Selecting Social Indicators to Forecast Child Welfare Caseload

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Abstract

The purpose of this study is to identify an optimum number of social indicators that provide maximum predictability of child welfare caseloads. The analysis is based on cross-sectional data pooled from the 1996 and 2001 censuses. The unit of analysis is the census division. From an exhaustive review of literature on social indicators and child welfare, we identified ten risk factors. Then, we identified social indicators that were statistically associated with the risk factors. After measuring the statistical association between social indicators with child welfare caseload, this study develops regression models to select and narrow down a list of social indicators with the highest predictability.

Key Words: Child welfare, social indicator, statistical relation

Résumé

Cette étude a pour but d'identifier un nombre maximal d'indicateurs sociaux qui pourraient le mieux possible prédire les dossiers en cours des services de protection de l'enfance. Notre analyse est basée sur des données transversales fournies par les recensements de 1996 et 2001. L'unité d'analyse est la division de recensement. Après une étude approfondie de la littérature sur les indicateurs sociaux et la protection de l'enfance, nous avons identifié dix facteurs de risque. Puis, nous avons identifié les indicateurs sociaux associés à ces facteurs de risque. Après avoir mesuré la relation statistique entre les indicateurs sociaux et les dossiers en cours de la protection de l'enfance, cette étude a développé des modèles de régression pour sélectionner et cerner la liste des indicateurs sociaux qui offrent le plus haut niveau de prédiction.

Mots-clés : Protection de l'enfance, indicateurs sociaux, relation statistique

Introduction

An extensive review of literature on child welfare (Fulton 2001) indicates that child welfare caseloads are driven by a diverse client group. They include (i) abused and neglected children; (ii) children or teenagers evicted from their families because of developmental, emotional or behavioural problems; and (iii) parents at the risk of abusing children due to strain in life caused by lack of adequate housing, poverty, psychiatric difficulties, domestic violence etc. The literature further confirms that the social problems faced by these groups vary in severity (Fulton, 2001).

The severity of a social problem can be predicted by its *risk factors*. A risk factor may be defined as a factor that statistically predicts adverse outcome across the life span (Rae-Grant, 1979). *Social indicators* are the predictor variables that are statistically associated with a *risk factor*.

Social Indicators and Risk Factors

A child welfare caseload is an outcome of a social problem - child abuse and neglect. The purpose of this study is to ascertain the statistical relationships between child welfare caseload and social indicators to determine which indicators are better predictors for forecasting child welfare caseload. From a review of literature (Fulton, 2001), we first identified the following ten

important risk factors associated with child abuse and neglect. We then identified social indicators associated with each of the risk factors.

Domestic Violence

Domestic violence is a powerful predictor of maltreatment in childhood (Offord et al, 1989). Kruttschnitt (1994) found exposure to domestic violence to be a predictor of recurrence of child abuse and neglect. Statistics Canada's (1999) Longitudinal Survey of Children and Youth reported that a child who has witnessed such violence, displayed higher rates of emotional and behavioural problems. A child with a violent and inexperienced father is six times more likely to be abused or neglected and it has also been reported that domestic violence is ten times more likely to be prevalent in common-law unions with children than among married couples with children (Fulton, 2001). Accordingly, the social indicators associated with this risk factor are the *crime rate* in the community and growth of *common law unions*.

Substance Abuse

Substance abuse among parents increases the risk of child abuse and neglect by six times the base rate (Chaffing et al, 1996). Other studies that found parental substance abuse associated with child abuse include Herzberger, 1996; Gelles, 1993; Kasim and Cheah, 1995; O'Leary, 1993; and Squires and Bussuttil, 1995. We have selected the *alcohol-related death rate* in the community as a social indicator related to this risk.

Parental Depression

Parental depression also increases the risk of child abuse and neglect by six times the base rate (Chaffing et al, 1996). Chaffing et al, (1996) demonstrated by longitudinal research that the probability of serious child abuse and neglect increases by six times when the mother suffers from depression or the father has an antisocial personality disorder or substance abuse disorder. The social indicator used for this risk factor is *suicide rate* in the community.

Low Socio-economic Status (SES)

Low socio-economic status (SES) is positively associated with the proportion of mothers with depression and as well as the proportion of fathers with substance

abuse (Dohrenrend et al, 1992). The communities with low SES lack resources and usually have poor quality of schools, poor housing, and a higher incidence of substance abuse. These communities are also likely to have higher incidence rate of foetal alcohol syndrome and mild retardation among children due to poor parental care, poor medical follow-up and poor nutrition (Fulton, 2001). These outcomes predispose children to neglect and abuse (Fulton, 2001). The *proportion of population with less than grade 9 education, proportion of workers in low-paying jobs,* and *proportion of lone parents in low paying jobs* are examples of indicators of low SES.

Risk-taking Behaviour among Youth

Teenage pregnancy, accidental teenage deaths and offences by young offenders are strong markers of youth risk-taking behaviour that is associated with a higher child welfare caseload (Fulton, 2001). The social indicators associated with this risk factor are *teenage birth rate* and *percent of young offenders* among their age groups.

Infant Mortality

High mortality generally and high infant mortality particularly, in a community is an indicator of low socio-economic status (SES), which in turn predisposes children to neglect and abuse. Ram (1993) used sex differences in mortality as a social indicator of relative status of female in society. *Infant mortality* being an excellent social indicator of SES of a community can be an indicator of child neglect and abuse in a community.

Poor Early-School Bonding

Failure to bond to school and early school failure has been identified in recent longitudinal studies to be excellent predictors of conduct disorder and aggression (Fergusson et al, 1995; Gagnon et al, 1995; Tremblay et al, 1992, Tremblay et al, 1995). Conduct disorder and aggression among children is associated with neglect and abuse, and by extension, therefore, data on poor early-school bonding is an indicator of severity of neglect and abuse (Fulton, 2001). Poor performance on Ontario's standardized *Grade 3 mathematics, reading and writing tests* can be used as an indicator of poor early school bonding and early school failure.

Poverty

Sameroff (1995) reviewed 14 longitudinal studies and found poverty to be a risk factor of child abuse and neglect. Low income or poverty generates stress on children, parents and disrupts proper functioning of a family. One of the driving forces behind child welfare caseload is stress produced by low income on children and parents. Statistics Canada's *Low Income Cut-offs (LICOs), average income, percentage of income from government transfer payments* and *percentage of social assistance recipients* are indicators of poverty.

Housing Insecurity

Children who are homeless have a higher incidence of injuries and burns, and low educational attainment (Canadian Public Health Association, 1997). The high average rent, the high average owner payments, the higher percentage of renters, a lower average number of rooms in a dwelling and a lower average number of bedrooms in a dwelling in a community can be used as indicators of housing difficulties.

Demographic Structure

The basic demographic structure of a community is an important determinant of child welfare caseload. The *size of the child population, the number of common- law unions* and *the number of lone parents* are important demographic indicators associated with child welfare caseload.

Data and Method

Data on some social indicators (predictor variables) on 49 census divisions (counties/municipalities) of Ontario, Canada were collected from federal and provincial sources. We used cross-sectional data for 1996 and 2001, as timeseries data were not available for many social indicators. To circumvent the lack of time-series data, we used census division as a unit of analysis. Census divisions coincide with counties and municipalities in Ontario. Data on investigations completed and children in care were available from Ontario Association of Children's Aid Societies at the Children's Aid Society level. The catchment areas of most of the Children's Aid Societies coincide with the counties and municipalities in which they reside. However, there are some Children's Aid Societies that cross the boundaries of several counties. This is particularly true for the Children's Aid Societies in northern Ontario. In those

cases, the data on the number of investigations completed and the number of children in care by Children's Aid Societies were assigned to census divisions by mapping data from census sub-divisions in Children's Aid Societies catchment areas to the census divisions. Accordingly, the data on children in care by Children's Aid Society were assigned to their respective counties or regional municipalities.

Pearson's Correlation Coefficients were calculated to examine the relationship between social indicators and child welfare caseload variables. The correlation analysis only quantifies the strength of the linear relationship between two variables. Multiple regression was used to calculate the relationship between *dependent variables* and *independent variables*, and to assess the significance of the independent variables (social indicators) in explaining the variability in the dependent variable (caseload). The terms social indicators, independent variables and predictor variables are used interchangeably in this paper.

The analysis was carried out in several steps. First, statistical correlation coefficients were calculated between dependent and independent variables. Next, full multiple regression models were run by using all the independent variables. The best model free of multicollinearity, which explained the maximum percentage of variation in dependent variable, was chosen for further analysis. Finally, the stepwise regression analyses were carried out with the remaining predictor variables to determine a model, which provided the contribution of each predictor variable to the total variation explained in the dependent variable.

Findings

There are several types of social indicators that influence child welfare caseload in Ontario. They are demographic (child population, percentage of recent migrant or visible minority population), economic (unemployment and income), social (suicide rate or crime rate) and housing insecurity (rooms or bedrooms per dwelling). Though we have used 2001 census data for most of the independent variables, 1996 data was pooled for the few independent variables where 2001 data was not available. Pearson's Correlation Coefficients were calculated between the dependent variables and some 84 independent variables. The independent variables with statistically significant relationship were used for the further regression analyses.

Statistical Correlation between Child Welfare Caseload and Selected Social Indicators

There are two types of services that are provided by children's aid societies to families and children at risk of neglect and abuse in Ontario. The services provided to families and their children who still live at home in their community are called non-residential services. Services provided to children who live in foster homes or group homes rather than at home are called residential services. Investigations conducted on the reports received by the Children's Aid Societies are non-residential services and services provided to children in the care of foster parents or in group homes are residential services.

Table 1 gives the values of statistically significant Pearson's Correlation Coefficients for the independent variables (social indicators) with two dependent variables namely, investigations completed and children in care. The number of investigations completed has been chosen as a proxy for non-residential services and the number of children in care has been selected for residential services. Both services combined are referred to as child welfare caseload. There are substantial differences in non-residential and residential child welfare services in terms of funding. Residential services are far more expensive than the nonresidential services.

The correlation analysis shows that child welfare caseload is significantly related to demographic structure, housing insecurity, economic circumstances, social conditions and early school failure. Among the demographic indicators, child population, lack of official language ability, percentage of movers, recent migrants and visible minority have significant correlation with the number of investigations as well as the number of children in care. The municipalities where a higher percentage of the population does not speak or know one of the official languages or have non-official language mother tongue are more likely to have higher child welfare caseloads. Similarly, counties with larger proportion of movers, recent migrants or visible minority population are more likely to have higher proportion of child welfare caseloads. This finding is a reflection of change induced in the population composition of Ontario by a change in immigration source countries. It also suggests that the delivery of Ontario's child welfare programs must be ethnically sensitive. Another demographic variable that shows significant correlation with investigations completed is the percentage of lone parents in a county. The percentage of lone parents may be a reflection of economic hardship as the average family income of lone parents is also correlated with investigations completed.

Table 1Statistically Significant Pearson's Correlation Coefficientsfor Investigations Completed and Children in Care

Indicator	Investigations	Children in	
mulcator	Completed	Care	
Demographic			
Child population	0.96	0.89	
Percent of lone parents in a county	0.47	-	
Percent of population with non-official mother tongue	0.32	0.34	
Percent of population with no knowledge of English or French	0.32	0.35	
Percent of population with no spoken English or French	0.33	0.35	
Percent of population with non-official mother tongue	0.3	0.32	
Percent mover within last 5 years	ars 0.52		
Percent recent migrants	0.71	0.62	
Percent visible minority	0.85	0.73	
Housing			
Average rooms per dwelling	-	-0.33	
Average bedrooms per dwelling	-0.46	-0.55	
Economic			
Percent with incomes below Low-Income Cut-offs (LICOs)	0.72	0.74	
Sole support parents on Family Benefits (FBA)	0.97	0.96	
Total Family Benefits (FBA) recipients	0.91	0.98	
General Welfare (GWA) recipients	0.86	0.096	
Average family income for common law families	0.48	0.31	
Average family income lone parent families	0.35	-	

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Variables related to household crowding also show significant inverse relationship, particularly with children in care. The average number of rooms and average number of bedrooms per dwelling are negatively correlated with child welfare caseload, indicating that the more crowded a dwelling is the higher the risk of child abuse or neglect.

Among economic indicators, income related variables are significantly correlated with the child welfare caseload. The income is an indicator of poverty and income related variables included in this analysis are low-income cut-offs, welfare payments, average family income of common-law and lone parent families.

Results of Regression Analyses

We developed regression models separately using *investigations completed* and *children in care* as the *dependent variables*. We used social indicators given in Table 1 as the independent variables. Many independent variables were statistically correlated with each other. To reduce the influence of multicollinearity, independent variables with high correlation coefficients with each other were identified from the correlation matrix and were dropped from subsequent analyses. The regressions were repeated until a set of predictor variables without multicollinearity was achieved.

This process was repeated for each dependent variable separately until the model which explained the maximum variation in the dependent variable emerged. The independent variables with statistically significant t-values are given in Table 2.

Demographic, housing conditions and economic indicators are important predictors of child welfare caseload. Child population, frequency of mobility of parents, household crowding and percentage of parents on welfare can be used to predict the child welfare caseload.

Table 2 only lists those independent variables that showed statistically significant t-values. First model explained 99.6% of the variation in the investigations completed. Second model explained 97.9% variation in the children in care. The proximity of R-Square values to those of Adjusted R-Square values suggests that there were not too many variables in the model. Though these models have narrowed down the list of significant predictor variables, we still do not know the individual contribution of significant predictor variables. We carried out a step-wise regression to determine the contribution of each independent variable in explaining variation in the dependent variables.

Table 2Results of Full Regression Model: Standardized Estimates
for Independent Variables with Significant t-values

	Dependent Variables		
	Investigations Completed	Children in Care	
Demographic			
Child Population	0.939(4.73)	0.752 (3.83)	
% Mover within Last 5 Years	0.195 (3.21)	0.702 (0.00)	
% Visible Minority	-0.443 (-2.65)	-0.455 (-2.73)	
Housing			
Average Bedrooms per Dwelling	-0.204 (-3.0)		
Economic			
Sole Support Parents on Family Benefits	0.352(2.29)		
General Welfare Recipients	-0.207 (-2.24)	0.452 (4.23)	
R-Square Adjusted R-Square	0.996 0.989	0.979 0.970	

Note: t-values are in parentheses

Most Parsimonious Model with Individual Contribution of Predictor Variables

We conducted a *stepwise regression analysis* where in the first step, a predictor variable with the highest R-square value is selected and in the second step, a predictor variable with the second highest R-square is selected. The model continues to select predictor variables this way until no variable with the R-square significant at .05 level is found.

Table 3 shows that in the case of investigations completed, child population explains most of the variation followed by visible minority, the low-income cutoffs and the percentage of movers within the last five years. The variable, population with no spoken official language, also emerges significant with less than one percent of variation explained in investigations completed.

Child population also explained most of the variation in the number of children in care indicating a strong demographic impact on child welfare caseload. In the next steps, the visible minority emerged significant followed by average number of rooms per dwelling. The smaller number of rooms in a dwelling is an indicator of household crowding. Several Canadian studies (Smith and Jackson, 2002 and Reitz, 2005) have indicated that recent immigrants experience higher rates of poverty compared to earlier cohorts of immigrants. As sources of immigration to Canada have shifted to non-European countries, a relatively larger portion of recent immigrants is also from visible minorities. It seems that apart from demographic impact on child welfare caseload, the poverty manifested through visible minority status, household crowding and the population unable to speak one of the official languages is the another main predictor of child welfare caseload.

Table 3
Variation Explained by each Independent Variable
in the Dependent Variable

Predictor Variables	Investigations Completed		Children in Care	
	t-Values	Variation Explained	t-Values	Variation Explained
Child Population	10.7	91.6%	11.6	81.8%
Visible Minority	-5.28	2.3%	-6.7	10.3%
Low Income Cut-offs (LICOs)	3.03	1.0%		
Rooms per Dwelling			-3.39	1.8%
Movers within last 5 years	3.76	1.0%		
No spoken English or French	2.87	0.8%	2.38	0.8%
Total Variation Explained	-	96.7%	-	94.&%

-- Not statistically significant.

Conclusion

The most parsimonious model suggests that changes in child welfare caseload are strongly influenced by demographic, social and economic changes in Ontario. This analysis is based on cross-sectional census data, as time-series data for most social indicators is not available. The most parsimonious model includes at least two indicators (child population and low-income cut-offs) for which at least annual time series data are available. These two indicators can be used to forecast child welfare caseload in Ontario, Canada.

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