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Out-of-home placement and regional variations in poverty and health and social services spending: A multilevel analysis

Tonino Esposito [a,*], Martin Chabot [b], David W. Rothwell [c], Nico Trocmé [b], Ashleigh Delaye [b]

[a] Canada Research Chair in Social Services for Vulnerable Children, School of Social Work, University of Montreal, 3150, Jean-Brillant, Montreal, Quebec H3C 3J7, Canada
[b] Centre for Research on Children and Families, McGill University, 3506, University Street, Montreal, Quebec H3A 2A7, Canada
[c] School of Social and Behavioral Health Science, Oregon State University, 462 Waldo Hall, Corvallis, OR 97331, USA

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ABSTRACT

This paper examines the extent to which regional variations in poverty and health and social services spending impact the risk of placement, after controlling for individual-level risk factors and regional latent differences in delivery of child protection services. Clinical administrative child protection data were merged with income and health and social services spending data for the province of Quebec; the final data set included all children ($N = 122{,}466$) investigated for maltreatment for the first time between April 1, 2002 and March 31, 2010, of which 22.6% ($N = 27{,}710$) were placed in out-of-home care. Multilevel hazard results indicate that poverty, controlling for health and social services spending, contributes to the increased risk of placement. Specifically, poverty and health and social services spending account for 57.1% of the variation in regional placement for younger children <5 years of age and 38.1% for children age 5 to 11 years.

1. Introduction

Poverty is a well-established risk factor for various indicators of child maltreatment (Cancian, Slack, & Yang, 2010; Chamberland, Bouchard, & Beaudry, 1986; Drake & Pandey, 1996; Lindsey & Shlonsky, 2008; Pelton, 1989; Rothwell & Boer, 2014; Slack, 2004; Sedlak et al., 2010), and placement in out-of-home care (Berger, 2004; Berger & Waldfogel, 2004). However, far less is known about the extent to which poverty reduction policies and family support services might mitigate this relationship (Jones, Finkelhor, & Halter, 2006; Steinberg, Catalano, & Dooley, 1981). The influence and strength of the relationship between poverty and child maltreatment is particularly interesting to consider in jurisdictions that have made clear and sustained efforts to reduce the effects of poverty through socially progressive family-centered policies.

The province of Quebec has been one of the most socially progressive jurisdictions in North America, offering an array of poverty reduction and family support services, ranging from universal free health care, subsidized public child care and early learning services, affordable tuition fees, higher parental leave benefits, and a very progressive income tax redistribution system (Fréchet, Lechaume, Legris, & Savard, 2013; Swift & Callahan, 2006). Among the provinces in Canada, Quebec has the second lowest rate of relative poverty among both children and single-parent female-headed families (Statistics Canada, 2015a). As a result of the redistribution system, Quebec maintains the lowest level of after-tax and transfer income inequality when compared with other large Canadian provinces (Fréchet et al., 2013). In Quebec, income inequality as measured by the Gini coefficient, is reduced from 0.443, using market income, to 0.292 after taxes and transfers. This 34% decrease is the largest proportionate reduction across Canadian provinces (Statistics Canada, 2015b). This is primarily because Quebec, compared to the rest of Canada, has adopted a socially progressive model establishing a social minimum through province-sponsored universal services and relatively high tax rates and income transfers (Boychuk, 2004).

Despite Quebec's socially progressive model, socioeconomic disadvantages continue to be important risk factors for child maltreatment and subsequent out-of-home placement (Chamberland et al., 1986; Esposito et al., 2013). Esposito et al. (2013) found that neighborhood-level socioeconomic disadvantages of the clinical population served by child protection significantly contribute to the increased risk of out-of-home placement for all children, but are most influential for younger children investigated primarily for reasons of neglect and parents' high-risk lifestyle. Beyond the influence of neighborhood socioeconomic disadvantages of the clinical population served, this paper examines the extent to which regional[1] variations in poverty and health and social

* Corresponding author.
E-mail addresses: Tonino.esposito@umontreal.ca (T. Esposito), Martin.chabot@mcgill.ca (M. Chabot), David.rothwell@oregonstate.com (D.W. Rothwell), Nico.trocme@mcgill.ca (N. Trocmé).

[1] Regions represent territorial aggregations used to organize the delivery of provincial government services. They are often referred as Quebec administrative regions.

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services spending impact the risk of placement, after controlling for individual-level risk factors and regional latent differences in delivery of child protection services.

2. Theoretical framework

Ecological and life-course perspectives that focus on the combination of environmental factors and the timing of life experiences (Belsky, 1993; Cicchetti & Lynch, 1993; Gill & Jack, 2007; Jack, 2000; Laub & Sampson, 2001) serve as theoretical frameworks in understanding how poverty, and health and social services spending influence the risk of out-of-home placement. Child placement is assumed to result from a wide array of interconnected risk factors at multiple levels associated with children's age-specific vulnerabilities (Wulczyn, Barth, Yuan, Harden, & Landsverk, 2005). Children's security and developmental well-being are influenced not only by experiences of proximal environments, such as relationships within the immediate family, but are also thought to be influenced by environments that impact the financial statuses and support networks for families (Kauppinen, Kortteinen, & Vaattovaara, 2011; Rivaux et al., 2008; Tremblay & Nagin, 2005).

Poverty plays a particularly strong predictive role in the quality of parenting received by children. When families experience income constraints, they may encounter stressors that affect relationships and parenting capacity (Conger & Conger, 2002; Elder & Caspi, 1988), and can result in forms of maltreatment, particularly child neglect (Berger, 2007; Slack, 2004). However, child protection legislation attributes the primary responsibility for conditions associated with neglect to parents, with relatively little emphasis on the role that poverty plays in creating these conditions (Trocmé et al., 2013). Families who are poor struggle to balance basic financial demands, such as the cost of food, accommodation, transportation, clothing, and education, which results in overall difficulties in daily living. In addition, the stress of low income places psychological demands on individuals that affects their judgement and decision making abilities (Mani, Mullainathan, Shafir, & Zhao, 2013). Parental difficulties, poverty, and a lack of resources and supports may aggravate the challenges these vulnerable families face, which altogether decreases parental ability to provide safe and adequate environments for their children and increase the risk of out-of-home placement in situations of maltreatment.

3. Background studies

The relationship between family-level poverty, child maltreatment, and out-of-home care is well documented (Berger, 2004; Berger & Waldfogel, 2004; Cancian et al., 2010; Drake & Pandey, 1996; Fallon, Ma, Black, & Wekerle, 2011; Gelles, 1992; Lindsey, 1991; Lindsey & Shlonsky, 2008; Pelton, 1989; Sedlak et al., 2010). In a review of child welfare research, Lindsey and Shlonsky (2008) suggest that a significant proportion of children come to the attention of child protection services as a result of poverty alone. Examining the U.S. National Incidence Study, Sedlack and associates (2010) found that risk of maltreatment is up to five times higher for low-income families compared to non-low-income families. Similarly, examining the Canadian National Incidence study of Reported Child Abuse and Neglect, Fallon et al. (2011) found that family-level poverty was a significant and influential risk factor for child maltreatment reports resulting in services. Regarding the risk of out-of-home placement, Lindsey (1991) suggested that the income level of parents is one of the best predictors of whether children will be placed in out-of-home care. Conclusions by longitudinal studies such as Berger (2004) and Berger and Waldfogel (2004) support this claim, finding that children from low-income families are much more likely than children from non-low-income families to be placed in out-of-home care.

Beyond the immediate family and at the broader level, most evidence suggests that socioeconomically disadvantaged environments have higher child maltreatment rates. Several studies by Coulton et al. (1995, 1999, and 2007) and a review of the literature by Freisthler, Merritt, and LaScala (2006) confirmed that neighborhood-level socioeconomic disadvantages were highly correlated with higher incidence of maltreatment. Analyzing 159 census tracts in Maryland's Montgomery County, Ernst (2001) reported similar results, suggesting that the combination of residential instability and poverty account for close to half of the variation in rates of maltreatment between census tracts. Other studies obtained a more specific result based on maltreatment type. For example, Drake and Pandey (1996) found the association with neighborhood poverty to be strongest for neglect when compared to physical and sexual abuse. In a similar fashion Kim (2004) found a correlation between neighborhood poverty and neglect, but not with sexual or physical abuse. The relationship seems to hold for income inequality as well. In a more recent U.S. national study across 3142 counties, income inequality was associated with higher maltreatment rates after controlling for child poverty, demographic and economic variables, and state-level variation in maltreatment rates (Eckenrode, Smith, McCarthy, & Dineen, 2014). However, one study found no consistent and compelling relationship between state-level measures of economic insecurity and child maltreatment rates (Millett, Lanier, & Drake, 2011).

While the association between poverty and maltreatment risk has been established, fewer studies have examined the risk on out-of-home placement or variation in rates of out-of-home placement between broader level aggregations of populations. In a recent study, Lery (2009) examined the role of community structure and placement rates using three different spatial scales—(1) census tract; (2) block groups; and, (3) zip codes—and found that the different spatial scales produced similar results in that placement was significantly higher in poorer aggregations. Similarly, Needell, Brookhart, and Lee (2003) found that neighborhood poverty, based on zip codes, predicts a higher likelihood of foster care placement. In a more recent multilevel analysis, Rolock, Jantz, and Aner (2015) used the Chicago Community Adult Health Study data and administrative data from the Illinois Department of Children and Family Services to examine the effect of child and community-level characteristics on placement. They report a significant and positive association between community risk factors such as residential insecurity and placement in foster care.

The extent to which health and social services might mitigate the observed effects of poverty and risk of maltreatment and placement remains elusive. Studies examining the influence of broader aggregations of poverty often do not include measures of health and social services spending, which may moderate the observed effects of poverty, risk of maltreatment, and placement. Jones et al. (2006) for instance, report a negative relationship between funding and child maltreatment: U.S. states with higher funding per capita for child welfare services had lower rates of neglect. In a similar fashion, Paxson and Waldfogel (2002, 2003) report negative associations between a reduction in welfare benefits and out-of-home care. However, significant gaps remain. Studies focusing on broader aggregations have primarily focused on reports of maltreatment, but less is known about the ensuing interventions (e.g., out-of-home placement). These studies also do not differentiate between the youngest children and the oldest, thereby masking age-specific clinical differences associated with out-of-home placement. Quebec is particularly interesting in this context where adolescents, under the age of 18, may be investigated and receive child protection services for severe behavioral disturbances as a main concern, but these children will likely fall under broad categories of maltreatment (i.e., neglect) in other Canadian provincial jurisdictions and U.S. states (Trocmé et al., 2010). Lastly, studies have not examined the extent to which broader aggregations of poverty and health and social services spending explain regional variations in child protection placement risk. The present study, therefore, contributes to the child maltreatment literature by examining the extent to which regional population-based variations in poverty and health and social services spending impact the risk of placement, after controlling for individual-

level risk factors and regional latent differences in delivery of child protection services.

4. Method

This study uses a multilevel longitudinal research design that draws data from four sources: (1) longitudinal administrative data from Quebec's child protection agencies (Esposito, Trocmé, Chabot, Duret and Gaumont, 2015; Esposito, Trocmé, Chabot, Coughlin, Gaumont and Gobeil, 2015); (2) social assistance and family low-income data from the Quebec Institute of Statistics (QIS); (3) Canadian Census data; and, (4) intra-province health and social services spending data from the Ministry of Health and Social Services (MHSS). The first data source consists of anonymized longitudinal clinical administrative child protection data from all mandated child protection regions across the province of Quebec. These data were drawn from a common provincial information system used by every mandated child protection agency in Quebec and contain data on approximately 450,000 children dating back to 1989 (Esposito et al., 2015a, 2015b). All covariates used in this study—except for neighborhood and regional poverty, and health and social services spending—were constructed using these clinical administrative data. The second, third, and fourth data source is intra-province data retrieved from Census Canada, QIS, and MHSS, used to create a clinical population-specific measure of socioeconomic disadvantages, and regional population-specific measures of poverty, and health and social services spending.

The clinical population studied consists of all children ($N = 122{,}466$) investigated for maltreatment for the first time between April 1, 2002, and March 31, 2010, and were followed for a minimum of 18 months from their initial child maltreatment investigation. Out-of-home placement is the dependent variable in this study. Initial out-of-home care is defined as any placement lasting longer than 72 h following initial investigation.[2] Out-of-home placement includes, (1) a formal subsidized placement in family-based care; and, (2) a formal subsidized placement in a structured group living setting or a therapeutic residential treatment facility. The follow-up period started from the date of initial investigation within a child protection jurisdiction to the date of initial placement or end of follow-up period—September 31, 2011—or the child's 18th birthday, whichever came first.

4.1. Covariates

The model includes covariates reflecting the ecological influences that impact the risk of out-of-home placement. *Age at entry* is measured as a continuous variable. *Gender* is a nominal variable with female as the reference group for male. *Reason for investigation* consists of the following dichotomous constructs: (1) psychological and emotional abuse, which includes rejection, denigration, exposure to intimate partner violence and exploitation; (2) physical, material and health neglect, which includes physical neglect, medical neglect, and material deprivation; (3) parent high-risk lifestyle, which represents parents' lifestyle resulting in a failure to supervise or protect the child, including abandonment due to parental absence, substance abuse, refusal to assure child care, and risk of neglect; (4) school truancy and school neglect, which includes failure to attend school or failure to ensure that the child attends school; (5) physical abuse; (6) sexual abuse; (7) behavioral problems such as harming behavior, violence towards self and others, child substance abuse, school behavioral problems, runaway behavior, and destruction of property; (8) risk of sexual abuse; and, (9) risk of physical abuse. *Youth criminal justice service request* measures, as a nominal variable, whether older children received a request for services under the Quebec Youth Criminal Justice Act (LSJPA—Loi sur la justice pénale des adolescents) prior to placement. *Number of investigations* is calculated by examining the number of times children are investigated for maltreatment prior to placement or (in the absence of a placement) the end of the follow-up period. *Source of referral* includes the following nominal values: (1) community health and social services clinics (CLSC); (2) child protection agency; (3) extended family and neighbors; (4) school staff; (5) police; (6) hospital staff; (7) other professional institutions; and, (8) unknown. The measure of *neighborhood socioeconomic disadvantage* assigned to each sample member includes six socioeconomic indicators (see Esposito et al., 2013). For each of the census dissemination areas, we coded the (1) total population age 15 years and over who are unemployed or not in the labor force; (2) median income for population age 15 years and over; (3) total persons in a private household living alone; (4) total population 15 years and over who were separated, divorced or widowed; (5) family median income; and, (6) median household income.[3] The socioeconomic disadvantage is intended as a proxy for family income, given that family-level information on income was not available for the study. The index was normalized and linked with the child protection clinical administrative data based on the children's postal codes at initial maltreatment investigation, reflecting the socioeconomic disadvantage estimates of the immediate neighborhood surrounding—ranging from 400 to 700 persons—of the clinical population of children served by child protection. The index has a minimum score for children investigated by child protection of −3.37 representing the lowest socioeconomic risk and a maximum score of 3.51 representing the highest socioeconomic risk. The index has a mean score of 0.2898 (s.d. 0.9203) and median of 0.2931.

At the second level, three measures were generated for each of the 15 regions. First, *percentage of people receiving social assistance payments* was created by dividing the average number of people receiving social assistance payments by the average population of people living within the region for years 2008 to 2012. The basic monthly social assistance payment ranges from $616 for an individual adult to $955 for two adults in a household (Quebec, 2015). Slightly over 4% of the population in Quebec receive social assistance payments. The minimum regional percentage was 1.99% and the maximum regional percentage was 7.09%. The percent of regional population receiving social assistance can be considered an indicator of absolute poverty in the region. Second, the *percentage of low income families with children* consists of a compound measure of relative poverty aggregated by region. The measure was created by dividing the average number of low-income families with children—including both single and two-parent families—by the average number of families with children within the each region. Average values were calculated for years 2008 to 2012. The relative poverty threshold is a standard measure based on 50% of median equalized after-tax income for the province of Quebec. The average median after-tax yearly income for families in Quebec for the same time period was $59,840 (Statistics Canada, 2013). Our measure, therefore, computes the regional percentage of families with children with an average after-tax yearly income of $29,920 or less. Slightly over 10% of families with children in Quebec are low-income families. Across regions, relative poverty ranged from 5.39% to 18.50%. *Health and social services spending* per capita consists of a compound measure of uncapped spending aggregated by region between 2006 and 2014—a measure reflecting the needs of the population. Average regional spending was computed for each year for: (1) social services (excluding child welfare services spending); (2) physical and intellectual disabilities services; (3) loss of autonomy services; (4) mental health and substance dependency services; and, (5) physical and public health services. The average sum of regional spending was divided by the average regional population, and the per capita spending was then divided by 100, reflecting

[2] The reported results are insensitive to numerous definitions of placement. As a result, placements are considered only if they last longer than 72 h, in order to control for respite placements and emergency placements, which are not part of a child's long-term plan.

[3] The socioeconomic disadvantages index is based on a deprivation index created by Pampalon and colleagues used to facilitate the monitoring of social inequalities for health planning. For details, see Pampalon, Hamel, Gamache, and Raymond (2009).

the amount of health and social services spending per capita in $100 units. The provincial average health and social services spending was $1523 per capita with a minimum regional spending amount per capita of $988 and a maximum regional spending amount per capita of $2214.

4.2. Analytic model

This study uses multilevel Cox proportional hazard models to estimate the individual and regional effects on out-of-home placement. The proportional hazard component identifies the probability of placement at time *t* given that children were investigated for maltreatment and at risk of placement until time *t*. In a Cox proportional hazard regression model, children are considered at risk until they either experience the placement, are censored (the follow-up time—September 31, 2011—expires), or turn 18 years old and are no longer at risk of placement. The multilevel component in this study also models the variation between regions. The overall statistical model is specified as:

$$\ln [H(t)/H_0(t)]_{ij} = b_{00} + b_1X_{1ij}\ldots\ldots + b_kX_{kij} + C_{1J}Z_{1j}\ldots\ldots + C_{3J}Z_{3j} + U_j + e_{ij}$$

where $X_{1ij\ldots\ldots}X_{kij}$ represents individual covariates for children *i* in region *j*; Z_j represents second-level covariates (percentage of people receiving social assistance payments, percentage of low-income families with children and health and social services spending per capita) for region *j*; *Uj* is the random effect at the second-level associated with region *j*; and e_{ij} is the random error. The $\exp^{(b|c)}$ represents the risk (expressed as a hazard ratio) of placement for each covariate holding all other covariates constant. Given the different units of measurement, covariates have been standardized using both the variance of the covariates and the outcome, allowing for the comparison of the relative importance of each with placement (Bring, 1994). Interpretations of standardized exponential coefficients reflect the hazard risk of placement associated with one standard deviation increase in covariates. This allows us to determine whether a change of one standard deviation in one covariate produces more of a change than in another covariate. Lastly, the proportion of explained variance that is at the second-level was calculated as:

$$V_{explained} = \frac{V_0 - V_1}{V_0} \mathrm{X}\, 100$$

where V_0 is the residual variance in the null multilevel model accounting for the nested data structure (children nested in administrative regions) and V_1 is the second-level residual variance once we include percentage of people receiving social assistance payments, percentage of low-income families with children, and health and social services spending per capita (final multilevel model). The data set was constructed and transformed using SPSS version 22 and analyzed using Mplus 7. Statistical tests were conducted at 95% level of confidence.

4.3. Analytic process

Fig. 1 illustrates a curvilinear distribution regarding children's age at initial investigation and proportion of out-of-home placement in Quebec. Of all children investigated for the first time in the last 9 years, children younger than 1 year and older than 12 years have the highest proportion of out-of-home placement, a trend noted in all administrative regions. A sensitivity analysis examining the age distribution within regions associated with placed children confirms a regional curvilinear distribution skewed in the direction of children under the age of one. Given that age distributions and proportion of placed children are similar but nonlinear across administrative regions, a decision was made to analyze older and younger children separately.

The analysis was performed in several steps. First, descriptive analyses were used to examine all covariates and placement (see Table 1). Table 2 presents correlational interactions between regional percentage of people receiving social assistance payments, percentage of low-income families with children, and health and social services spending per capita, respectively, and overall regional percentage of children placed in out-of-home care. This allowed us to assess the nature and magnitude of the bivariate interaction between regional poverty, health and social services spending, and placement.

In order to ensure that there is no linearity among covariates, an ordinary least squares linear regression was conducted with first-level covariates used in the final multilevel hazard models, to determine the variance inflation factor estimates (VIF). If the values of VIF exceed 5, they are regarded as indicating multi-collinearity (Frees, 2004). For children age 0 to 4 years, the VIF estimates ranged from a low of 1.016 to a high of 2294. For children age 5 to 11 years, the VIF estimates ranged from a low of 1.010 to a high of 1349, and for children age 12 to 17 years, the VIF estimates ranged from a low of 1009 to a high of 2288. There are no issues of linearity between first-level covariates in any of the age-specific models.

Next, a null multilevel model (children nested in administrative regions), a multilevel model with each regional variable modeled independently at the second-level, and a final multilevel model with all three regional variables entered were estimated, for the purpose of comparing possible moderating effects of second-level variables on out-of-home placement. The final models include covariates that were not significantly associated with placement in out-of-home care, which enables us to assess whether second-level covariates would

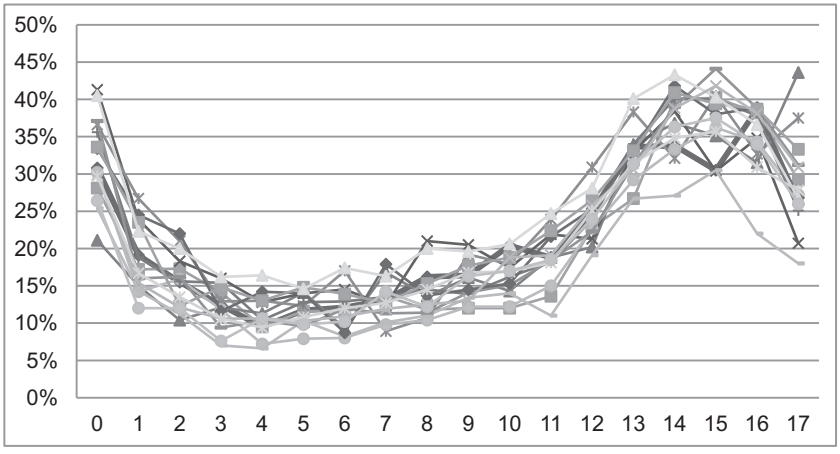

Fig. 1. Proportion of placement by age at initial investigation by administrative region ($N = 122{,}466$).

Table 1
First-level descriptive factors.

Individual factors	Children investigated 0–17 ($N = 122,466$)	Children investigated 0–4 ($N = 35,923$)	Children investigated & placed 0–4	Children investigated 5–11 ($N = 45,386$)	Children investigated & placed 5–11	Children investigated 12–17 ($N = 41,157$)	Children investigated & placed 12–17
Out-of-home placement:	22.6% ($N = 27,710$)		20.1% ($N = 7237$)		14.3% ($N = 6488$)		33.9% ($N = 13,985$)
Gender:							
Male	50.6%	51.3%	21.3%	53.7%	14.9%	46.6%	36.7%
Female	49.4%	48.7%	19.0%	46.3%	13.6%	53.4%	31.6%
Reason for investigation:							
Psychological & emotional abuse	7.1%	7.9%	13.5%	7.9%	13.4%	5.6%	25.2%
Physical, material & health neglect	5.7%	9.7%	22.0%	5.8%	13.7%	2.3%	18.5%
Parent high risk lifestyle	37.4%	57.2%	26.6%	39.2%	17.0%	21.4%	24.0%
School truancy & neglect	4.6%	–	–	5.1%	11.3%	4.7%	23.8%
Risk of sexual abuse	1.6%	1.7%	5.5%	2.0%	4.5%	1.2%	7.9%
Sexual abuse	8.4%	6.5%	3.6%	9.7%	9.2%	8.5%	15.6%
Behavioral problems	15.0%	–	–	4.4%	27.4%	39.7%	51.4%
Risk of physical abuse	2.1%	3.7%	9.9%	1.9%	5.1%	1.0%	12.4%
Physical abuse	18.0%	13.1%	10.8%	24.0%	12.2%	15.7%	25.2%
Source of referral at investigation:							
CLSC	10.5%	12.4%	22.1%	9.5%	18.9%	10.1%	35.4%
Youth protection agency	10.1%	12.5%	24.6%	9.7%	13.7%	8.3%	26.9%
Police	16.6%	16.5%	14.9%	14.2%	13.1%	19.2%	39.2%
Other professional institutions	7.8%	11.9%	13.8%	6.7%	10.7%	5.3%	27.8%
School	20.8%	–	–	31.1%	14.3%	24.2%	25.5%
Hospital staff	6.9%	14.5%	33.8%	3.2%	18.3%	4.2%	35.5%
Unidentified	3.8%	8.1%	20.5%	3.8%	16.1%	2.7%	25.8%
Family	23.4%	23.6%	16.8%	21.6%	13.6%	25.9%	41.7%
	–	–	–	–	–	18.2%	34.9%
Request for youth criminal justice services	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)
Child age at investigation	7.70 (5.28)	2.10 (1.59)	1.38 (1.51)	8.47 (2.00)	8.79 (2.00)	14.71 (1.48)	14.83 (1.37)
Number of investigations	1.50 (0.95)	1.68 (1.17)	1.80 (1.30)	1.55 (0.978)	2.01 (1.27)	1.28 (0.61)	1.36 (0.68)
Socioeconomic disadvantages	0.28 (0.92)	0.43 (0.89)	0.61 (0.86)	0.26 (0.91)	0.43 (0.88)	0.17 (0.94)	0.19 (0.95)

change the significance of the estimate. Tables 3 to 5 report estimates of the multilevel Cox proportional hazard regression models for age-specific groups—children age 0 to 4 years (see Table 3, $N = 35,923$); children age 5 to 11 years (see Table 4, $N = 45,386$); and children age 12 to 17 years (see Table 5, $N = 41,157$).

5. Results

A description of the clinical population appears in Table 1. The vast majority of investigated children remain living with their families. <23% of the population of children studied were placed in out-of-home care over the study time period. There was considerable variability across age groups. The proportion of children investigated and placed out-of-home is highest (33.9%) for older children age 12 to 17 at initial investigation, followed by 0 to 4-year-olds (20.1%) and 5 to 11-year-olds (14.3%). There are relatively equal proportions of male and female investigated children, although males have a higher proportion of placement. Younger and older children were also investigated for different reasons, with 57.2% of children age 0 to 4 years and 39.2% of children age 5 to 11 years investigated for parents' high-risk lifestyles, of which 26.6% of investigated 0 to 4-year-olds and 17.0% of 5- to 11-year-olds were placed in out-of-home care. While for older children 12 to 17 years old, 39.7% were investigated for behavioral problems as a main concern, of which 51.4% of investigated 12- to 17-year-olds were placed in out-of-home care.

Overall, the highest proportions of investigated children were reported by a family member (23.4%), except for children 5 to 11 years old, close to one third (31.1%) were reported by a school staff. A request for youth criminal justice services was also made prior to placement for 18.2% of older investigated children, of which 34.9% of older investigated children with a request for youth criminal justice were placed in out-of-home care. The average count of child protection investigations is 1.50 (s.d. 0.95), an average that increases for younger children age 0 to 11 years old and decreases for older children 12 to 17 years old. The index of socioeconomic disadvantages for the clinical population of investigated children is 0.28 (s.d. 92), an estimate that reflects an increase in socioeconomic disadvantages for younger children age 0 to 11 years old and a decreases for older children 12 to 17 years old, and overall higher for placed children than children investigated for maltreatment.

Table 2
Correlation between regional placement, percentage of people receiving social assistance, percentage of low-income families with children and health and social services spending.

	Regional out-of-home placement	Percentage of people receiving social assistance payments (2008–12) (PSS)	Percentage of low-income families with children (2008–12) (PLIF)	Health and social services spending per 100$ units per capita (2006–14) (HSS)
Regional out-of-home placement	1			
Percentage of people receiving social assistance payments (2008–12) (PSS)	0.395^{***}	1		
Percentage of low-income families with children (2008–12) (PLIF)	-0.033^{***}	0.845^{***}	1	
Health and social services spending per 100$ units per capita (2006–14) (HSS)	0.470^{***}	0.681^{***}	0.562^{***}	1

Table 3
Multilevel Cox proportional hazard model of initial out-of-home placement for children age 0 to 4 years.

	Number of events and censored values							
	Total	Events	Censored	% Censored				
	35,923	7237	28,686	79.8%				
	Null model				Final model			
	Beta	t	Adj. HR	(95% CI)	Beta	t	Adj. HR	(95% CI)
Child age at initial investigation	−0.500	−29.8	0.607***	(0.58, 0.62)	−0.500	−29.7	0.607***	(0.58, 0.62)
Child sex:								
Male (female ref)	0.056	3.38	1.05**	(1.02, 1.09)	0.056	3.37	1.05***	(1.02, 1.09)
Reason for investigation:								
Psychological & emotional abuse	0.091	3.15	1.09**	(1.03, 1.15)	0.091	3.15	1.09***	(1.03, 1.15)
Physical, material & health neglect	0.203	6.29	1.22***	(1.15, 1.30)	0.202	6.28	1.22***	(1.14, 1.30)
Parents' high risk lifestyle	0.445	9.53	1.56***	(1.42, 1.71)	0.444	9.50	1.56***	(1.42, 1.71)
Risk of sexual abuse	−0.078	−2.98	0.92**	(0.87, 0.97)	−0.079	−3.00	0.92**	(0.87, 0.97)
Sexual abuse	−0.257	−8.35	0.77***	(0.72, 0.82)	−0.258	−8.40	0.77***	(0.72, 0.82)
Risk of or physical abuse (ref)								
Source of referral:								
CLSC	0.068	2.71	1.07**	(1.01, 1.12)	0.069	2.72	1.07**	(1.02, 1.12)
Youth protection	0.114	7.84	1.12***	(1.08, 1.15)	0.115	7.84	1.12***	(1.08, 1.15)
Police	−0.080	−2.64	0.92*	(0.87, 0.97)	−0.080	−2.63	0.92**	(0.87, 0.98)
Other prof. Institutions	−0.012	−0.992	0.98	(0.96, 1.01)	−0.012	−0.976	0.98	(0.96, 1.02)
Hospital staff	0.231	9.85	1.26***	(1.20, 1.31)	0.034	9.78	1.26***	(1.20, 1.32)
Unidentified	0.034	3.07	1.03**	(1.01, 1.05)	0.034	3.05	1.03**	(1.01, 1.07)
Family (ref)								
Number of investigations	0.030	1.58	1.03	(0.99, 1.07)	0.029	1.53	1.03	(0.992, 1.06)
Socioeconomic disadvantages	0.193	3.94	1.21***	(1.10, 1.33)	0.191	3.92	1.21***	(1.10, 1.33)

Level 2	Null Model	PSS Only	PLIF Only	HSS Only	PSS & PLIF & HSS		
Percentage of people receiving social assistance payments (2008–12) (PSS)		1.41* (1.08, 1.84)			0.714	3.62	2.04*** (1.38, 3.00)
Percentage of low income families with children (2008–12) (PLIF)			0.85 (0.62, 1.16)		−0.806	−4.11	0.44*** (0.30, 0.65)
Health and social services spending per 100$ units per capita (2006–14) (HSS)				1.54** (1.15, 2.05)	0.352	2.16	1.42* (1.03, 1.95)
	Null model	PSS Only	PLIF Only	HSS Only	Final model (PSS & PLIF & HSS)		
Residual variance (V_1)	0.028	0.025	0.028	0.023	0.012		
$V_{explained}$ $((V_0 - V_1) / V_0)100$		10.7%	0%	17.8%	57.1%		

* $P < 0.05$.
** $P < 0.01$.
*** $P < 0.001$.

Statistically significant correlations were found between regional placement and second-level variables (see Table 2). Out-of-home placement is strongly correlated with two of the three second-level variables. We see that 15.6% of the variation in regional placement is explained by the level of social assistance payments of the population served between administrative regions. Higher per capita spending for health and social services was also related to a higher percentage of placements, as 22.1% of the variation in regional placement is explained by the level of spending per capita in health and social services. The correlation between relative poverty and placement was statistically significant and negative, but not strong. Table 2 also shows strong relationships between second-level variables (correlations ranging from 0.562 to 0.845). Regions with a higher percentage of the population receiving social assistance also have a higher percentage of low-income families with children. There is also a moderate correlation between health and social services spending and regional percentage of people receiving social assistance ($r = 0.681$, $p < 0.001$), low-income families ($r = 0.562$, $p < 0.001$).

5.1. Hazard of placement for children 0 to 4 years old

Table 3 presents the null nested and final multilevel hazard model estimates of initial out-of-home placement for children age 0 to 4 years. The null nested model produced a Log likelihood statistic of 48,857 (df = 16), and the final model produced a Log statistic of 48,851 (df = 20). The decreasing Log estimates suggest that the final multilevel model for children age 0 to 4 years is a better model fit.

Within each category, the most influential factors predicting an increased risk of placement were: younger age (Beta = −0.500, $t = -29.7$); males (Beta = 0.056, $t = 3.37$); children investigated because of their parents' high risk lifestyle (Beta = 0.444, $t = 9.50$); children reported by hospital staff (Beta = 0.034, $t = 9.78$); and, children living in more socioeconomically disadvantaged neighborhoods (Beta = 0.191, $t = 3.92$).

Analyzing each second-level regional variable independently, the percentage of people receiving social assistance and spending for health and social services were significant predictors of placement, whereas the percentage of low-income families with children was not statistically significant. However, under the final model, both measures of poverty and spending for health and social services were significant predictors of placement. Controlling for higher health and social services spending—a possible reflection of increased need—absolute poverty increased the likelihood of placement while relative poverty did not. In addition, 57.1% of the variation in regional placement is explained by regional differences in the percentage of people receiving social assistance, percentage of low-income families, and health and social services spending. Young children age 0 to 4 years, therefore, are more likely to be placed in regions where there is a higher need for health and social services and a higher percentage of the population living in extreme poverty.

Table 4
Multilevel Cox proportional hazard model of initial out-of-home placement for children age 5 to 11 years.

	Number of events and censored values							
	Total	Events	Censored	% Censored				
	45,386	6488	38,898	85.7%				
	Null model				Final model			
	Beta	t	Adj. HR	(95% CI)	Beta	t	Adj. HR	(95% CI)
Child age at investigation	0.419	15.9	1.52***	(1.44, 1.60)	0.419	16.01	1.52***	(1.44, 1.60)
Child sex:								
Male (female ref)	0.049	2.25	1.05*	(1.00, 1.09)	0.049	2.23	1.05*	(1.01, 1.09)
Reason for investigation:								
Psychological & emotional abuse	0.109	2.96	1.11**	(1.03, 1.19)	0.109	2.91	1.11**	(1.03, 1.19)
Physical, material & health neglect	0.047	0.820	1.04	(0.93, 1.17)	0.047	0.819	1.04	(0.93, 1.17)
Parents' high risk lifestyle	0.193	2.37	1.21*	(1.35, 1.42)	0.193	2.36	1.21*	(1.03, 1.42)
School truancy & neglect	0.072	1.24	1.07	(0.95, 1.20)	0.072	1.24	1.07	(0.95, 1.20)
Risk of sexual abuse	−0.154	−2.86	0.85**	(0.77, 0.95)	−0.155	−2.86	0.85**	(0.77, 0.95)
Sexual abuse	−0.167	−3.90	0.84***	(0.77, 0.92)	−0.167	−3.86	0.84***	(0.77, 0.92)
Behavioral problems	0.268	10.6	1.30***	(1.24, 1.37)	0.268	10.6	1.30***	(1.24, 1.37)
Risk of or physical abuse (ref)								
Source of referral:								
CLSC	0.229	5.80	1.25***	(1.16, 1.36)	0.230	5.81	1.25***	(1.16, 1.36)
Youth protection	0.016	0.281	1.01	(0.90, 1.13)	0.016	0.287	1.01	(0.90, 1.13)
Police	−0.058	−1.62	0.94	(0.87, 1.01)	−0.059	−1.64	0.94	(0.87, 1.01)
Other prof. institutions	−0.044	−1.62	0.95	(0.90, 1.01)	−0.045	−1.64	0.95	(0.90, 1.08)
School	0.075	2.05	1.07*	(1.01, 1.15)	0.075	2.05	1.07*	(1.01, 1.15)
Hospital staff	0.106	5.19	1.11***	(1.06, 1.15)	0.106	5.20	1.11***	(1.06, 1.16)
Unidentified	0.007	0.187	1.07	(0.93, 1.08)	0.007	0.18	1.00	(0.93, 1.85)
Family (ref)								
Number of investigations	0.625	27.5	1.86***	(1.78, 1.95)	0.626	27.5	1.87***	(1.78, 1.95)
Socioeconomic disadvantages	0.319	10.1	1.37***	(1.29, 1.46)	0.316	9.90	1.37***	(1.28, 1.46)

Level 2	Null model	PSS only	PLIF only	HSS only	PSS & PLIF & HSS		
Percentage of people receiving social assistance payments (2008–12) (PSS)		1.40* (1.05, 1.89)			0.786	3.02	2.19**(1.31, 3.65)
Percentage of low income families with children (2008–12) (PLIF)			0.97 (0.63, 1.48)		−0.534	−3.29	0.58**(0.42, 0.80)
Health and social services spending per 100$ units per capita (2006–14) (HSS)				1.06 (0.73, 1.52)	−0.139	−0.53	0.87 (0.52, 1.44)
	Null Model	PSS Only	PLIF Only	HSS Only	Final Model (PSS & PLIF & HSS)		
Residual Variance (V_1)	0.021	0.018	0.021	0.021	0.013		
$V_{explained}$ $((V_0 - V_1)/V_0)100$		14.2%	0%	0%	38.1%		

* P < 0.05;
** P < 0.01;
*** P < 0.001.

5.2. Hazard of placement for children 5 to 11 years old

Table 4 presents the null nested and final multilevel hazard model estimates of initial out-of-home placement for children age 5 to 11 years. The null nested model produced a Log likelihood statistic of 47,939 (df = 19), and the final model produced a Log statistic of 47,936 (df = 22). The decreasing Log estimates suggest that the final multilevel model for children age 5 to 11 years is a better model fit.

Within each category, the most influential factors predicting an increased risk of placement were: increased age (Beta = 0.419, t = 16.0); males (Beta = 0.049, t = 2.23); children investigated because of behavioral problems (Beta = 0.268, t = 10.6); children reported by a community health and social services clinics (Beta = 0.230, t = 5.81) and hospital staff (Beta = 0.106, t = 5.20); children experiencing a higher number of investigations (Beta = 0.626, t = 27.5); and children living in more socioeconomically disadvantaged neighborhoods (Beta = 0.316, t = 9.90).

Analyzing each second-level regional variable independently, the percentage of people receiving social assistance was a significant predictor of placement, whereas the percentage of low-income families with children and spending for health and social services were not statistically significant. However, under the final model, both measures of poverty were significant predictors of placement. Controlling for health and social services spending, absolute poverty increased the likelihood of placement while relative poverty was negatively associated to placement. In addition, 38.1% of the variation in regional placement is explained by regional differences in the percentage of people receiving social assistance, percentage of low-income families, and health and social services spending.

5.3. Hazard of placement for children 12 to 17 years old

Table 5 presents the null nested and final multilevel hazard model estimates of initial out-of-home placement for children age 12 to 17 years. The null nested model produced a Log likelihood statistic of 30,589 (df = 19), while the final model produced a Log statistic of 30,589 (df = 22). The stable Log estimates suggest that the final multilevel model for children age 12 to 17 years is not a better model fit than a nested model with no second-level variables.

Within each category, the most influential factors predicting an increased risk of placement were: older age at initial investigation (Beta = 0.136, t = 7.46); children investigated because of behavioral problems (Beta = 0.723, t = 41.5); children who experience a higher number of investigations (Beta = 0.246, t = 12.2); and, children living in more socioeconomically disadvantaged neighborhoods (Beta = 0.064, t = 4.81).

Table 5
Multilevel Cox proportional hazard model of initial out-of-home placement for children age 12 to 17 years.*

	Number of events and censored values							
	Total	Events	Censored	% Censored				
	41,157	13,985	27,172	66.0%				
	Null model				Final model			
	Beta	t	Adj. HR	(95% CI)	Beta	t	Adj. HR	(95% CI)
Child age at investigation	0.124	6.47	1.13***	(0.91, 1.17)	0.136	7.46	1.14***	(1.10, 1.18)
Child sex:								
Male (female ref)	0.009	0.482	1.00	(0.96, 1.03)	0.009	0.487	1.00	(0.97, 1.04)
Reason for investigation:								
Psychological & emotional abuse	0.015	0.741	1.01	(0.97, 1.05)	0.013	0.667	1.01	(0.97, 1.05)
Physical, material & health neglect	−0.081	−3.55	0.92***	(0.88, 0.96)	−0.081	−3.65	0.92***	(0.88, 0.96)
Parents' high risk lifestyle	−0.058	−2.97	0.094**	(0.90, 0.98)	−0.054	−2.78	0.94**	(0.90, 0.98)
School truancy & neglect	0.010	0.538	1.01	(0.98, 1.06)	0.014	0.761	1.01	(0.97, 1.04)
Risk of sexual abuse	−0.212	−5.35	0.80***	(0.74, 0.87)	−0.210	−5.45	0.81***	(0.75, 0.87)
Sexual abuse	−0.233	13.2	0.79***	(0.76, 0.82)	−0.227	−12.8	0.79***	(0.76, 0.82)
Behavioral problems	0.703	38.8	2.02***	(1.95, 2.09)	0.723	41.5	2.06***	(1.99, 2.13)
Risk of or physical abuse (ref)								
Source of referral:								
CLSC	−0.015	−0.540	0.98	(0.93, 1.03)	−0.018	−0.683	0.98	(0.93, 1.03)
Youth protection	−0.149	−4.92	0.86***	(0.81, 0.91)	−0.142	−4.94	0.86***	(0.82, 0.91)
Police	−0.027	−1.20	0.97	(0.93, 1.01)	−0.020	−0.836	0.98	(0.93, 1.02)
Other prof. Institutions	−0.103	−8.54	0.90***	(0.88, 0.92)	−0.105	−8.84	0.90**	(0.87, 0.92)
School	−0.292	−14.4	0.74***	(0.71, 0.77)	−0.280	−14.3	0.74	(0.71, 0.77)
Hospital staff	−0.032	−1.21	0.96	(0.91, 1.02)	−0.036	−1.40	0.96	(1.06, 1.16)
Unidentified	−0.081	−4.29	0.92***	(0.88, 0.95)	−0.080	−4.28	0.92**	(0.88, 0.95)
Family (ref)								
Youth criminal justice services	−0.198	5.60	0.82***	(0.77, 0.88)	−0.193	−5.61	0.82***	(0.77, 0.87)
Number of investigations	0.234	10.9	1.26***	(1.21, 1.31)	0.246	12.2	1.27***	(1.23, 1.33)
Socioeconomic disadvantages	0.061	4.50	1.06***	(1.03, 1.09)	0.064	4.81	1.06***	(1.03, 1.09)

Level 2	Null model	PSS only	PLIF only	HSS only	PSS & PLIF & HSS		
Percentage of people receiving social assistance payments (2008–12) (PSS)		1.18 (0.82, 1.69)			0.328	1.56	1.46 (0.95, 2.25)
Percentage of low income families with children (2008–12) (PLIF)			1.03 (0.69, 1.53)		−0.205	−1.33	0.78 (0.57, 1.06)
Health and social services spending per 100$ units per capita (2006–14) (HSS)				1.08 (0.69, 1.68)	−0.008	−0.033	0.93 (0.57, 1.51)
	Null Model	PSS only	PLIF only	HSS only	Final model (PSS & PLIF & HSS)		
Residual variance (V_1)	0.007	0.007	0.007	0.007	0.007		
$V_{explained}$ $((V_0 - V_1) / V_0)100$		0%	0%	0%	0%		

* P < 0.05.
** P < 0.01.
*** P < 0.001.

Analyzing each second-level regional variable independently, the percentage of people receiving social assistance, and the percentage of low-income families with children and spending for health and social services were not significant predictors of placement. Under the final model, no measures of poverty or spending were significant predictors of placement. Unlike the high percentage of regional variance in risk of placement explained in the final model for younger children 0 to 4 years (57.1%) and 5 to 11 years (38.1%), no variation in regional placement for older children is explained by regional differences in poverty and health and social services spending. While the increased risk of placement for older children is primarily explained by severe behavioral problems, they nevertheless remain at increased risk of placement when living in neighborhoods that are socioeconomically disadvantaged.

6. Discussion

This study uses clinical administrative child protection data for the province of Quebec, social assistance and low-income data from the Quebec Institute of Statistics and the Canadian Census, and health and social services spending data from the Ministry of Health and Social Services in order to examine the extent to which regional variations in poverty and health and social services spending impact the risk of placement. We also describe how much of the regional variance in the decision to place a child in out-of-home care is explained by poverty and health and social services spending.

Our study supports findings from Esposito et al. (2013) suggesting that the increased risk of placement for younger children is explained primarily by family difficulties, whereas the increased risk of placement for older children is primarily explained by severe behavioral problems. Building on research suggesting that maltreatment (Coulton et al., 1995, 1999; Coulton, Crampton, Irwin, Spilsbury, & Korbin, 2007; Ernst, 2001, Eckenrode et al., 2014; Freisthler et al., 2006; Kim, 2004) and placement (Esposito et al., 2013; Lery, 2009) are greater among children living in disadvantaged environments; this study suggests that poverty, controlling for health and social services spending, contributes to an increased risk of placement.

Although highly correlated, our results suggest that different forms of economic deprivation—absolute or relative—have differential impact on regional placement risk. Whereas relative poverty[4] does not increase

[4] It is important to note that a family on social assistance would always be considered relatively poor, but a relatively poor family (low-income families with children) is not necessarily on social assistance.

the risk of placement, absolute poverty does for younger children. One possible explanation is that the relatively generous array of health and social services offered is enough to buffer relatively poor families with children from the additional stress of living in economically disadvantaged environments. However, the same services do not appear to have the same buffering effect for regions with a high concentration of absolute poverty.

Together, these findings suggest a regional differential sensitivity to placement—in that variation in absolute poverty, accounting for per capita health and social services spending—continue to significantly explain why some regions have higher percentage of out-of-home placement for younger children. Beyond the influence of neighborhood poverty and child neglect, this study also found that poverty continues to matter even when behavioral problems, one of the influential factors in predicting increased risk of placement for younger children 5 to 11 years old, is present.

Our findings contribute to emerging literature demonstrating the importance of socioeconomic environments for child well-being. Chetty, Hendren, and Katz (2015), for example, estimated that young children who moved out of a high poverty environment to a less impoverished environment experienced a 31% increase in income during their mid-twenties compared to a randomized control group. In a similar fashion, it may be possible that improving environmental circumstances has an impact on the risk of experiencing placement, especially for younger children.

7. Conclusion

Social policies and social services programming directly and indirectly reduce the stressors caused by a lack of social and economic resources. Scholars such as Swift and Callahan (2006), like many others, refer to Quebec as a North American example for providing a range of preventative community services to support vulnerable families. Yet, within the province, poverty continues to matter to the extent that it predicts the removal and placement of children in out-of-home care.[5] In the context of significant cuts to social services in general and social assistance specifically, this study invites policy-makers and child welfare professionals to ensure that a supportive structure that integrates community family support services aiding child protection intervention is in place in order to be proactive in addressing family difficulties and not reactive to family circumstances. Reviewing region-specific spending strategies and improving access to community services and resources for regions with the highest rates of poverty should be considered in order to tackle the economic disparities of the population served. Frequent case reviews can also assist in monitoring efforts made to ensure that community family support services are responding to address family functioning concerns.

Lindsey and Shlonsky (2008), among others, suggest that maltreatment incidents can best be reduced if environmental stressors, notably economic disadvantages, are mitigated—a recommendation that clearly has impact beyond maltreatment incidences. Failing to address the economic vulnerabilities faced by many of the families served by child protection will limit the ability to improve family circumstances, and ultimately to prevent the placement of children in out-of-home care.

Further analysis will be carried out to test the robustness of the results reported in this study. Future research will examine: (1) the differential patterns observed for regional placement rates per capita; (2) how changes in poverty policies influence the risk of placement over time for smaller jurisdictional aggregations; and, (3) the types of regional-level economic hardship and health and social services spending mechanisms that matter most. Will our findings hold for relative poverty if we consider 60% of the median family income rather than 50%? We also plan to utilize geographic technologies to understand the geo-spatial distributions of children placed in out-of-home care. Understanding these changes is critically important in an era of rising economic inequality that has been shown to influence child welfare (Eckenrode et al., 2014).

[5] This is particularly concerning given the current cost cutting reform of social assistance which reduces monthly social assistance payments to $200 for people requiring inpatient substance abuse treatment.

8. Limitations

While this study is unique in allowing for a provincial ecological analysis of factors that increase a child's risk of experiencing an initial placement, it is not without limitations. One such limitation is our inability, given the clinical administrative data used, to control for family-level poverty. If we had household income information of the clinical population served, it might reduce the relationship between regional population poverty measures and placement. We attempted to address this bias by creating an index based on the immediate socioeconomic surrounding (400 to 700 persons surrounding) of investigated children, reflecting a proxy measure of family-level poverty. Also, including children's ethno-racial background as a predictive characteristic in the final multilevel hazard models posed a particular methodological challenge given that for 40.3% of investigated children the ethno-racial background was not identified and that missing information was not random.

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