Patterns of Health Care Use of Injured and Non-injured Children

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For Canadian infants, 1 hospitalization in 20 is injury related, and the rate increases to 1 in 9 for 1-4 year olds and 1 in 6 for 5-9 year olds. For 10-14 year olds, injuries are the leading cause of hospitalization; almost 1 in 4 hospitalizations are injury related. According to Canada's 1993 General Social Survey, 11% of children aged 0-15 years sustained an injury severe enough to require a visit to the doctor. In contrast to our knowledge of injury and hospital use in children, we know relatively little about visits to other medical practitioners.

Much of our current knowledge of the medical services used to treat injuries at the population level comes from hospital data (e.g., provincial hospital databases, Canadian Institute for Health Information; Ontario Health Survey). We know less about patterns of health service utilization associated with those children who suffer injuries who are cared for in the home and are not seen at the hospital. The impact of injury includes costs and services beyond hospital fees, particularly for those recovering from injury and requiring ongoing treatment from health care providers. Furthermore, children who have a history of injury experiences are more likely to encounter frequent injuries as well as more numerous future injuries requiring medical care.¹

This study examines associations between maternal reports of childhood injuries during the last 12 months and visits to medical practitioners by age group and gender of the child. In our models we include factors that have been shown to influence both injuries and health service use including gender of the child as well as family socio-demographic indicators such as marital status, household income, household size, and maternal levels of education.²

METHODS

Data come from Cycle 1 of the National Longitudinal Survey of Children and Youth (NLSCY). The NLSCY is a national prospective longitudinal study designed to measure child well-being, health, and development and is based on a random probability sample of Canadian residential households of children aged 0-11 years. Details of the study are presented elsewhere.^{3,4} Mothers completed three questionnaires including demographic information, socio-economic information, and information on the child. A cross-sectional sample of 22,831 children aged 0-11 years was surveyed for the first cycle of data from November 1994 to June 1995.

Variables

Injury Status

Mothers were asked whether the children included in NLSCY were injured in the past 12 months (yes/no).

Health Care Use

Mothers reported on children's health care utilization by specifying the number of consultations with each type of the following health professionals in the past 12 months: general practitioner, pediatrician, nurse prac-

itioner, dentist/orthodontist, welfare or case worker, other medical professional (not specified), and other specialist (e.g., social worker, speech therapist). Mothers were also asked about children's hospitalizations, "In the past 12 months, was the child ever an overnight patient in a hospital?" The response choices were "yes" or "no".

Covariates

Covariates included child's gender (0=male, 1=female), number of siblings (0,1,2+), marital status (0=two-parent family, 1=single-parent family), household income (low, < \$10,000-14,999; middle, \$15-29,999; and high \$30,000-40,000+), and maternal level of education (less than high school, high school, more than high school).

Analyses

All the analyses were conducted by child age group (infants/toddlers, aged 0-3 years; preschoolers, 4-5 years; and school-aged children, 6-11 years) and separately for boys and girls. Descriptive statistics were calculated for health care use by age group and injury status. Logistic regressions, adjusted for the selected covariates, were used to examine the relationship between injury status (independent variable) in the last 12 months and reported contacts with various types of health care professionals (dependent variable) also in the last 12 months. All analyses were weighted to account for the NLSCY design effect, but sample weights were recalibrated to reflect the actual size of the sample.

RESULTS

Ten percent (n=2,288; weighted n=468,360) of children aged 0-11 years had been injured, with an average of 1.20

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injuries (SD=0.57; range 1-9 for those who had one or more injuries). Table I shows that injured children of all age groups were more likely to have consulted with a variety of medical practitioners. Injured infants and toddlers had an increased likelihood of having consulted general practitioners, pediatricians, dentists and orthodontists, and other medical specialists than uninjured infants and toddlers. Injured infants and toddlers were also more likely to have spent an overnight visit at the hospital as compared to uninjured infants and toddlers. Injured preschoolers were more likely to have had one or more contacts with general practitioners and were more than twice as likely to have spent a night at the hospital than uninjured preschoolers. The oldest group of children exhibited a similar pattern. School-aged children who were injured were more than twice as likely to have had contact with a general practitioner and were more likely to have consulted with pediatricians, nurse practitioners, dentists or orthodontists, and "other" medical specialists than their non-injured peers. School-aged children who had experienced injury were also more than twice as likely to have spent a night at the hospital as compared to children who were not injured.

For both injured and non-injured children, the mean number of visits to general practitioners, pediatricians, and dentists and orthodontists also varied by age group of the child (see Table II). The number of visits to general practitioners was inversely related to the age of the child, with injured infants and toddlers making the most frequent visits. Injured preschoolers made the most frequent contact with pediatricians, followed by infants and toddlers, and school-aged children. For the non-injured group, infants and toddlers reported the most frequent visits with both general practitioners and pediatricians, followed by preschoolers and school-aged children. Patterns for visits with dentists and orthodontists by age of the child were similar for injured and non-injured children. The mean number of visits increased as age of the child increased.

The association between injury status, child's gender, and child's age in relation to any contact with health care profession-

TABLE I
Contacts with Health Care Professionals Over the Past 12 Months by Age Group Among Injured and Non-injured Children in NLSCY

Variables	Infants & Toddlers* OR (95% CI)	Preschoolers† OR (95% CI)	School-aged‡ OR (95% CI)
General Practitioner			
Not Injured	Reference	Reference	Reference
Injured	1.53 (1.23, 1.89)	1.38 (1.05, 1.81)	2.22 (1.92, 2.56)
Paediatrician			
Not Injured	Reference	Reference	Reference
Injured	1.20 (1.02, 1.42)	1.14 (0.89, 1.45)	1.23 (1.07, 1.41)
Nurse Practitioner			
Not Injured	Reference	Reference	Reference
Injured	0.95 (0.78, 1.16)	1.06 (0.78, 1.44)	1.46 (1.23, 1.74)
Dentist/Orthodontist			
Not Injured	Reference	Reference	Reference
Injured	1.57 (1.27, 1.95)	0.91 (0.72, 1.16)	1.27 (1.07, 1.52)
Other Medical			
Not Injured	Reference	Reference	Reference
Injured	2.06 (1.68, 2.53)	1.20 (0.92, 1.57)	1.84 (1.63, 2.08)
Overnight Visit			
Not Injured	Reference	Reference	Reference
Injured	1.87 (1.48, 2.38)	2.81 (1.91, 4.13)	2.38 (1.87, 3.04)

* Infants and toddlers: not injured weighted n=6,789 (population n=1,389,126); injured weighted n=631 (SE=0.003) (population n=129,136; SE=0.0002)
† Preschoolers: not injured weighted n=3,494 (population n=715,184); injured weighted n=343 (SE=0.005) (population n=7,198; SE=0.0003)
‡ School age: not injured weighted n=9,905 (population n=2,027,592); injured weighted n=1,312 (SE=0.003) (population n=268,488; SE=0.0002)
OR: Odds ratio (adjusted for household size, marital status, household income, and maternal levels of education)

als indicated that injured boys of all age groups were more likely to have visited with each type of medical practitioner and were also more likely to have experienced a hospitalization. There were no differences for preschool boys' visits to pediatricians. Injured girls were also more likely to have had a visit with each of the medical practitioners and were more likely to have experienced hospitalizations. Visits with nurse practitioners did not differ for injured and non-injured girls of the two youngest age groups nor were differences found for visits to dentists and orthodontists for preschool-aged girls (see Table III).

CONCLUSION

This study examined associations between maternal reports of childhood injuries and visits to health care professionals. Maternal reports of childhood injuries are associated with an increased use of a variety of health care services. This pattern is consistent for infants/toddlers, preschoolers, and school-aged children as well as for girls and boys. Our analyses show that larger differences exist between injured and non-injured boys than injured and non-injured girls. Injured boys are

more likely to visit dentists and nurses and to make more numerous visits to pediatricians, dentists, and other medical professionals. Boys are also more likely to have more numerous as well as more severe injuries than girls.⁴ Furthermore, children who had suffered injuries were also twice as likely to have spent a night in the hospital.

One limitation of this study is that it is based on cross-sectional data from one cycle of the NLSCY and causal relationships cannot be established. It is therefore not possible from this study to determine whether or not the reported patterns of health care utilization were specifically due to injury. As a follow-up to this study, we plan to take advantage of the longitudinal sample of the NLSCY to establish temporal relationships and to test if the pattern of health care use identified among injured children proves to be true over time. However, the relatively higher use of a variety of health services by the injured compared to the non-injured and the consistent pattern by age group and child gender suggest that increased health care use could be due to injury. Despite the lower severity of childhood injuries in maternally reported data, results of this study demonstrate the importance of examining mater-

TABLE II
Average Number of Visits to Health Care Professionals by Age Group and Injury Status Among Children in NLSCY

	Injured				Non-Injured			
	Infants & Toddlers n† =631 n‡=129,136	Pre-schoolers n† =343 n‡=70,198	School-aged n† =1,312 n‡=268,488	F(df)	Infants & Toddlers n† =6,789 n‡=1,389,126	Pre-schoolers n† =3,494 n‡=715,184	School-aged n† =9,905 n‡=2,027,592	F(df)
General Practitioner	5.64 (6.58)	4.50 (5.26)	3.66 (3.80)	28.35* (2, 1840)	4.41 (4.96)	3.41 (3.83)	2.84 (3.39)	208.80* (2, 14069)
Pediatrician	3.53 (3.58)	4.68 (7.75)	0.67 (2.05)	7.27* (2, 686)	3.69 (5.40)	2.54 (2.85)	0.51 (1.65)	54.44* (2, 5594)
Nurse Practitioner	2.29 (2.43)	1.91 (4.05)	0.24 (1.32)	0.96 (2, 361)	2.83 (4.70)	1.39 (1.96)	0.15 (0.98)	47.36* (2, 2984)
Dentist/Orthodontist	1.68 (1.47)	1.77 (.92)	1.92 (1.95)	10.30* (2, 1464)	1.32 (0.74)	1.58 (0.92)	1.74 (1.83)	161.30* (2, 11391)
Other Medical	2.20 (2.97)	1.86 (1.88)	0.69 (1.54)	2.42 (2, 741)	2.26 (3.44)	2.30 (5.37)	.41 (1.30)	23.60* (2, 4102)

* p<0.001
† Sample weighted by sample weight
‡ Sample weighted by population weight

TABLE III
Contacts with Health Care Professionals in the Past 12 Months by Age Group and Gender Among Injured and Non-injured Children in NLSCY*

	Infants & Toddlers OR (95% CI)		Preschoolers OR (95% CI)		School-aged OR (95% CI)	
	Male	Female	Male	Female	Male	Female
General Practitioner						
Not Injured	Reference	Reference	Reference	Reference	Reference	Reference
Injured	2.28 (2.23, 2.34)	1.05 (1.03, 1.07)	1.68 (1.64, 1.72)	1.12 (1.09, 1.15)	1.99 (1.96, 2.01)	2.59 (2.55, 2.63)
Paediatrician						
Not Injured	Reference	Reference	Reference	Reference	Reference	Reference
Injured	1.10 (1.08, 1.11)	1.37 (1.35, 1.40)	0.99 (0.96, 1.01)	1.35 (1.31, 1.38)	1.31 (1.29, 1.33)	1.14 (1.13, 1.16)
Nurse Practitioner						
Not Injured	Reference	Reference	Reference	Reference	Reference	Reference
Injured	1.10 (1.08, 1.12)	0.76 (0.74, 0.78)	1.71 (1.67, 1.75)	0.49 (0.47, 0.51)	1.55 (1.52, 1.57)	1.37 (1.34, 1.40)
Dentist/Orthodontist						
Not Injured	Reference	Reference	Reference	Reference	Reference	Reference
Injured	1.57 (1.54, 1.60)	1.56 (1.53, 1.60)	1.37 (1.34, 1.41)	0.57 (0.56, 0.59)	1.32 (1.30, 1.34)	1.22 (1.20, 1.24)
Other Medical						
Not Injured	Reference	Reference	Reference	Reference	Reference	Reference
Injured	1.88 (1.85, 1.92)	2.37 (2.32, 2.43)	1.28 (1.25, 1.31)	1.14 (1.10, 1.17)	1.65 (1.63, 1.67)	2.09 (2.07, 2.12)
Overnight Visit						
Not Injured	Reference	Reference	Reference	Reference	Reference	Reference
Injured	1.74 (1.70, 1.77)	2.14 (2.08, 2.19)	2.12 (2.05, 2.20)	4.15 (3.99, 4.32)	2.95 (2.88, 3.02)	1.94 (1.89, 1.99)

* Analysis adjusted for household size, marital status, household income, and maternal levels of education

nally reported injuries and not only injuries treated in hospitals and emergency rooms. Maternally reported injuries result in a substantial increase of health care services, increase the burden on the health care system, and lead to increased costs over time.

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Received: July 26, 1999

Accepted: September 14, 2000