-of-home care placements. Is there a way to take into account (censor?) the period when children were into care (so they were not at risk for subsequent episode while they were still in the current placement)? Exposure: same as above. Also, is it possible to stratify by age groups?

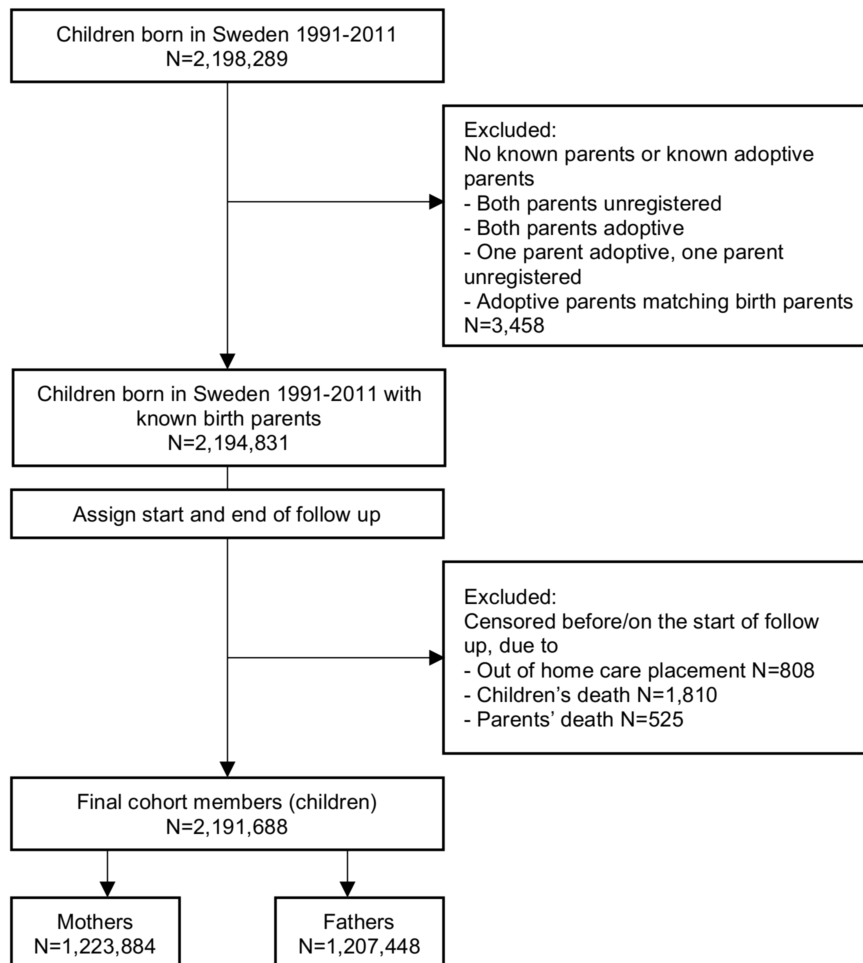
4. Interaction or effect modification by parental demographics, parental/family socioeconomic position, and county of residence

5. Sensitivity analysis: Children to be exposed until the end of follow up once their parents (mothers or fathers) received the first diagnosis of mental illness.

Update:

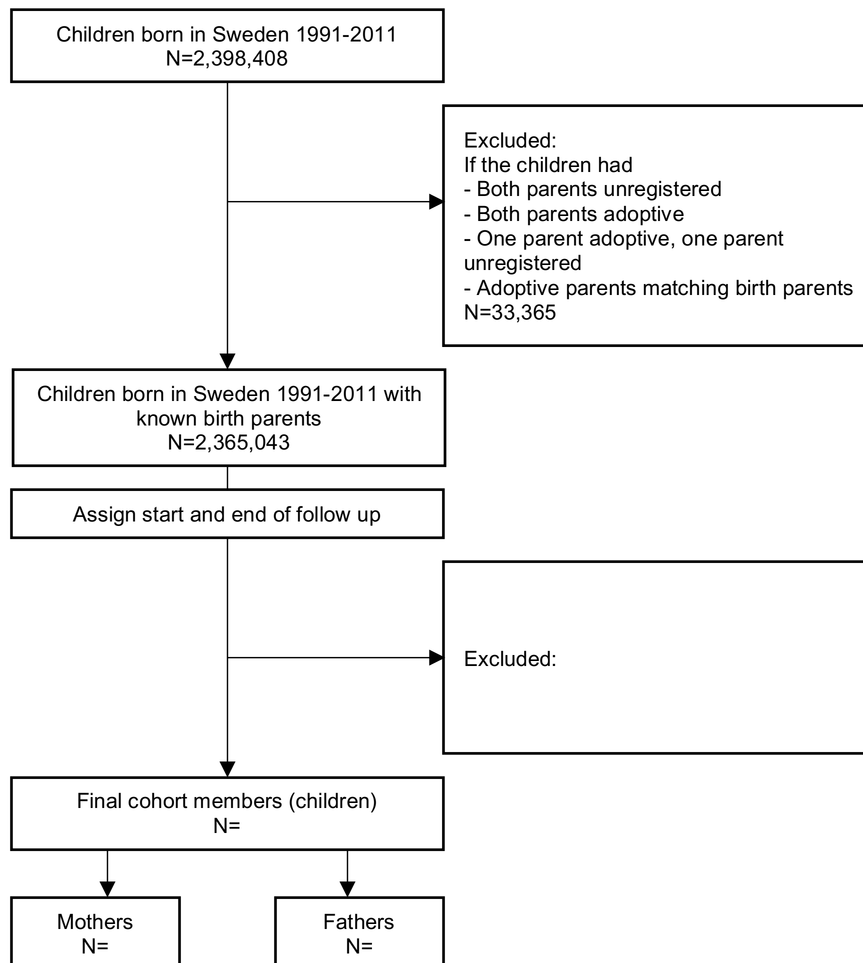
1. For risk OHC: use all pop, exposure anynat? Adjust for confounders
2. For predictors: use CAPRI only, exposure perhaps anynat? Think of factors to adjust and how you would like to go about with diff MI & age & sex?

Study population



## Results

Figure 2. Flowchart of the analytical sample



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Example