**Physical and mental health trajectories of children across families' structures with a special focus on same-sex parents: Evidence from Swedish register data.**

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**Abstract**

A fundamental problem of research on health outcomes of children raised in different family structures, in particular those raised by same-sex parents, is how to deal with the numerous transitions between family forms and their interrelationship with health. Children living in a given family configuration may have followed several paths until getting there, and the same may be said about their health histories. This uses high quality register data from Sweden, following children from birth throughout their early infancy. Marital histories of parents are combined with histories of medical prescriptions and hospitalizations to provide a picture of how family forms and health outcomes co-evolve over children's early childhood. We draw on the descriptive methods of sequence analysis to systematically group trajectories into meaningful typologies and to better understand how timing, order, and length of spells living in several types of family correlate to physical and mental health outcomes of infants.

## 1. Background and objectives

Despite clear progress in the analysis of family transitions and processes over the past decade, the conceptualization and measurement of child health remains relatively underdeveloped (Carr & Springer 2010). Identifying profiles of different health trajectories has been recently suggested as an important source of valuable insights on health inequalities (Pais 2007). Health trajectories can inform about the timing of the onset as well as the nature of health impairment, which can be episodic, recurrent or persistent. Variation of health trajectories among children growing up in different family contexts may reveal the development of diverging needs regarding health care provision.

The aim of this paper is to compare health trajectories among children across family structures. We define the family structure as a composition of a child's residential and biological family. We pay special attention to a variety of parents' partnership relations and we distinguish between single parents, consensual and marital partnerships as well as opposite-sex and same-sex unions. We examine how growing up in a context of a specific family structure is related to following a specific health trajectory.

Growing diversity of family forms across developed countries implies that a family consisting of children with two opposite-sex married biological parents is no longer omnipresent. Still, a married heterosexual couple is it often viewed as a favorable context for raising children in good health (Barrett & Turner, 2005; Sweeney, 2007). It is often stressed that married couples have an economic advantage over unmarried or lone parents and that two parents can provide children with more time, emotional support and attention (Lansford, Ceballo, Abbey, & Stewart, 2001). Moreover, according to the minority stress hypothesis, children in living arrangements differing from those that can be observed in the majority of other children's families may experience more stress due to social stigma (Meyer 2003). This kind of culture-related disadvantage may be pronounced in countries where some family arrangements, such as non-marital unions or same-sex partnerships receive less legal protection from the state and less social acceptance (Lick et al. 2012).

Previous research on family-related determinants of child health was mainly performed in the United States. We carry out our analysis using data for families in Sweden, where diverse family forms are more socially accepted (European Commission 2006) and institutionally supported. For example, the rights for same-sex couples include the right to registered partnership since 1995; adoption since 2003; donor insemination since 2005; and marriage since 2009 (Singer 2010). Thus, when put in an

international perspective, our study may highlight the role of social norms and supportive institutions in fostering the wellbeing of children across family contexts. The availability of a substantial number of children living with same-sex couples allows us to examine this family form using data so far not available for most studies in this field (Moore & Strambolis-Ruhstorfer 2013).

Previous research linking changes in child health with transitions in family structures has been limited by the nature of the available data (Carr & Springer 2010). Any survey can provide only low number of cases of children with major health conditions; besides, carrying out surveys among infants and very small children is not feasible. At the same time, child caregivers' reports may be inaccurate or discrepant (De Los Reyes & Kazdin, 2005). Especially research on health outcomes of children raised by same-sex couples is characterized by the use of mostly small or non-representative samples or data that suffer from recall and report bias (see Tasker 2005 and Hardt and Rutter 2007 for an overview).

In this paper, we use register data that cover the whole Swedish population and thus do not impose small-sample restrictions. To reconstruct health trajectories, we use the Prescribed Drug Registry, where we can identify the patterns of consumption of prescribed medicines (including date and dosage), and National Patient Registry, in which hospitalization (timing, duration and diagnoses) is registered. The quality of these registers is very high according to validation studies (Wettermark et al., 2007). The provision of public health care services for children in Sweden is universal, comprehensive and free of charge (Burström, 2002, Mossialos, Dixon, Figueras, & Kutzin, 2002). Interestingly, recent research based on linked data from the Prescribed Drug Registry and the Survey of Living Conditions, which provides self-reported measures of health suggests that affordability of medicines does not prevent drug utilization in Sweden (Nordin, Dackehag, & Gerdtham, 2013; Weitoft, Rosen, Ericsson, & Ljung, 2008). Most socioeconomic differences in drug use patterns captured in the Prescribed Drug Registry appear to be of the same magnitude as those found in studies on disease incidence and prevalence, meaning that drugs are prescribed and dispensed according to need. Therefore, in Swedish population, the use of health care can be used as an indicator of the occurrence of certain diseases.

## 2. Study design, material and methods

In this paper, we take advantage of the unique longitudinal data provided in the Umeå SIMSAM Laboratory combining information from registers that cover the whole Swedish population. These data capture all registered partnerships or marriages, as well as their biological and adopted children.

Moreover, geographic coordinates for place of residence make it possible to determine if and for how the children live in specific living arrangements of their parents. Research has shown that these coordinates are as reliable as direct measurement of co-residence (Thomson and Eriksson 2013). Our data source provides a sufficient sample to examine health trajectories among children in different family forms.

The Umeå SIMSAM Data Laboratory provides a high level of detail in terms of measures of child health. To reconstruct health trajectories, we use the Prescribed Drug Registry, where we can identify prescribed medicines, and National Patient Registry, in which hospitalization (timing, duration and diagnoses) is registered. In order to analyze these data we use Sequence Analysis with Optimal Matching Algorithm. Originally, this method was previously used for the analysis of protein and DNA sequences in biomolecular studies, but it has been adapted for use in describing sequences of events or states within one's life-course (Abbot & Tsay 2000) Unlike event history analysis, which focuses mostly on single events, sequence analysis allows the analysis of entire trajectories of different types of events, to compare them and to identify prevalent patterns. Multichannel sequence analysis allows the study of multiple parallel sequences (Gauthier et al. 2010), allowing us to study health and family form trajectories simultaneously. It allows us to identify patterns of association between length, timing, and order of children's experiences of the several family forms and their health trajectories. As a descriptive technique, it is an important first step towards understanding how child health and family type co-evolve.

We examine monthly health outcomes of children in period 2005-2010, which is the period observed in the Prescribed Drug Register. Children are followed for five years from birth, and their living arrangements and health outcomes are recoded annually. The adoption of such a "time window" is an arbitrary but necessary choice, because the comparison of trajectories by means of sequence analysis requires sequences of health statuses to be of equal length. The health trajectories are analyzed as they unfold across a state space of physical and mental health domains. The mental health domain includes spells defined as: (1) receiving prescriptions for medications classified as psycholeptics or psychoanaleptics (2) hospitalization due to diagnoses related to mental health (3) receiving no treatment related to mental health. The physical health domain concerns (1) receiving prescriptions for medications related to physical health (Anatomic Therapeutical Categories other than psycholeptics or psychoanaleptics) and (2) hospitalization due to diagnoses different from mental health (3) receiving no treatment related to physical health. The family structure domain includes spells defined as: (1) living with two biological parents of opposite sexes; (2) living with two non-biological parents of opposite sexes; (3) living with two male non-biological parents of same sex;

(4) living with two female non-biological parents; (5) living with one biological mother and a non-biological father; (6) living with one biological father and a non biological mother; (7) living with a one biological and one non-biological mother; (8) living with one biological and one non-biological father; (9) living with a single biological father; (10) living with a single biological mother; (11) living with a single non-biological mother; and (12) living with a single non-biological father.

Sequence dissimilarity calculated based on optimal matching will be used to derive a typology of association between these three domains by means of clustering algorithms. The characteristics of each cluster such as mean time spent at each type of family, under each type of medication, and under hospitalization will be summarized, providing a detailed picture of the co-evolution of health and family trajectories.

## 3. Expected results

We expect to find clusters showing that negative physical and mental health outcomes are associated to disadvantaged family structures such as adoptive, foster, and single parenting. We also expect our analysis to shed light on the importance of timing, length and order of spells living in such structures for shaping mental and physical health of children.

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