CHILD SAFETY and UNINTENTIONAL INJURIES in NORTHERN ONTARIO

A Report from the Northern Ontario Perinatal and Child Health Survey Consortium

A Perinatal and Child Health Survey Strategies Initiative

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EXECUTIVE SUMMARY

INTRODUCTION

In 2002, as part of the overall Ontario Early Years initiative, each Ontario health unit was eligible for funding for Perinatal and Child Health Survey Strategies from the Ministry of Health and Long-Term Care, Public Health Branch. Health units across Northern Ontario pooled some of these resources, and together with other northern partners, established the Northern Ontario Perinatal and Child Health Survey (NOPCHS) Consortium. The Consortium has representation from the eight northern health units: Algoma, Muskoka-Parry Sound, North Bay & District, Northwestern, Porcupine, Sudbury & District, Thunder Bay District, and Timiskaming, as well as the Northern Health Information Partnership (NHIP), and the three Northern universities: Lakehead, Laurentian and Nipissing. The Public Health Research, Education & Development (PHRED) Program at the Sudbury & District Health Unit, coordinates the Consortium. The Consortium had two key objectives: quality data to guide northern child health program and policy decisions, and a strong collaboration between northern health units, all three northern universities, NHIP and the Sudbury PHRED Program.

In 2002, the Consortium released two reports: **The Northern Ontario Perinatal and Child Health Survey Highlights Report: A First Look** (Public Health Research, Education and Development Program, 2002) and the **Northern Ontario Baseline Child Health Information: Analysis of Secondary Data** (Northern Health Information Partnership, 2002). The "Highlights Report" presents initial findings from the Consortium's 2002 telephone survey of 3413 mothers of children aged 0-6 years. The "Baseline Report" presents existing data from secondary sources on the health of Northern Ontario children aged 0-6, and provides a compendium of information to supplement the survey findings.

In 2003, continued funding from the Ministry of Health and Long Term Care allowed five focused reports to be undertaken as a continuation of the work of the Consortium. The reports present in-depth analyses of the survey data, and focus on the implications of the findings for child and family programs offered by health units and community agencies. Topics of the focused reports are: Access to Parenting Resources; Breastfeeding Practices; Determinants of Child Health; Nutrition in Northern Ontario; and the present report, **Child Safety and Unintentional Injuries**.

Data Source

The data source for this report is the Northern Ontario Perinatal and Child Health Survey (NOPCHS). The telephone survey targeted Northern Ontario mothers of children aged 0-6. The total sample for this survey was 3413 participants. The NOPCHS project was designed to provide information for perinatal and child-focused program and service planning for Northern Ontario and at the individual health unit level. Data were collected between March and June 2002. Potential participants were contacted by telephone at various times of the day as well as evenings and

weekends. Interviews were conducted in both English and French. Mothers who did not have a telephone are excluded from the sample.

RESULTS AND IMPLICATIONS

Child Safety and Injury Prevention

This survey collected information on injury prevention behaviours by the parent and examined potential contributing factors such as geographic location, sex of 'target child', age of 'target child', or income level. The questions in this category measure self-reported behaviour data and could be influenced by social desirability.

Storage of Medicines and Cleaners

Approximately 91% of respondents indicated that they stored medicines and cleaners in a safe place – either locked in cabinets or high, out of the child's reach. Although this is a high rate, still close to 1 in 10 homes report not storing medication and cleaners safely.

Bicycle Safety

Over 16% of the respondents indicated that their 'target child' does not wear a helmet when riding a tricycle and over 6% indicated that their 'target child' does not wear a helmet when riding a bicycle. Age was a significant factor, with the highest use in the older ages. Income was related to helmet use when riding a bicycle alone, with children from families above LICO wearing helmets significantly more often. Over 10% of the respondents indicated that the 'target child' did not wear a helmet when riding as a passenger on the back of a bicycle. The question of whether the helmet is being correctly used is not ascertained by this survey.

Car Safety

Car seats were always used by 51.1% of respondents, and boosters seats were used by 28.9%. The question of whether the car seat or booster is being correctly used is not ascertained by this survey. Age differences were noted: car seats are used almost exclusively from ages 0 to under 3 years and then usage declines rapidly as the child ages. Booster seat use begins at 2 to under 3 years and peaks at 4 to under 6 years. By 3 to under 4 years, not using a car seat or booster has begun and by 6 to under 7 years, it predominates. A significant difference was observed between families living above and below low-income cut-off levels, with more children living above the low-income cut-off using car seats or boosters.

Sun Safety

Hat use varied with age, significantly declining with increasing age. Hat use was found to be significantly more common among male children than female children

and among children in families living above the LICO. Sun block protection also showed decline with age, with significant variation, but not as pronounced in pattern as the decline observed in hat use. The question of whether the hat or sun block is being correctly used is not ascertained by this survey.

Unintentional Injuries

According to Health Canada, injuries are the leading cause of death among children in Canada. Injury is a major cause of disability and death in Ontario, and particularly in Northern Ontario (NHIP, 2002). In terms of aetiology of injury mortality in children aged 6 or younger, the leading cause in both Northern Ontario and the province was motor vehicle crashes, at 24% and 28% respectively, of total injury mortality.

This survey collected information on only two types of injuries, falls requiring medical attention and unintentional poisonings. It must be remembered that the two categories examined would not reflect total injuries for children aged 0 to 6 years in the northern health units. The questions in this category measure self-reported injury data and would be influenced by the parent's perception of what constitutes an injury, and how serious an injury need be in order to seek medical attention.

Most child injury data are drawn from hospital statistics. However, the results from this survey reveal that up to 1 in 5 falls requiring medical attention does not result in the child attending hospital. Therefore, the present statistic may be a more accurate reflection of the rate of falls in Northern Ontario than the rates drawn from hospital visits alone.

Falls

Approximately 9% of respondents indicated that their 'target child' had sustained a fall serious enough to require medical attention in the past year – just over 80% of these reported that they brought the child to the hospital and approximately half of these respondents reported that the injury sustained was a cut.

When the responses for 'target children' that did *not* suffer a fall were examined, age was found to have significant differences between the category 0 to under 1 year and the remaining categories, with younger children experiencing fewer reported falls.

Accidental Poisonings

Just under 2% of respondents indicated that their 'target child' had been accidentally poisoned and of those, over 80% were taken to the hospital emergency room.

IMPLICATIONS

- Given the prevalence and costs of unintentional childhood injuries and the fact that young children rely on their parents to decrease their vulnerability to risks, current investments towards making parents better parents and risk managers would be both practical and cost effective.

- More research is needed to improve our understanding of parental influences on children's injury-liability and future risk-taking, with particular attention being paid to patterns of parents' perceived efficacy beliefs.
- Given that 9% of mothers in this survey reported storing medicines and cleaners in unlocked or accessible locations, health units and other child and family agencies should continue and enhance promotion of child safety, including the safe storage of medicine and cleaners.
- Given that helmet use and sun safety are not always practiced, health units and other child and family agencies should continue and enhance promotion of child safety, including helmet use and sun safety. The fact that more male children wear hats to protect from the sun points to the need for increased awareness about acceptable methods of sun protection for female children.
- Given that car safety is not always practiced, health units and other child and family agencies should continue and enhance promotion of car safety, particularly among families with older children and those living below low-income cut-off levels.
- All families should be encouraged to ensure that the car seats and boosters they use are installed properly.
- Given that 9.1% of children in this survey had reportedly experienced a fall requiring medical attention in the last year, health units and other child and family agencies should continue and enhance injury prevention programs including fall prevention programs for children to 6 years.
- Advocate for government policies and legislation to promote child safety. For example, although helmet legislation currently exists, enforcement is inconsistent. Increased promotion of helmet legislation requirements could serve to increase the likelihood of such safety practices being followed.
- Consider the distribution of home safety kits with Healthy Babies, Healthy Children program or possibly earlier, prior to pregnancy. This intervention is currently undergoing pilot-testing in some health units as part of an Early Years initiative.
- Educate Healthy Babies, Healthy Children staff and Parenting Partners regarding the findings from this focused report for injury and safety discussions with parents. The report could be useful as a source of evidence showing that the problems are common in the northern region and not singling out the individual.
- Given that approximately one in five falls requiring medical attention will not appear in hospital statistics, there is a need for more comprehensive data on non-hospital-treated injuries. In addition, further research is needed due to a lack of Northern Ontario and health unit-specific child injury data, especially regarding cause and environmental location (i.e., playground) of injury and safety behaviours for parents and/or caretakers.
- Because these survey data do not address this issue, there is a need for data on whether injury prevention products are being used correctly, i.e., car seats, helmets, etc.

EXECUTIVE SUMMARY REFERENCES

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INTRODUCTION

In September 2000, the Ministry of Health and Long-Term Care, Public Health Branch, received funding from the Government of Ontario to support health unit-based Early Years projects. In 2002, as part of the overall Ontario Early Years initiative, each health unit was eligible for funding for Perinatal and Child Health Survey Strategies. The four key action areas identified as priorities for funding in the First Ministers' Meeting Communiqué on Early Child Development were:

- Promoting healthy pregnancy, birth and infancy
- Improving parenting and family supports
- Strengthening early childhood development, learning and care
- Strengthening community supports (SCICS/Children's Policy HRDC, 2000).

After discussion among health units and partners across Northern Ontario, a decision was made to pool some of these resources to maximize the use of the funds and the scope of the projects. As a result, the Northern Ontario Perinatal and Child Health Survey Consortium was established in 2002, and continued with additional funding through 2003. The Consortium has representation from the eight northern health units: Algoma, Muskoka-Parry Sound, North Bay & District, Northwestern, Porcupine, Sudbury & District, Thunder Bay District, and Timiskaming, as well as the Northern Health Information Partnership (NHIP), and the three Northern universities: Lakehead, Laurentian and Nipissing. The Consortium is coordinated by the Public Health Research, Education & Development (PHRED) Program at the Sudbury & District Health Unit.

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REVIEW OF LITERATURE

THE PROCESS OF UNINTENTIONAL CHILDHOOD INJURY

Although there has been a decrease in the number of injury-related deaths among Canadian children, unintentional injury still accounts for more Canadian children's deaths than all other childhood diseases combined (SAGE Research Corporation, 1996). Injury data from the Canadian Hospitals Injury Reporting and Prevention Program (CHIRPP), obtained between 1990 and 1998, shows that there were 81,754 injuries reported for children under age fourteen (Health Canada, 1998). Furthermore, 32,221 of these injuries occurred at the child's place of residence. Considering that the CHIRPP database is limited only to those injuries attended to by emergency rooms of sixteen Canadian hospitals, it is clear that the incidence of childhood injuries is significantly greater than may be appreciated.

Childhood injury-related mortality, morbidity and disability result in needless costs: the loss of human potential or functional capacity, immeasurable suffering and the consumption of health care resources. According to SMARTRISK Foundation (1998), direct and indirect expenses for all preventable injuries cost Canadians $8.7 billion in 1995 alone. The study also estimated that every year, fall-related injuries for children aged 0-9 cost Canadians $630 million. In joint partnership, SMARTRISK, the Ontario Ministry of Health and the Kingston, Frontenac & Lennox & Addington Health Unit produced a groundbreaking provincial report entitled, *The Economic Burden of Unintentional Injury in Ontario* (Smartrisk, 1999). It was found that Ontario spent $2.9 billion on preventable injuries in 1996 and that approximately $4,000 in direct and indirect costs are generated as a result of every Ontario injury. It also revealed that injuries caused by childhood falls were one of the most frequent types of unintended, preventable injuries in Ontario, which economically translated into an annual expenditure of $220 million.

Remarkably, some parents do not regard falls, among numerous other sources of inadvertent childhood injuries, as resulting from predictable events (SAGE Research Corporation, 1996). Instead, many unintentional childhood injuries are deemed as 'accidents' or the result of random or chance occurrences (Peterson, Farmer, & Kashani, 1990; Tremblay & Peterson, 1999; SAGE Research Corporation, 1996). Unfortunately, equating injuries with 'accidents' or uncontrollable, unpredictable events is a false equation, which contributes to children's injury liability and may also hinder parental preventative actions. Peterson et al., (1990) demonstrated the relationships between caregivers' preventative action and their personal views about injuries, and found that reported parental attitudes and beliefs significantly predicted parental reports of teaching safe behaviours. Many consistently reported the belief that only 50% of various types of injuries were preventable (Peterson et al., 1990). Similarly, these parents reported low ratings of children's susceptibility to injury.

Young children are exceptionally vulnerable to risks posed by physical and social environments because they usually lack both the physical size and cognitive or behavioural development necessary to negotiate such risks successfully (Gilk, Kronenfeld, & Jackson, 1993). Therefore, young children must rely on others to

decrease their vulnerability to risks, and research implicates parents as the primary resource for decreasing such vulnerability (Gulotta & Finney, 2000; Greaves, Gilk, Kronenfeld & Jackson, 1994; Valsiner & Lightfoot, 1987). The integration of available data suggests that children's injury-liability and risky behaviours result from a complex process involving parental cognitions and parent-child-environmental interactions.

Learning is a process of taking risks, and risks are necessary for development. However, it is important to separate those behaviours that promote development from those behaviours that hinder development. The importance in drawing this distinction stems from the fact that parents must attempt to balance between positive and negative risks in the face of uncertain developmental outcomes for which there are no clear-cut guidelines. Bandura (1997) maintains that in learning how to deal successfully with potentially risky situations, our sense of self-efficacy is expanded and strengthened. Review of the literature surrounding self-efficacy and injury indicates that Bandura's theory has been largely ignored in the area of unintentional childhood injury.

Through socialization, parents help children deal with the environment. How parents themselves deal with the environment must then affect their children's transactions with the environment. A considerable amount of research concerning parental and child cognitions in the context of the family have brought new insights regarding the link between family members' cognitions and individual and shared patterns of behaviour (Bugental & Johnson, 2000). Reviewing the literature, Bugental and Johnston (2000) recognize that a crosscutting theme in research regarding cognitions about family relationships is that they differ in content and they suggest four different types of cognitions: descriptive, analytical, evaluative-prescriptive, and efficacy cognitions. Yet, they fall short of demonstrating the extent to which efficacy beliefs actually play a mediating role in these selectively focused cognitions. Instead, Bandura's (1997) efficacy theory gives a better account of the direct and moderating influence of self-efficacy on such selective cognitions.

Self-efficacy is defined as one's "…beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (Bandura, 1997, p.3). Bandura's theory embeds the self-efficacy belief system in a unified sociocognitive framework. Perceived self-efficacy is not the sole determinant of action, but Bandura (1997) provides evidence towards the central role it plays in a multifaceted social cognitive theory, demonstrating how efficacy beliefs operate in concert with other sociocognitive determinants. In his view, there is a reciprocal causation between characteristics of persons and their environments, such that people not only become products of their environments but they also produce, or select and shape their environmental contexts.

Peterson et al. (1990) investigated parental beliefs of 198 children and found that parents were more likely to have taught their children about home safety if the parents believed they were well versed in safety knowledge, felt competent in teaching and believed the intervention was efficacious, which suggests that efficacy beliefs may increase parental receptivity towards proactive and reactive prevention/intervention strategies. Attainment of knowledge, in and of itself, does

not directly translate into better risk management by parents; they need to feel confident and competent in the knowledge and intervention strategies they acquire. To further demonstrate, Mize, Pettit and Brown (1995), in exploring the interactive influences of parenting knowledge and causal beliefs, found that parents' knowledge of socialization strategies was a significant predictor of the quality of their supervision of children's peer play only when they believed that social skills were modifiable and valued.

Numerous factors operate in daily life that can undermine efficacious use of an individual's knowledge and skills (Bandura, 1997). Parents are not always equipped with enough knowledge, skills or resources to adequately address all situations, and even in those instances where parents feel a sense of competence, other factors can affect their sense of control and ultimately their decisions or ability to act rationally (i.e., coping efficacy, affective efficacy, social efficacy). Contextual activation of inefficacy is well documented (see Bandura, 1997 for review) and can illustrate how sociocultural realities can impose constraints on the exercise of personal control. For example, society usually misconstrues disadvantaged (economically and/or educationally) parents' lower level of educational guidance and involvement with their children's school as resulting from a lack of caring or interest.

Teachers' sense of efficacy also plays a role in the level of parental involvement. Bandura (1997) asserts that parental educational involvement results from a process of mutual efficacy enhancement, where efficacious teachers are more likely to initiate and support parental efforts, which increases parental involvement and in turn raises teachers' sense of instructional efficacy.

The content represented in parental cognitions, their efficacy beliefs, and the interdependent interactions between parent-child-environment can directly and indirectly influence children's injury-liability and risky behaviours. Perceived self-efficacy not only facilitates development of strategies but it can also affect effective strategy utilization (Bandura, 1997). For example, in the search for optimal solutions, efficacious individuals are consistent and persistent in the utilization of strategies, whereas individuals with weaker senses of efficacy experience difficulty in finding optimal solutions and their efforts become erratic and ineffective (Wood & Bandura, 1989). Similarly, quality parent-child-environment interactions can have important effects on parental cognitions and children's safety and development. For instance, Berk (2003) reports that parents who are warm and accepting but who are uninvolved, overindulgent or inattentive, cultivate disobedience and poor self-control in their children and adolescents (Berk, 2003). However, efficacy-enhancing interactions, where the parent engages in authoritative child-rearing styles, can promote children's compliance and their own self-regulation (see Berk, 2003for review).

Efficacy-promoting influence doesn't flow solely from parent to child; rather, parent, child and environment operate in a process of reciprocal causation (Bandura, 1997). Bandura (1997) argues that perceived parental efficacy plays a crucial role mediating the parent-child-environment interactions. Therefore, parents' self-efficacy and the interdependent nature of parent-child-environment interactions directly and indirectly

influence parental reasoning and decision-making with regard to their children's injuries and injury risk behaviours.

Age-Injury Association

It is generally accepted by both researchers and parents that injury-liability is associated with a child's age and developmental level (Rivera & Mueller, 1987; SAGE Research Corporation, 1996; Peterson, Ewigman & Kivlahan, 1993). Toddlers are more likely to ingest a poison, fall from another level or be burned by a hot substance in comparison to older children (Kronenfeld & Glik, 1995) who are more likely to sustain injuries from falls, motor vehicle accidents either as a passenger, pedestrian or bicyclist, bicycling and sports (Pless & Millar, 2000). Consistent with findings from hospital injury data, Kohen, Soubhi and Raina (1999), in examining maternal reports of unintentional childhood injuries from a cross-sectional sample of children aged 0-11 years who participated in the National Longitudinal Survey of Children and Youth (NLSCY), found that 2,288 out of 22,831 children were reported as having been injured in the last 12 months (girls n=999; boys n=1,289), a rate of about 10%. Falls (excluding bicycle or sports) were the most commonly reported cause of injury for infants/toddlers, preschoolers and school aged children, with the next most frequently reported cause of injury for infants/toddlers and preschoolers being scalds (from hot liquids or foods) and sports for school aged children. More severe injuries increased with age, with broken/fractured bones reported more frequently for school-aged children (30%) than for preschoolers (19%) and infants/toddlers (13%). Preschoolers were reported as being more frequently injured in or around the home (35% and 32%, respectively), with school-aged children being more frequently injured at school or day care (23%) as opposed to in or around the home (21% and 17%, respectively).

Gender-Injury Association

Developmental trends fail to account fully for childhood injury-risk, since the statistics regarding the risks for injuries reveal systematic variations rather than random distributions (Matheny, 1987). Specifically, epidemiological evidence suggests particular subgroups bear a disproportionate share of unintentional injuries, namely boys and children from lower socioeconomic (SES) backgrounds (e.g., Health Canada, 1998; Reading, Langford, Haynes & Lovett, 1999; Rivera & Mueller, 1987). Additionally, boys and children from disadvantaged backgrounds sustain more frequent and severe injuries (Baker, O'Neill & Ginsburg, 1992; Kohen, et al., 1999; Pless & Millar, 2000). Research has also indicated that children's injury potential increases if they are from a lone-parent family, have a teenage mother and come from large families (e.g., Wadsworth, Burnell, Taylor & Neville, 1983; Reading et al., 1999).

Until recently, relatively little was known about the foundations of gender differences in injury rates. Some researchers have focused on investigations of behavioural and cognitive factors that may differentiate boys from girls and have attempted to relate such distinctions to injury-risk behaviours (Morrongiello & Dawber, 2000). Literature suggests that boys are more active and impulsive (Eaton, 1989; Block, 1983), and

that they engage in more risky behaviours that compromise their safety (Morrongiello & Dawber, 1999). Unobtrusive observations of 30 mother-toddler (aged 2 ½ to 3 ½) interactions, in an unfamiliar setting containing both hazardous and non-hazardous items, revealed boys were more likely to approach injury-risk hazards and were less compliant than girls in response to mother's redirection strategies (Morrongiello & Dawber, 1998). It has also been suggested that boys perform activities in a more risky manner than do girls. Statistically correcting sex differences in risk exposure, Rivera, Bergman, LoGerfo and Weiss (1982) found that the size of sex differences in injury rates increases, suggesting that despite activity or frequency of activity, boys have a more risky approach in performing activities than do girls (Morrongiello & Dawber, 1998).

Differential attitudes, beliefs and attributions have also been demonstrated between the sexes. For example, in comparing 6-10 year old boys and girls, it was found that boys rate themselves as less vulnerable to injury, rate the same types of injuries as less severe and attribute more injuries to bad luck than do girls (Hillier & Morrongiello, 1998). For a variety of play activities, boys rate their risk of injury lower than do girls (e.g., Hillier & Morrongiello, 1998; Morrongiello & Rennie, 1998). It has been suggested that such differential beliefs predict children's risk-taking decisions, and may influence boys' increased participation in risk-taking behaviours (Morrongiello & Dawber, 2000). Hillier and Morrongeillo (1998) observed that the 6-10 year old girls focused on their perceived vulnerability ("Will I get hurt?") whereas the same age boys focused on their perceived severity ("How hurt might I get?"), in deciding whether or not to partake in a risky behaviour. Such differential beliefs have also been explored to clarify whether such appraisals are gender-bias based. Morrongiello, Midgett and Stanton (2000) asked 6, 8, and 10 year old children to provide risk-appraisal ratings for both boys and girls engaging in a range of visually presented pictures of risky playground activities, which included varying degrees of injury risk (none, low, moderate, and high) and two types of facial expressions, confident and wary. Both boys and girls in this sample rated boys as having a lower likelihood of injury despite engagement in the same activities.

Gender biases in young children's risk perceptions may seem surprising given that boys experience more frequent and severe injuries than girls, however, such gender biases may actually contribute to the gender-injury association. Girls seem to make more accurate risk assessments, which may serve a protective function. Girls' attributions and beliefs may provide a better foundation for risk assessments and decisions because their personal responsibility acknowledgment allows for more informed risk versus benefit consideration, whereas boys' external attributions do not allow for appropriate weighting of risks. Ascriptions removing personal control lead to misperceptions of risk, which cloud definitions of risk and ultimately affect engagement intentions. So, gender biases may actually predispose boys to injury and risk-taking in that they are more likely to repeat risky activities when engagement is determined by injury severity and where failure is perceived as beyond their control.

Risk perceptions are often influenced by our sense of control over a perceived risk (Centre for Toxicology, 1999). Consequently, those who believe that the probability of facing harm is out of their control may end up defining risk according to their capabilities (i.e., How hurt will I get) as an alternative way of managing the risk.

According to Bandura (1997), beliefs about whether one can produce certain actions is independent from locus of control or beliefs about whether actions affect outcomes, with self-efficacy beliefs being more predictive of diverse forms of behaviour. Perhaps boys and high risk children possess a unique conflict in their cognitive representations of risk, such that they believe in their ability to produce certain actions (strong specified self-efficacy) and that their injuries do not result from their actions (external locus of control), which results in a highly efficacious personal judgement and provides them with the venturesomeness that makes them prone to 'taking the risk'. So, highly efficacious boys may incorrectly view potentially deleterious situations as more predictable and under their personal control, resulting in less apprehension from extraneous factors. Despite increased vulnerability and susceptibility to more frequent and severe injuries, boys and high risk children may continue to engage in risky activities because they have an exaggerated sense of efficacy in their capabilities to perform risky behaviours and they equate injuries to external causes beyond their control rather than to their performance capabilities. Risky behaviours resulting in prior injuries will be repeated because the injury is not attributed to one's own performance capabilities.

Extensive literature exhibits a dramatic developmental shift in motor skills between genders following infancy, such that boys outshine girls in a range of motor skills. During infancy, however, no reported gender differences in motor performance have been found (see Mondschein, Adolph, & Tamis-LeMonda, 2000 for review). Despite differences in physical size (Hamill, Drizel, Johnson, Reed, Roche, & Moore, 1979) and activity levels (Eaton & Enns, 1986), developmental norms in infancy demonstrate that boys and girls do not differ in early motor skill acquisition. Literature has established that infants are equally accurate in their motor decisions in risky situations (Adolph 1997, 2000; Campos, Berthenthal & Kermolan, 1992). Yet, the emergence of motor skill differences between boys and girls is well documented and continues to widen in later years for particular tasks (see Mondschein et al, 2000 for review). Such sex differences in attitudes, beliefs and attributions have been linked to parenting practices.

In examining the influence of the consequences, such as positive parental attention or responses of praise of injury-risk behaviours, some have recognized the importance of such consequences of injury-risk behaviour as an underlying influence in the gender-injury association and have investigated parental/peer responses on the exhibition of risky behaviours. Bandura (1997) argues that young children's' self-appraisals rely heavily on immediate, salient outcomes as a result of their limited cognitive skills and experience and that they gradually improve such skills through exploration, modeling and instruction. A recent naturalistic study conducted by Morrongiello and Dawber (1999), investigated parental reactions to their 3-year-olds engaging in injury-risk tasks and results revealed that parents responded differently towards their sons and daughters. Specifically, mothers and fathers verbalized more directive statements in how to independently perform injury-risk tasks and placed more demands for independence on their sons, and even when he requested assistance or resisted directives, parents continued to communicate an expectation. Daughters were cautioned about safety and injury-risk more often, were provided with almost three times the amount of explanations offered to boys, and were more frequently supplied with spontaneous physical support. Despite the fact that none of

the children had any previous experience with the injury-risk tasks performed, these differences still emerged.

Morrongiello and Dawber (2000) had mothers watch a video of a child, same sex and of comparable age as their own child, engaging in injury-risk activities and asked them to stop the tape to respond whenever they felt they would intervene if this were their child. Again, mothers' verbalizations in response to sons' risk-taking was more encouraging, with mothers of girls communicating more cautions and complete explanations regarding the injury-outcome process. Such cautionary statements promoted analysis of how the behaviour could lead to negative outcomes and emphasized the potential for severe injury and injury vulnerability. Even when boys and girls engaged in the same injury-risk behaviours, despite ability and confidence, these parents consistently demonstrated differential responses that generally amounted to encouragement and toleration of sons' injury-risk behaviours and tutoring possible injury outcomes, injury vulnerability and caution in engagement of girls' risky activities (Morrongiello & Dawber, 1999, 2000).

Parental gender biases are also demonstrated prior to the emergence of gender differences. Mondschein et al. (2000), in evaluating mother's gender bias relative to infant's performance, found mothers of 11-month-old girls underestimated whereas mothers of same aged boys overestimated their child's crawling ability and crawling in a novel locomotor task. Mothers of boys expected their infants to be more successful at descending steep slopes, more likely to attempt steeper slopes and to attempt risky slopes as opposed to mothers of girls, despite the fact that all of the infants exhibited identical levels of motor performance. The discrepancy between mothers' estimates and infants' performance produced an average error size of 8 degrees, which has functional significance because previous studies using duplicate procedures demonstrated "the probability of crawling successfully down slopes drops precipitously from 100% success to 0% within a span of about 8 degrees" (Mondeschein et al., 2000, p.313). So, "on average, mothers expect their girls to fail when the probability of success is 100% and expect their boys to succeed when the probability of success is 0%" (Mondeschein et al., 2000, p.313). It was concluded that the mothers may have: generalized subtle gender differences to motor performance; relied upon social stereotypes in absence of reliable information and/or knowledge about motor development; and, given the unfamiliar context, mothers may have anticipated later gender differences (Mondeschien et al., 2000). Regardless, the results suggest that mothers' expectations and behaviours are shaped to some extent by personally and culturally constructed knowledge and that even motor skill acquisition occurs in a social context, where both nature and nurture interplay to affect development (Mondeschien et al., 2000).

Such implications are pertinent to the argument that parental cognitions influence their children's injury-liability and risk-taking. Individuals approach, explore and attempt to manage situations within their capabilities and avoid transactions where environmental aspects are perceived as exceeding their coping abilities (Bandura, 1997). Personal and cultural knowledge are at least partially responsible for the differences in children's injury-risk and risky behaviours.

Socioeconomic Status-Injury Association

Children living in low-income families experience more severe injuries than those from higher income families (Dowswell, Towner, Simpson & Jarvis, 1996; Nersesian, Petit, Shaper, Lemieux & Naor, 1985; Pless, Verrault, Arsenault, Frappier, & Stulginskas, 1987). Single marital status, low levels of maternal education and poverty are some of the socio-economic status (SES) indicators found to be associated with childhood injuries (Beautrais, Fergusson & Shannon, 1982; DiGuiseppi, Rivera, & Koepsell, 1990; Glik, et al., 1993). Again, it is not clear how social class influences injury processes, and this correlation is likely to be mediated by a mutual relationship to one or more extraneous variables. Thus, caution in the interpretation of such associations is required.

Studies concerning environmental hazards have established that lower income households have more observable hazards and that parental practices and home environment organization contributes to the level of such household risks (Glik et al., 1993; Matheny, 1986, 1987). Children from disadvantaged social backgrounds have an increased risk for injury due to increased exposure to uncontrollable environmental hazards (Nersesian et al., 1980; Wilson, 1996), and hazards such as substandard housing and toxic or dangerous materials, are more likely to affect those of low socioeconomic status (LeBailley, Freel, Kirschenman & Rotts, 1988; Tertinger, Green & Lutzker, 1984). Other research has concentrated on individual and family characteristics relating to controllable hazards or those hazards that parents are assumed to be able to manage (e.g., Matheny, 1986,1987; Greaves, Glik, Kronenfeld & Jackson, 1994; Glik, et al., 1993). It has been demonstrated that low SES mothers, income less than $25,000 and less than high school education, and mothers with a less protective/cautious supervisory style, had significantly more observed safety hazards and that mothers from disadvantaged backgrounds reported more stress, as measured by Daily Hassles (Greaves et al., 1994). Thus, SES indicators influence the presence of both controllable and uncontrollable hazards, and risk perceptions, stress and parenting behaviours additionally impact the presence of hazards (Greaves et al., 1994). However, the underlying process of how risk perceptions, stress and parenting behaviours influence hazard presence remains to be captured.

Some theorists have proposed a socioecological model to conceptualize the process underlying unintentional childhood injury (see Garling, 1985), which recognizes there is no singular cause for inadvertent injury. In this view, injury vulnerability of high-risk children occurs as a result of "…dynamic processes between the caregiver's cognitive reasoning in preventing an injury and the child's transactions with the environment" (Gulotta & Finney, 2000, p.34). Developmental and literature from a variety of other disciplines have examined how children grow and learn through observation and exploration at different ages, have highlighted the importance of early child development and have examined possible long-term effects of such developmental trajectories. For example, the amalgamation of neuroscience and experimental developmental psychology research offers a clearer understanding of critical periods (generally over by age six) and their synergy with core brain functions, demonstrating that the considerable amount of brain development that takes place prior to age three involves a complex interplay between genetics and

experiences. Our brain, which organizes individual nerve cells into efficient systems so we can sense, process, perceive, store and act on continuous environmental sensations, is a product of our genetic potential and our experience history (Perry, Hogan, & Marlin, 2000). Repetitive, consistent, predictable and nurturing experiences in childhood play a key role in expressing the underlying genetic potential or the foundational organization and capabilities of the brain (Shore, 1997). Positive parental stimulation or nurturance through active, responsive involvement or engagement impacts children's development, capacity for learning, behaviour and emotion regulation and later risk of disease, and likewise, negative parental stimulation, or the lack thereof, can have crucial effects depending upon the critical periods, which the brain can possibly compensate for but falls short of its prior potential (Early Years Study: Final Report, 1999). In support, Ramey, Campbell and Ramey (1999) assert that poor nutrition, low birthweight, prematurity, intergenerational poverty, low levels of parental education and intelligence, and unstimulating or nonoptimal parent-child interactions are some of the known risk factors for poor intellectual development.

From a bidirectional interactive perspective, parental efficacy beliefs operate as shapers and mediators of cognitive, behavioural and environmental contributors to their children's injury-liability and risk-taking. Parental proactive or preemptive and reactive action strategies "...require processes of reasoning in which specific interventions are predicated upon general knowledge of injuries or potential injuries" (Valsiner & Lightfoot, 1987), which are constructed by culture, such as the developmental nature of injuries, and personal experience, such as beliefs about the child's present capabilities and possible vulnerabilities. This general knowledge is compressed into one reasoning process and is further integrated with information about the given setting and children's action in it (Valsinger & Lightfoot, 1987). Some parents may lack appropriate resources to make logical inferences regarding their child's injury-vulnerability. For instance, a lack of specific knowledge and/or incorrect judgments about children's capabilities and/or vulnerabilities may hinder parental reasoning processes.

Increasing lower SES parents' awareness regarding unintentional injuries is necessary, but insufficient. Research demonstrates that parents do understand that children's developmental status influences injury-liability (e.g., Peterson, et al., 1993; SAGE Research Corporation, 1996) and that it can be indicative of certain precautionary measures, which promote their safety (e.g., Garling & Garling, 1995; Gralinski & Kopp, 1993). One study examined reported maternal interventions when their 1-2-, and 3-year-old children were at risk of injury and found mothers of the younger children more frequently reported physically restricting, moving the child away, or making an environmental change, whereas, mothers of the older children were more likely to report engaging in teaching strategies (Garling & Garling, 1995). So, parents do use developmental knowledge, beliefs about the child's capabilities and/or vulnerabilities and the child's action in the given setting to manage injury-liability. However, some parents may overestimate their children's cognitive competence (SAGE Research Corporation, 1996; Morrongiello & Dawber, 1999), which may inadvertently expose them to injury. Some parents hold the belief that teaching safety rules is an effective way to achieve injury prevention (Peterson et al., 1990). Between one and three years of age, there is apparently a shift of parental

emphasis from blocking access to hazards to the teaching of rules (Garling & Garling, 1995). Yet, this focus on teaching safety seems to decline after the age of three and shifts towards the teaching of other social norms (Gralinski & Kopp, 1993). If most sex differences emerge by three years of age (e.g., Baker et al., 1992; Matheny 1991; Rivera et al., 1982) and if there is also a shift away from safety teaching at this age, this suggests that parents' opinion of the likelihood of harm decreases at this crucial age or that they believe their child is somewhat capable of managing some of these risks. It would seem that many parents misperceive children's capabilities to negotiate risks in this age group. Perhaps this is due in part to complex interplay between parental efficacy beliefs in the management of injury-risk coupled with an increase in the three-year olds' assertion of independence.

Parent Roles in Injury and Injury Prevention

Misperceptions of risk and incorrect risk assessments are not exclusive to less educate or low SES parents. Even highly educated parents have demonstrated that they have not integrated the general knowledge they possess with aspects of the child-environment transactions into their process of reasoning. Literature has indicated that most parents are aware of the fact that boys are more likely to get injured (e.g., SAGE Research Corporation, 1996; Morrongiello & Dawber, 2000). Yet studies have also invariably demonstrated that highly educated parents encourage their boys to engage in relatively risky behaviours and to do so independently (Morrongiello & Dawber, 1999; 2000). For these parents, the benefits of risk seem to outweigh the consequences. Perhaps unaware of their gender bias and/or its impact, some parents are inevitably weakening boys' successful negotiation of risks and contributing to their risk-taking meanwhile strengthening girls' accuracy in risk assessments and decreasing their participation in risky activities. To demonstrate, previously mentioned studies observing controllable hazards have failed to find an association between having a boy or having a child recently injured and the decreased presence of controllable hazards, which suggests that these parents are not adjusting their risk management strategies for higher risk children (Glik et al., 1993; Greaves et al., 1994). In fact, it has been demonstrated that parents have a higher tolerance for risky behaviours of boys and those children who have reportedly had prior injuries (e.g., Morrongiello & Dawber, 2000).

Parents may assume that establishing rules and educating their children with regard to safety rules enables them to manage certain risks encountered within the home. Yet, one study examining 4-6 year olds' knowledge of parental home safety rules exemplified that knowledge did not predict injury frequency; rather, children's compliance and reported parental supervision (accounting for 26% of the variance) were the best predictors of reported injuries (Morrongiello, Midgett, & Shields, 2001). The fact that children in this sample were only able to spontaneously recall 46% of their parents' home safety rules supports the view that the acquisition of safety rules may not serve a protective function for young children (Morrongiello et al., 2001). Similarly, prior research has demonstrated that parents of 8-year-old children also overestimate their children's safety knowledge (Peterson et al., 1986). Such parental over-estimations of their children's cognitive processes and abilities may result in invalid conclusions regarding their children's injury-susceptibility, which in turn may

also influence the level of supervision provided or an over reliance on safety measures. Even if parents retain specific knowledge regarding unintentional injuries, their perceived level of danger can be attenuated by beliefs about their children's capabilities and /or actions in a given setting.

Parents are constantly faced with the dual task of promoting their children's development through exploration and preventing their engagement in potentially risky behaviours (Valsiner, 1985). The requirements of effective parental monitoring include: the identification of potential dangers, accurate matching of the child's developmental capabilities, and an appropriate level of supervision provided based upon the parent's general (both personally and culturally constructed) knowledge (Valsiner & Lightfoot, 1987). Safety rules may serve a protective function for older children but this does not seem to be the case for younger children (e.g., Morrongiello et al., 2001). Epidemiological data seem to support the notion that supervision may be necessary to ensure compliance with safety rules at certain ages and for children who are considered "high risk". For instance, the fact that children between the ages of five and nine have the highest pedestrian deaths and injuries, spend more time as pedestrians and have decreased supervision (Canada Safety Council, 1999) implies that more supervision in such contexts may aid in the reduction of such 'accidents'.

Parents' faulty knowledge regarding their children's capabilities may actually lead them to the invalid conclusion that their children requires less supervision, which can ultimately impair parents' ability to efficiently and accurately anticipate potential injuries or intervene between the child's transactions with the environment. So, parents who overestimate their children's capabilities may be more inclined to underestimate the need for supervision in certain contexts. Additionally, parents of younger children may over rely on safety measures (i.e., safety locks on cabinets with medications) as opposed to supervision, at the same time underestimating their children's capabilities and/or actions with the environment. Parents who place more weight on personally constructed knowledge when it conflicts with culturally constructed knowledge may also provide inadequate monitoring of their children. For example, parents who acknowledge that one year olds are susceptible to ingesting dangerous substances, but who believe their children have learned not to touch such substances based on the fact that the children have previously verbalized 'danger' in the presence of such substances, may be more likely to relax their active and passive prevention efforts. Thus, a parent's personal experiences may create an illusion of 'safety', which may inadvertently place their child at risk for injury.

Literature points to the importance of quality supervision. Mothers who had a protective supervisory style, as measured by Maternal Supervisory Index, had less observable safety hazards, which implies that they were more inclined to safe-proof their homes (Greaves et al., 1994; Glik et al., 1993). Thus, it would seem that the way in which parents supervise may not only affect their active but also their passive strategies. Mothers with a 'protective supervisory style', although faced with similar uncertain developmental outcomes for their children, may harbour stronger beliefs that they can (via active and passive strategies) produce certain actions (affect their children's injury-liability; intervene in risky behaviours). In short, supervision and teaching of rules may not be mutually exclusive for some parents, primarily those

parents with a strong sense of efficacy. The provision of quality supervision may, for some parents, include consistent teaching and modelling of appropriate behaviours, thereby reducing the likelihood of injury and opportunity to engage in risk-taking behaviours.

Embracing short-term benefits and disregarding/ignoring long-term costs in risky situations implicates that emotions may play a crucial role in parents' reasoning processes. Matheny (1986, 1987) observed that injuries for 1-to-3-year-old children were more likely if their mothers were more stressed, less educated, had more disorganized and noisy home environments, and were perceived by their mother as aggressive or hard to manage. Stressful stimuli activates the 'flight or fight' response, which initially results in a chemical release that heightens sensory stimulation sensitivity, but persistent or constant stress ultimately results in the reduced processing capacity of novel sensory stimulation, influences behaviour and negatively impacts memory (Early Years Study: Final Report, 1999). Consequently, parental stress may impact the parent-child relationship but may also affect parents' efficacy and their ability to efficiently and accurately anticipate and/or problem solve with regard to injury-risk assessments. Factors such as chronic or unrelenting stress, coupled with ineffective parenting skills may generate emotions that may serve to undermine the parent's ability to reason effectively.

SOCIAL INVESTMENT IN INJURY PREVENTION

Irrespective of the overwhelming expenditures resulting from childhood injuries, Canadians invest very little resources into prevention efforts as compared to other diseases (Tremblay & Peterson, 1999). It is the present view of our culture that diseases are, to a certain extent, under the control of an individual, more so than injuries. For instance, there is an emphasis on lifestyle changes and exercise in order to prevent disease. Furthermore, many parents, and individuals in general, still view unintentional injuries as mere 'accidents' or 'random events' that are further deemed to be uncontrollable (e.g., Peterson et al., 1990; Tremblay & Peterson, 1999; SAGE Research Corporation, 1996). Despite these obstacles, many studies have attempted to identify factors of children's preventable injuries in order to stimulate effective preventative/intervention strategies and policy initiatives (Finney, Christopherson, Friman, Kanins, Maddux, Peteerson, Roberts & Wolraich, 1993). From a societal perspective, investments into making parents better risk managers provides a means to decrease children's injury liability and make children better risk managers. Ultimately, making parents better risk managers involves making them better parents by increasing their parental efficacy. Investments in evidence-based research and efficacy-enhancing injury risk management programs translate into an investment in children.

Although advancements in early brain development, and its effect on learning, behaviour and the health of children has recently redirected a number of organizations and governments to focus on the provision of improved circumstances in and outside the homes of children (Early Years Study: Final Report, 1999), perceptions of a weak commitment to the principle of optimizing children's developmental outcomes still continues to contribute to individuals' flawed cognitions

regarding the successful management of the risks to children. It is easy to see how in such circumstances an overworked and underpaid single mother of two may overlook or fail to fully consider the consequences of leaving her child unattended for a few hours after school given her lack of resources, or how she might overestimate her child's competence in negotiating risks in her absence. Such a perception of weak commitment by government and organizations might encourage parents and children to adopt cognitive representations where considerations such as providing necessities and being a productive member of society take precedence over safety.

Similarly, the values transmitted by our culture might encourage parents and children to adopt cognitive representations where independence, bravery and resoluteness (particularly where boys are concerned) supersede safety. The successful negotiation of risks may depend partially on the values transmitted through micro and macro-social environments. So, it is not difficult to see how parents who value the outcome of independent, brave and resolute young men may be more accepting of risky behaviours by boys, perhaps even going further to encourage it. Furthermore, ignorance regarding the consequences of such encouragement may be fuelled by such a transmission of cultural values.

METHOD

The data source for this report is the Northern Ontario Perinatal and Child Health Survey (NOPCHS). The NOPCHS project was designed to provide information for perinatal and child-focused program and service planning for Northern Ontario and at the individual health unit level. Topics were proposed based on needs of program staff and community partners for current data to guide program and policy decisions. The main topic areas were:

- Parenting
- Breastfeeding
- Unintentional Injuries and Safety
- Asthma
- Food Security
- Prenatal and Child Nutrition

Data were collected between March and June 2002 by Oraclepoll Research Limited. Potential participants were contacted by telephone at various times of the day as well as evenings and weekends. Interviews were conducted in both English and French.

The telephone survey targeted Northern Ontario mothers of children aged 0-6. Only mothers were contacted for the survey, since several topic areas, such as breastfeeding and folic acid intake during pregnancy, were only applicable to mothers. For mothers with more than one child aged 0-6, the survey focused on the child who had the most recent birth month (the 'target child') in the family. This 'target child' approach ensured an equal chance of selection among the eligible children in a family. For all calls, surveyors asked to speak with the mother of a child 6 years of age or under who lives with her. If there was no answer, the surveyors made up to 15 repeat calls to each number.

The sample for the NOPCHS was drawn from two sources, the Integrated Services for Children information System database, and random digit dialling. In the NOPCHS sample, 56% of participants were recruited from consenting ISCIS contacts and 44% from random digit dialling. The total sample for this survey was 3413 participants.

For more details on the survey development, data collection and limitations, please refer to The Northern Ontario Perinatal and Child Health Survey Highlights Report: A First Look (Public Health Research, Education and Development, 2002).

WEIGHTING

Weights were assigned to the respondents' data based on two factors. First, a weight was calculated so that the distribution of children's ages 0-6 matched the population distribution within each health unit area, correcting for over-representation of younger children in our sample. The second level of weighting was for health unit population, in order to account for proportional under-representation of mothers in larger health unit areas in the calculation of northern rates.

STATISTICAL ANALYSES

For this report the primary analyses were: frequency distributions and cross-tabulations between variables for all northern health units combined, for all years combined. As a precaution, unweighted frequencies were determined in a preliminary analysis and any cell size with a count of less than 30 was excluded from any analytically weighted analysis. Data from cell sizes with a count less than 30 have been suppressed and are represented by N/A (not available) or '0.0'. Point estimates for frequency distributions and cross-tabulations are presented with 95% confidence limits (95% CI).

All 'Not Stated', 'Don't Know', or 'Refused' responses were coded as missing for all analyses. 'Missing' values were excluded from the analysis unless greater than 8% of the responses were missing, and in which case, missing values were reported separately as a category.

The primary analyses will be based on frequency distributions and cross-tabulations for all northern health units combined. Charts providing estimates will be presented with the respective 95% confidence limits.

Sampling error occurs as a result of selecting a sample rather than surveying an entire population. Statistics based on samples drawn from the same population will vary from each other (and from the true population) simply because of chance. The variation is called *sampling error*, and the measure used to estimate it is called *standard error*. Standard errors are used to estimate how precise the estimates are. The coefficient of variation (CV) is a measure of dispersion, based on the standard error of the estimate and the estimate itself. If an estimated proportion has a CV greater than 33.3% with sufficient sample size, the estimate must be suppressed. If an estimated proportion has a CV greater than 16.5%, but no greater than 33.3%, with sufficient sample size, the estimate can be reported but should be interpreted with caution.

Based on sampling distribution theory, we are 95% confident that the true value of an estimate is within two standard errors in either direction of the estimate. This range (estimate plus or minus 2 standard errors) is called the 95% confidence interval. A 95% confidence interval is defined as an interval that will contain the true parameter for 95% of all samples that could have been obtained from the reference population.

The confidence interval illustrates the degree of variability associated with an estimate. Wide confidence intervals indicate wide variability, and thus, such estimates should be interpreted and compared with due caution. Confidence intervals can be used to determine whether an estimate in one subgroup is statistically below, above, or no different than the estimate for the same indicator in another subgroup. If the confidence intervals for two estimates overlap, then we would conclude that the difference between them is not statistically significant. For this report, a program called Auto-CI (Leuske & Sanderson, 2003) was modified to calculate 95% confidence intervals and coefficients of variation (C.V.). For analysis in which recoding was not performed, the Northern Ontario Perinatal and Child Health Survey Interactive Query System (Northern Health Information Partnership, 2003) was used.

Low-income cut-off (LICO) was derived based on the 1992 Family Expenditure Survey by Statistics Canada and is based on number of people supported by family income and approximate family income.

LIMITATIONS

- Mothers who do not have a telephone are excluded.
- Mothers living in institutions are excluded.
- Due to limitations of time for a telephone survey, some questions that would have yielded useful information were not included in the survey.

ABBREVIATIONS

C.I.	Confidence intervals
C.V.	Coefficient of variation
E	Data with a C.V. from 16.6% to 33.3% should be interpreted with caution
F	Data with a C.V. greater than 33.3% were suppressed due to extreme sampling variability
LICO	Low income cut-off
UI	Unintentional injury

RESULTS

DEMOGRAPHIC PROFILE OF THE SAMPLE

The Northern Ontario Perinatal and Child Health Survey (NOPCHS) was conducted across the eight health units in Northern Ontario. Mothers of children aged up to 6 years were asked to provide information regarding several topic areas including demographics, unintentional injuries and safety and parenting. With the noted exceptions, the results represent weighted estimates. Frequencies are expressed as percentages of the total sample for both the north as a whole and for the catchment areas of each northern health unit. Sample sizes of less than 30 are suppressed. Point estimates for frequency distributions and cross-tabulations are presented with 95% CIs.

The sample sizes for each health unit comprised approximately 11.6 to 13.1% each of the total sample and varied from 396 to 460 respondents (unweighted data) (see Table 1). The response distribution was then weighted to represent the population distribution across Northern Ontario. The mother's mean age was 31 years, ranging from 16 years to 58 years (unweighted data). The child's mean age was 2.1 yrs, ranging from 0 years to 6 yrs (unweighted data).

Table 1. Descriptive statistics of the survey population (unweighted data), by Northern Health Units

Health Unit	Number of Respondents	Mother's Mean Age (yrs)	Child's Mean Age (yrs)	Child's Gender (% females)	Weighted Response Distribution
Algoma Health Unit	451	31.1	1.9	45.2	13.2%
Muskoka-Parry Sound Health Unit	421	31.5	2.1	44.7	8.1%
North Bay & District Health Unit	460	30.9	2.0	52.0	10.8%
Northwestern Health Unit	397	31.1	2.4	48.4	9.8%
Porcupine Health Unit	400	29.7	2.0	49.5	11.9%
Sudbury & District Health Unit	441	31.2	2.1	46.9	23.0%
Thunder Bay Health Unit	447	31.5	2.0	47.4	18.8%
Timiskaming Health Unit	396	30.8	2.5	51.0	4.3%
Total North	3413	31.0	2.1	48.1	99.9%

From the information highlighted in the Highlights Report (Public Health Research, Education and Development, 2002), it was determined that 4% of mothers identified themselves as Aboriginal, 22.5% identified French as their mother tongue, and 14% of respondents reported being single parents. Slightly more than a third of households reported total incomes of $60,000 or more, which is somewhat higher compared to Northern Ontario income levels for households with young children as reported in the Ontario Health Survey 1996-97.

CHILD SAFETY AND INJURY PREVENTION

The NOPCHS survey examined the reported use of safety precautions and protective devices (seat belts, car seats, helmets, etc.) and other preventive measures through a small number of questions posed to the respondents. Although there are many questions that could be asked with respect to these issues, the data in this report serve to provide a general overview of the precautions and protective approaches taken by mothers of young children.

Figure 1 presents the percentage of respondents indicating each location for medicines and cleaners by category within their household. Most respondents indicated that they stored their medicines and cleaners "high, out of children's reach" or in a "locked cabinet". It is interesting to note that just under 9% indicated that they used unlocked cabinets or cupboards that did not fit the category "high, out of children's reach".

Figure 1. Response distribution of locations where medicines and cleaners were stored, weighted data, all northern health units

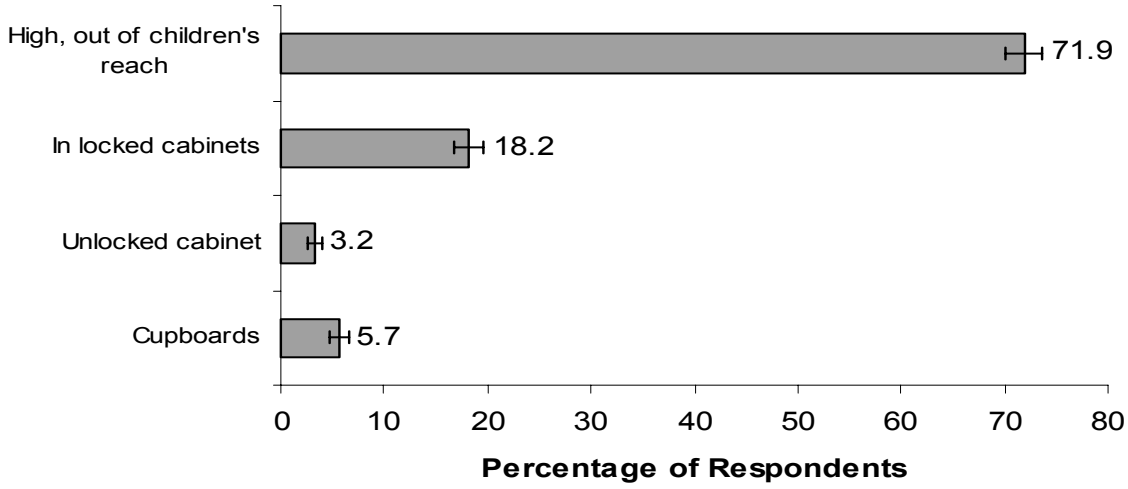


Figure 2 presents the percentage of respondents indicating that they stored medicines and cleaners "high, out of children's reach" or in a "locked cabinet", broken down by health unit area. Overall for the North, 91% of respondents indicated that medicines and cleaners were stored out of reach or in a locked cabinet. Although the percentages varied from a low 88.1% for Muskoka-Parry Sound Health Unit to a high of 93.4% for North Bay and District Health Unit, the differences were not found to be significant. Unfortunately, due to small cell numbers, safe storage of medicines and cleaners could not be analyzed by child's age.

Figure 2. Response distribution by respondents that medicines and cleaners were kept out of reach or in a locked cabinet, weighted data, by health unit

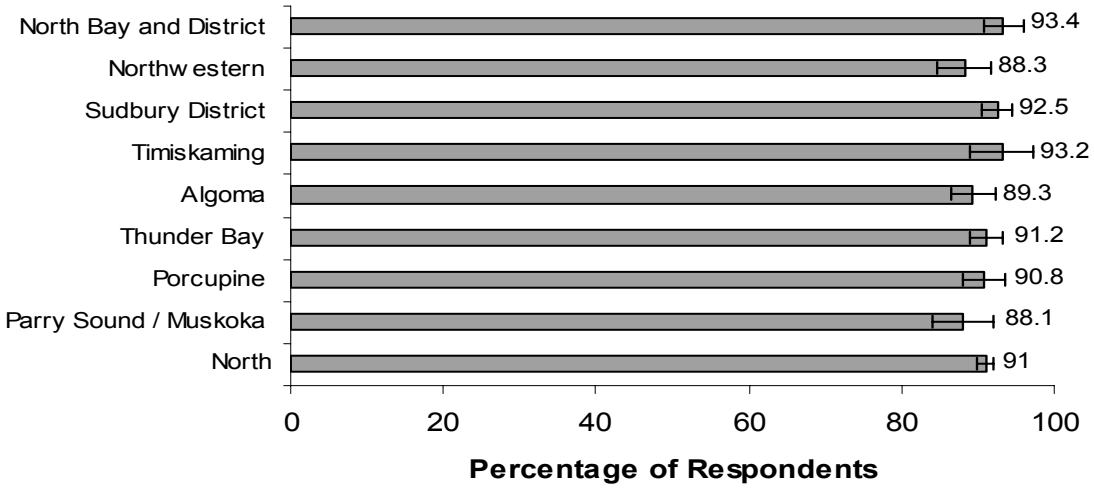
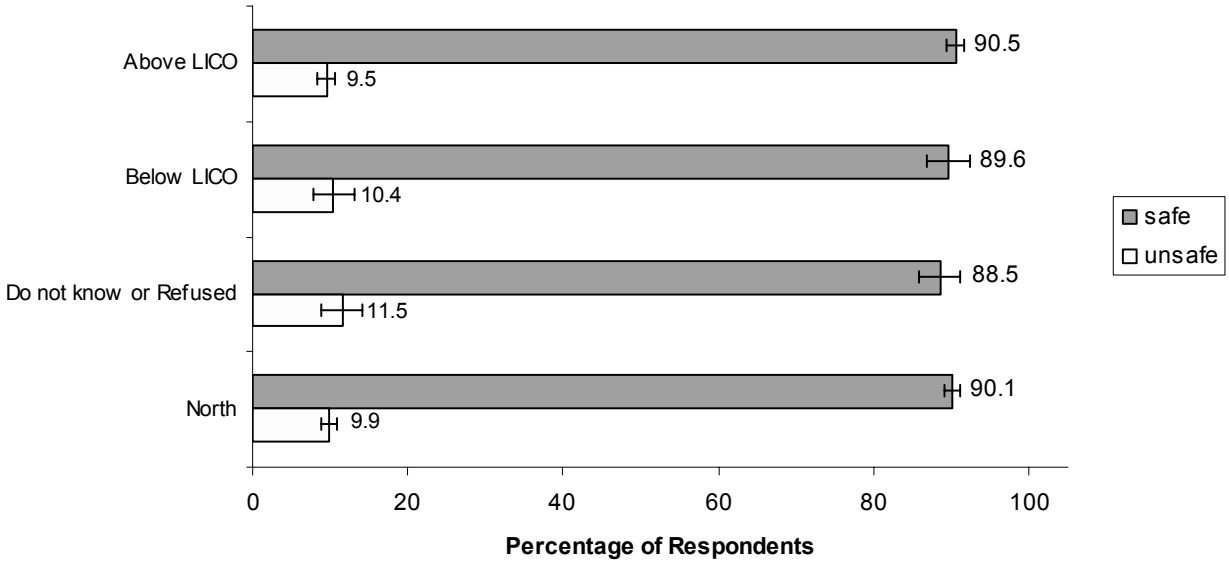


Figure 3 presents the percentage of respondents who indicated how they stored medicine and cleaners, broken down by LICO. Of the respondents above LICO, 90.5% were determined to be storing medicines and cleaners in a safe manner, 9.5% were determined to be storing medicines and cleaners in an unsafe manner. Of the respondents below LICO, 89.6% were determined to be storing medicines and cleaners in an safe manner and 10.4% were determined to be storing medicines and cleaners in an unsafe manner. These differences were not found to be significant.

Figure 3. Distribution of medicine and cleaner storage status of 'target child' by LICO, weighted data, all northern health units



BICYCLE SAFETY

The questions asked by the NOPCHS regarding helmet usage while riding tricycles or bicycles had a "not applicable" response option. All responses that indicated that the question was applicable were analyzed in the following descriptions, regardless of age of the 'target child'.

Helmet Use with Tricycles

The following section only included analysis of responses from respondents who indicated that questions regarding helmet use with tricycles were applicable to their target child (n=964).

Figure 4 presents the percentage of respondents indicating that the 'target child' wears a helmet when riding a tricycle, broken down by health unit. Overall, 83.3% of respondents indicated that the 'target child' wore a helmet. The percentages varied from a low of 75.1% for Northwestern Health Unit to a high of 91% for Porcupine Health Unit, with Northwestern significantly different from North Bay, Timiskaming and Porcupine, but not from the North as a whole.

Figure 4. Response distribution by respondents reporting that the 'target child' always wears a helmet when riding a tricycle, weighted data, by northern health unit

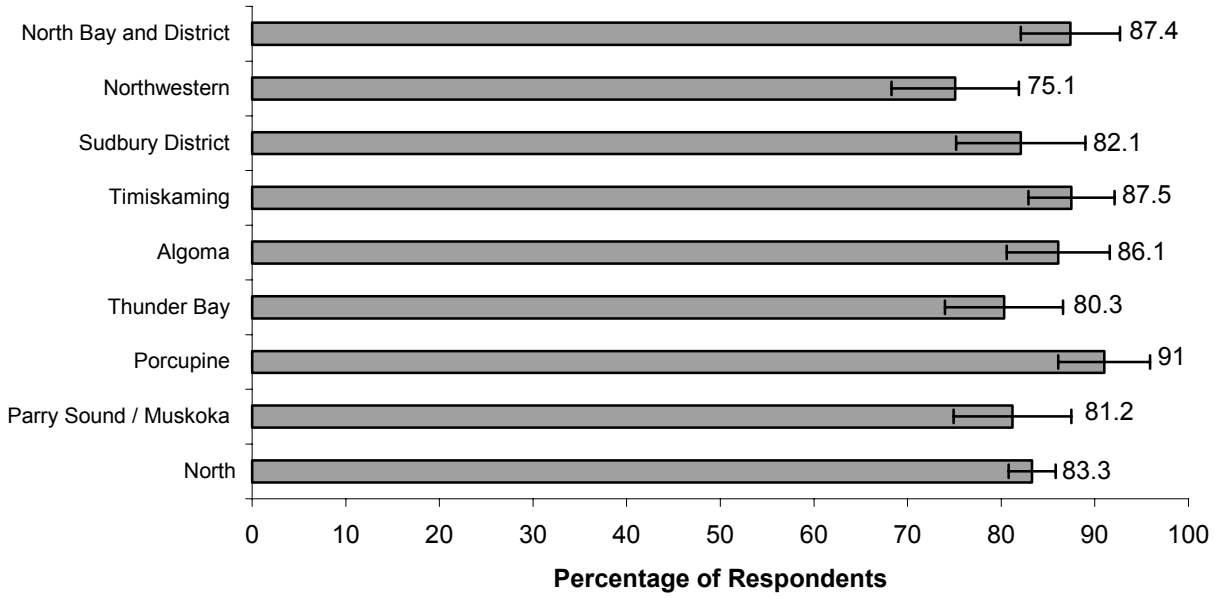


Figure 5 presents the percentage of respondents indicating that the 'target child' wears a helmet when riding a tricycle, by sex and health unit. Overall, 83.1% of male children and 83.4% of female children always wear a helmet when riding a tricycle. No significant difference between sexes in helmet use when riding a tricycle were found.

Figure 5. Response distribution, by gender, of the 'target child' always wearing a helmet when riding a tricycle, weighted data, all northern health units

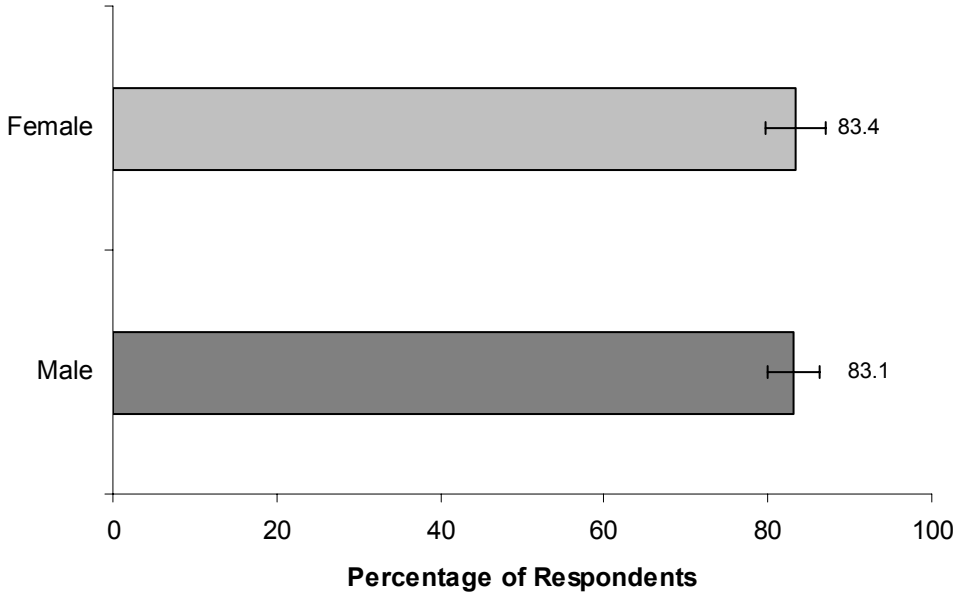


Figure 6 presents the percentage of respondents indicating that the 'target child' wears a helmet when riding a tricycle, by age. Helmet usage significantly increases as the child ages, from 63.1% for children aged 1 to under 2 years up to approximately 89% for 5 to under 6 years and 6 to under 7 years. Unfortunately the cell sizes for this category were not large enough to allow for health unit level analysis by age.

Figure 6. Response distribution by age of the 'target child' always wearing a helmet when riding a tricycle, weighted data, all northern health units

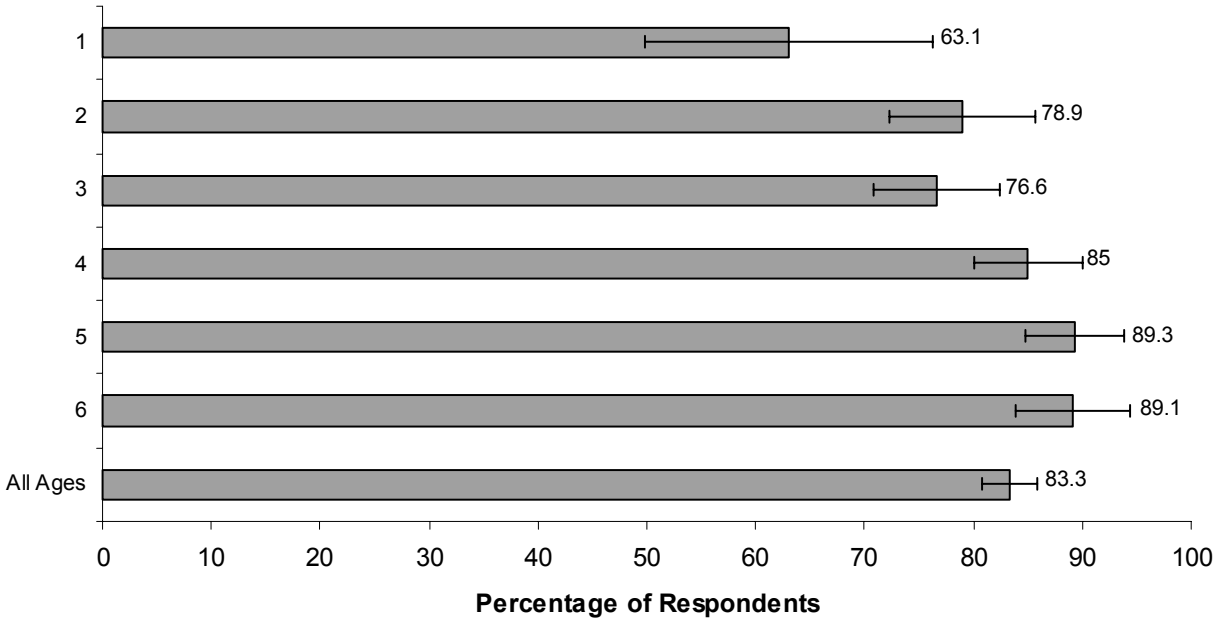
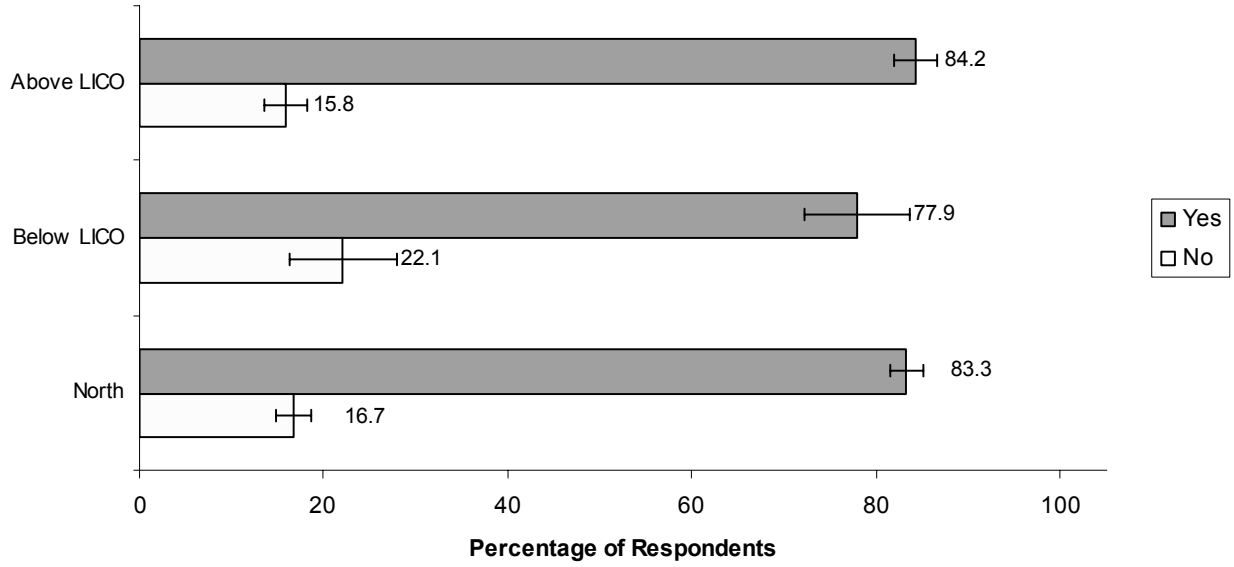


Figure 7 presents the percentage of respondents who indicated that the 'target child' wears a helmet when riding a tricycle, broken down by LICO. Of the 'target children' whose families were above the LICO, always wearing a helmet was reported for 84.2% and not always wearing a helmet was reported for 15.8%. Of the 'target children' whose families were below the LICO, always wearing a helmet was reported for 77.9% and not always wearing a helmet was reported for 22.1%. These differences were not found to be significant.

Figure 7. Response distribution, by LICO, for the 'target child' always wearing a helmet when riding a tricycle, weighted data, all northern health units



Helmet Use with Bicycles – Riding Alone

The following section only includes analysis of responses from respondents who indicated that questions regarding helmet use when riding alone on a bicycle were applicable to their target child (n=957).

Figure 8 presents the percentage of respondents indicating that the 'target child' wears a helmet when cycling alone, broken down by health unit. Overall, 93.6% indicated that the 'target child' wore a helmet. Although the percentages varied from a low 87% for Northwestern Health Unit to a high of 97.9% for Algoma Health Unit, the differences were not found to be significant, with the exception of children in the Northwestern Health Unit area being significantly less likely to wear a helmet when cycling alone than children in Timiskaming and Algoma.

Figure 8. Response distribution, by health unit, by respondents reporting that the 'target child' always wears a helmet when cycling alone, weighted data

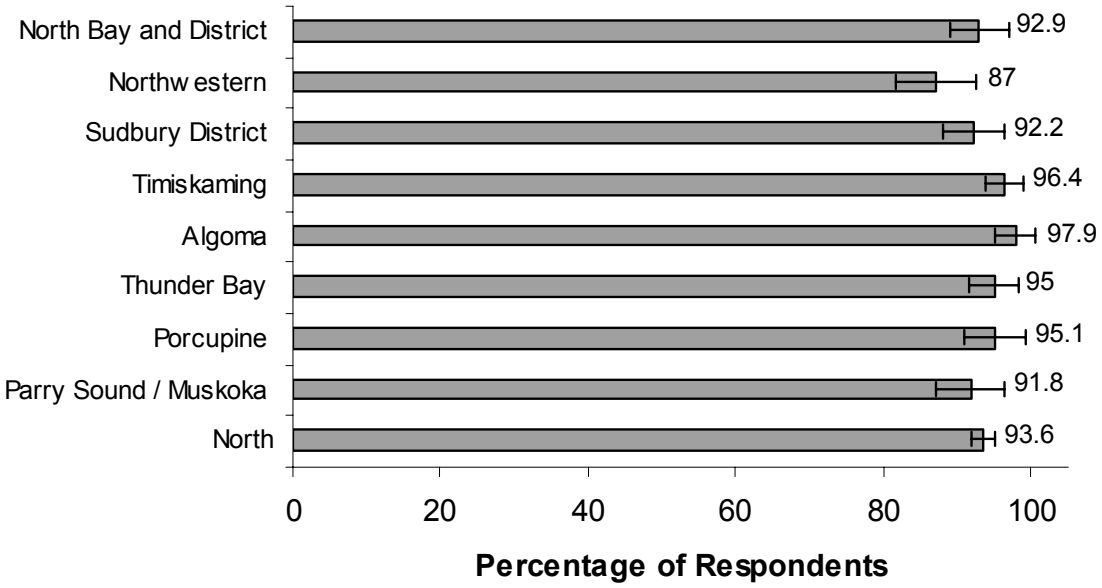


Figure 9 presents the percentage of respondents indicating that the 'target child' wears a helmet when cycling alone, by sex and health unit. Overall, 95.3% of male children and 91.8% of female children always wear a helmet when cycling alone. This difference was not found to be significant.

For most of the health units, the male 'target children' were more likely to wear a helmet when cycling alone; however, this difference was generally not found to be significant. Porcupine Health Unit had significant differences between the percentages of males and females wearing helmets when cycling alone, with more males (97.4%) than females (85.8%) wearing helmets (data not shown in figure).

Figure 9. Response distribution by gender for 'target child' always wears a helmet when cycling alone, weighted data, all northern health units

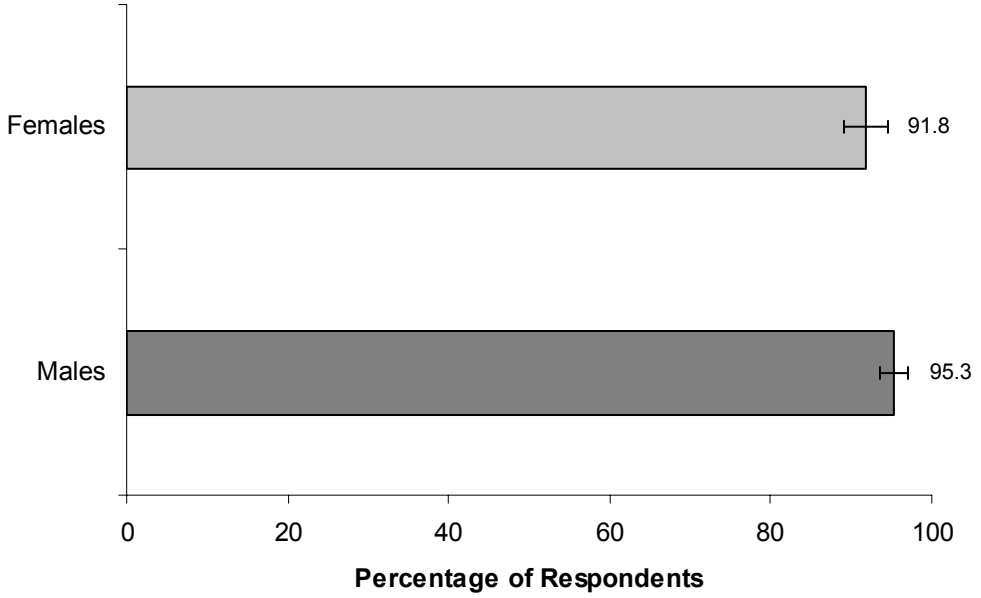


Figure 10 presents the percentage of respondents indicating that the 'target child' wears a helmet when cycling alone, by age, by health unit. Helmet usage significantly increases with age from 72.1% for 'target children' aged 2 to under 3 years and peaking at 95.5% for the 5 to under 6 year olds. Unfortunately the cell sizes for this category were not large enough to allow for health unit level analysis.

Figure 10. Response distribution by age of the 'target child' wearing a helmet when cycling alone, weighted data, all northern health units

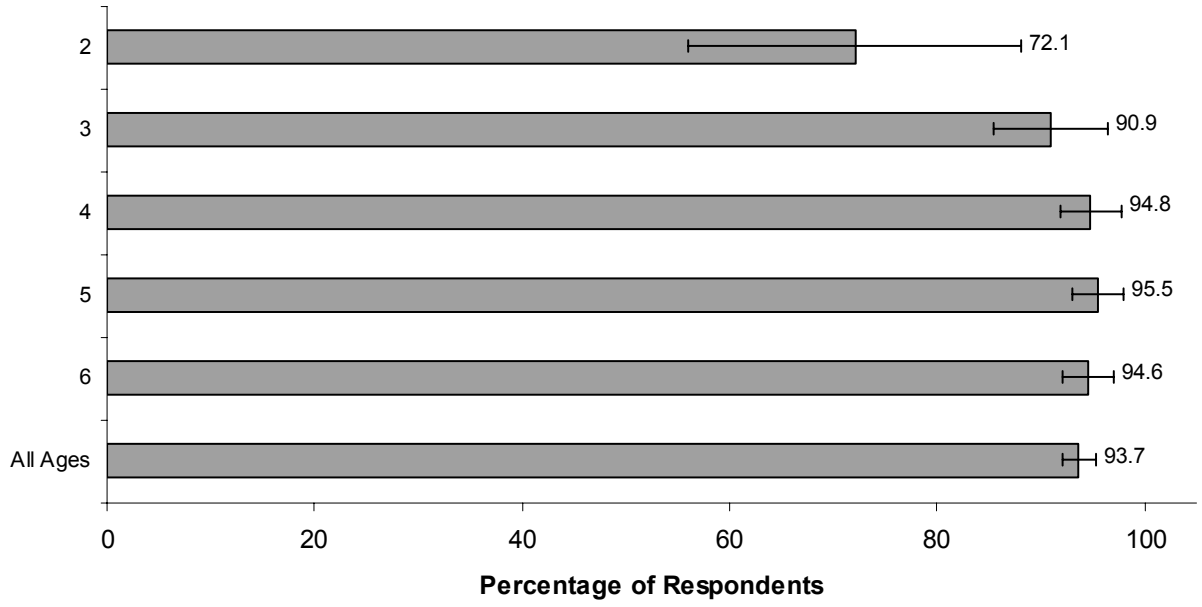
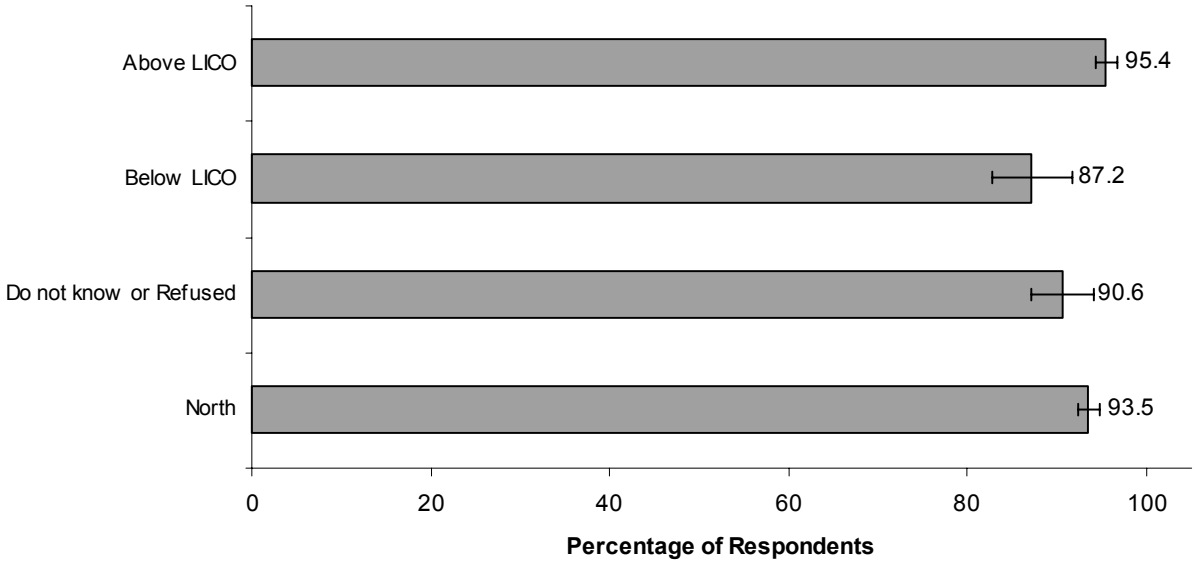


Figure 11 presents the percentage of respondents who indicated that the 'target child' wears a helmet when riding a bicycle alone, by LICO. Of the 'target children' whose families were above LICO, always wearing a helmet was reported for 95.4% and of the 'target children' whose families were below LICO, always wearing a helmet was reported for 87.2%. These differences were found be significant, with children whose families were above LICO wearing helmets significantly more often.

Figure 11. Response distribution for the 'target child' wearing a helmet when riding a bicycle alone by LICO, weighted data, all northern health units



Helmet Use with Bicycles – Riding as a Passenger

The following section only includes analysis of responses from respondents who indicated that questions regarding helmet use when riding as a passenger on a bicycle were applicable to their target child (n=560).

Figure 12 presents the percentage of respondents indicating that the 'target child' wears a helmet when riding as a passenger on the back of a bicycle by health unit. Overall, 88.1% of respondents indicated that the 'target child' wears a helmet. Although the percentages varied from a low 82.6% for Thunder Bay and District Health Unit to a high of 95.3% for Porcupine Health Unit, the differences were not found to be significant.

Figure 12. Response distribution by respondents reporting that the 'target child' wears a helmet when riding as a passenger on the back of a bicycle, weighted data, by health unit

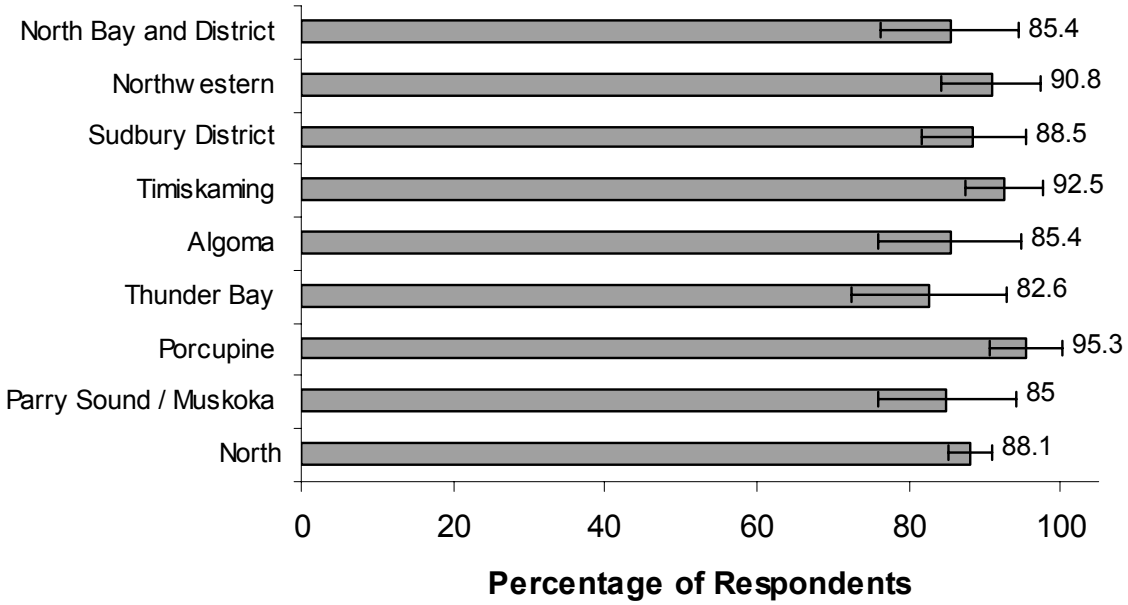


Figure 13 presents the percentage of respondents indicating that the 'target child' wears a helmet when riding as a passenger on the back of a bicycle, broken down by sex of target child. Although more males (90.4%) than females (85.5%) are reported to wear helmets, the difference is not significant. Unfortunately the cell sizes for this category were not large enough for health unit level analysis by gender.

Figure 13. Response distribution by gender for 'target child' wears a helmet when riding as a passenger on the back of a bicycle, weighted data, all health units

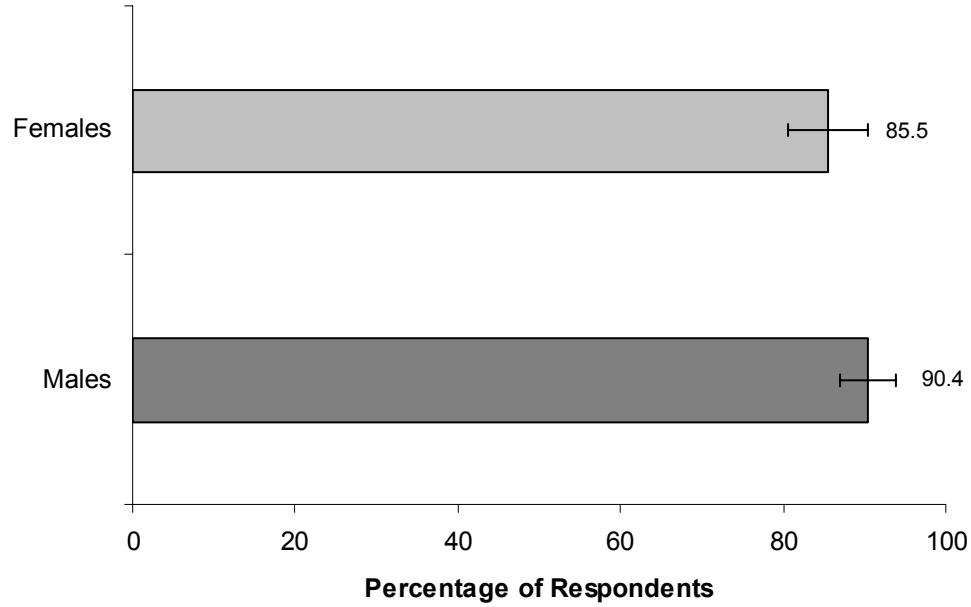


Figure 14 presents the percentage of respondents indicating that the 'target child' wears a helmet when riding as a passenger on the back of a bicycle, broken down by age. No significant differences between age categories were found, which ranged from a low of 82.5% for 'target children' 6 to under 7 years to a high of 93.5% for the age category of 3 to under 4 years. Unfortunately the age category 0 to under 1 year had a cell size of less than 30 and could not be reported. It was, however, included in the total age category.

Figure 14. Response distribution by target child age, of respondents reporting that the 'target child' always wears a helmet when riding as a passenger on the back of a bicycle, weighted data, all Northern Health Units

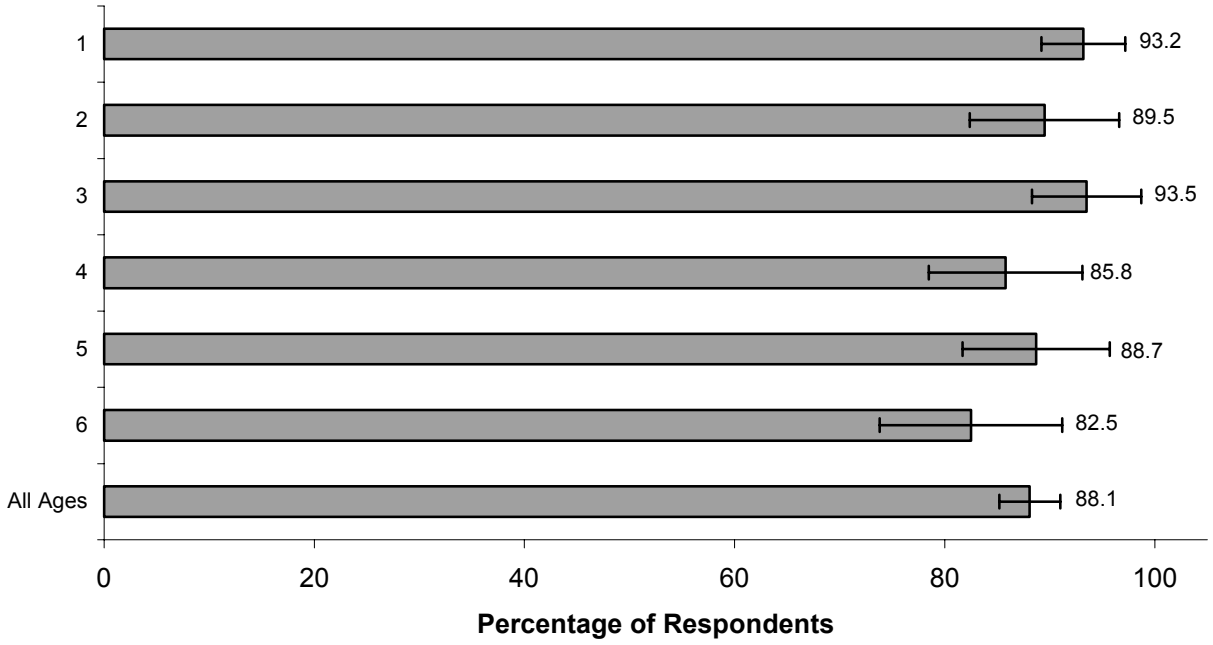
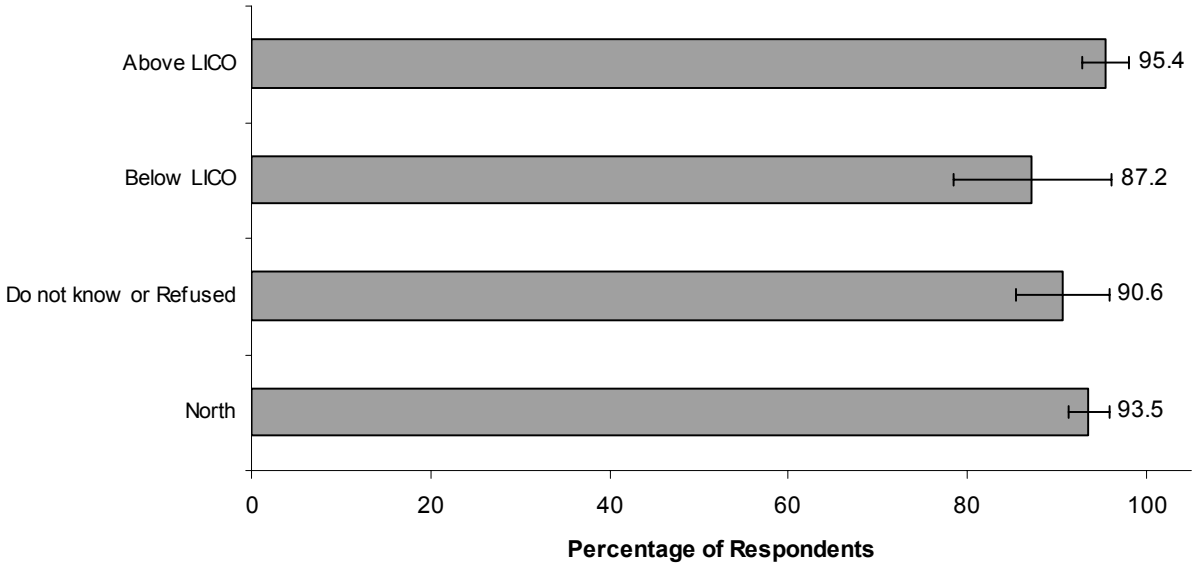


Figure 15 presents the percentage of respondents who indicated that the 'target child' always wears a helmet when riding a bicycle as a passenger, by LICO. Of the 'target children' whose families were above LICO, always wearing a helmet was reported for 95.4% and of the 'target children' whose families were below LICO, always wearing a helmet was reported for 87.2%. These differences were not found to be significant.

Figure 15. Response distribution for the 'target child' wearing a helmet when riding a bicycle as a passenger by LICO, weighted data, all Northern Health Units.

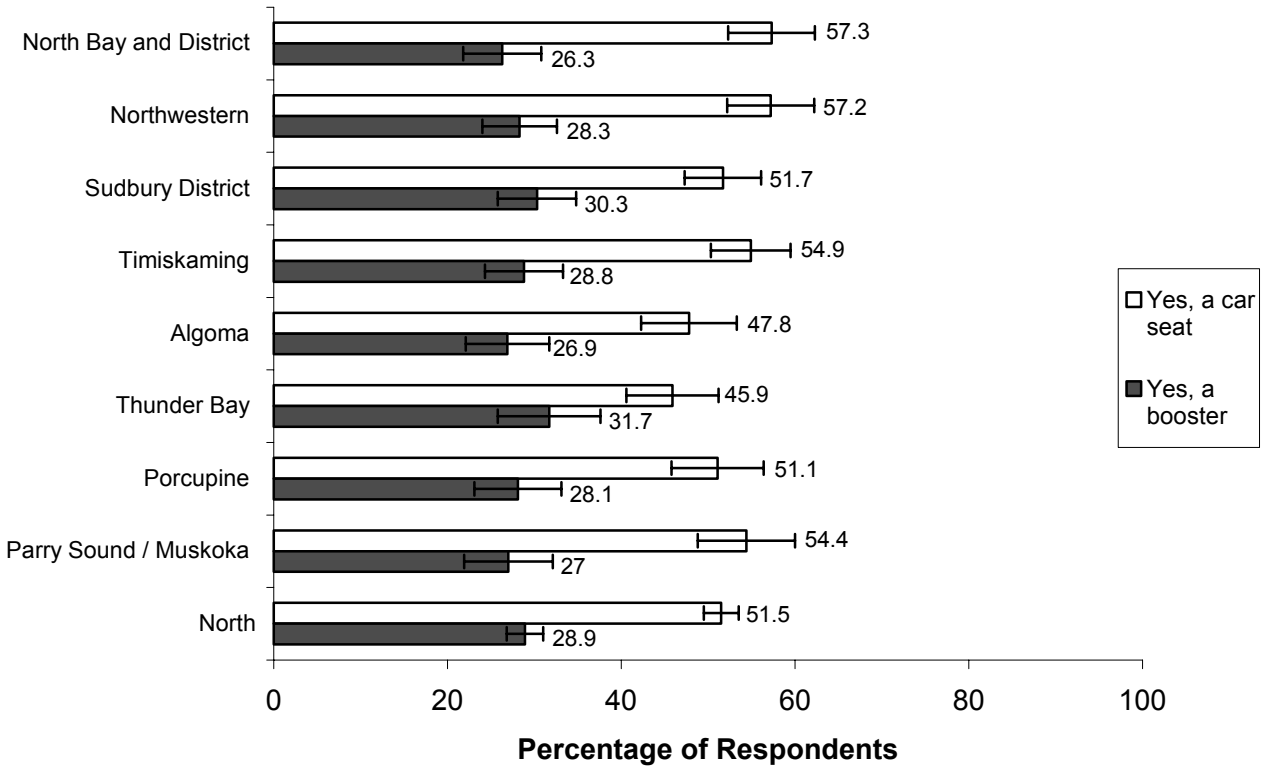


CAR SAFETY

The following questions were analyzed using the age of 'target child' rather than a height to weight ratio, because child's weight was missing from many cases.

Figure 16 presents the percentage of respondents indicating that the 'target child' always uses a car seat or booster when going somewhere by car. Overall, 51.5% indicated the use of a car seat and 28.9% indicated use of a booster, for a total of 80.4% using some car restraint device. Use of either a car seat or booster ranges in percentage from 74.7% for Algoma Health Unit to 85.5% for Northwestern Health Unit. Some significant differences among health unit areas were observed: Algoma rates are lower overall than North Bay, Northwestern and Sudbury, and Thunder Bay rates are lower overall than Northwestern.

Figure 16. Response distribution by respondents reporting that the 'target child' always uses a car seat or booster when going somewhere by car, weighted data, by Northern Health Units



For a more detailed look at these findings, Figure 17 presents the percentage of respondents indicating that the 'target child' always uses a car seat or booster when going somewhere by car broken down by age. Use of car seat is almost exclusive in the age categories from birth to under 2 years and still is the majority up to the category of 3 to under 4 years. Booster use tends to begin at age category 2 to under 3 years and stays high until after the category of 5 to under 6 years. Use of neither starts around the age category of 3 to under 4 years and continually rises to become the majority category by the age of six years.

Figure 17. Response distribution by target child age, of respondents reporting that the 'target child' always uses a car seat or booster when going somewhere by car, , weighted data, all Northern Health Units

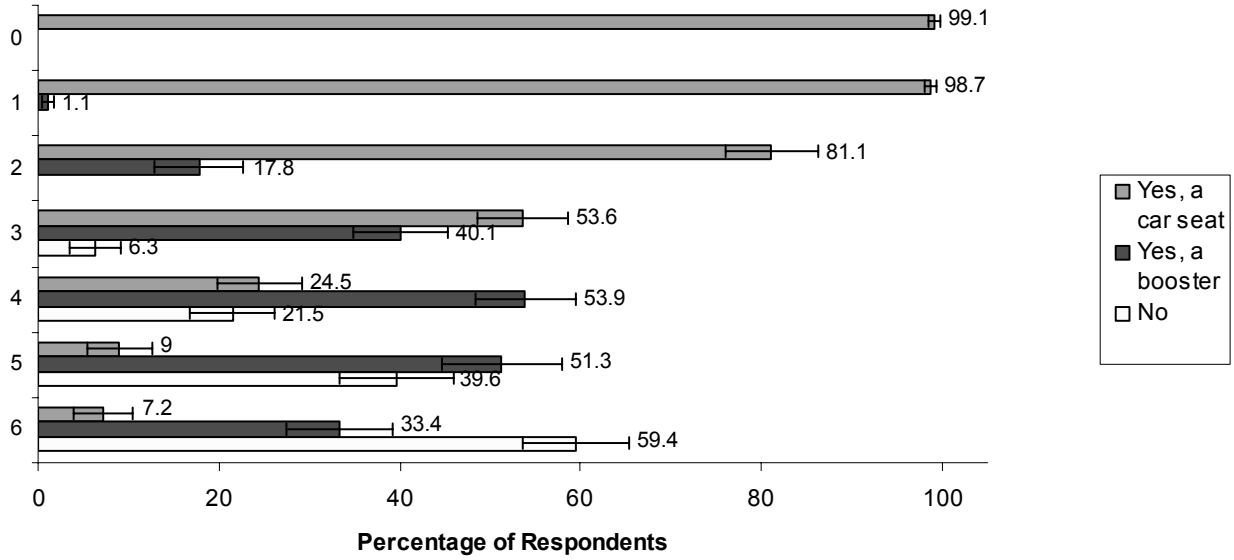


Figure 18 presents the percentage of respondents indicating that the 'target child' uses a car seat or booster when going somewhere by car, by LICO. Of the 'target children' whose families were above LICO, "always uses a car seat or booster when going somewhere by car" was reported for 82.1% and "not always uses a car seat or booster when going somewhere by car" was reported for 17.9%. Of the 'target children' whose families were below LICO, "always uses a car seat or booster when going somewhere by car" was reported for 73.6% and "not always uses a car seat or booster when going somewhere by car" was reported for 25.4%. These differences were found to be significant, with respondents above the low-income cut-off always using a car set or booster more than respondents below the low-income cut-off.

Figure 18. Response distribution by respondents reporting that the 'target child' uses a car seat or booster when going somewhere by car by LICO, weighted data, all Northern Health Units.

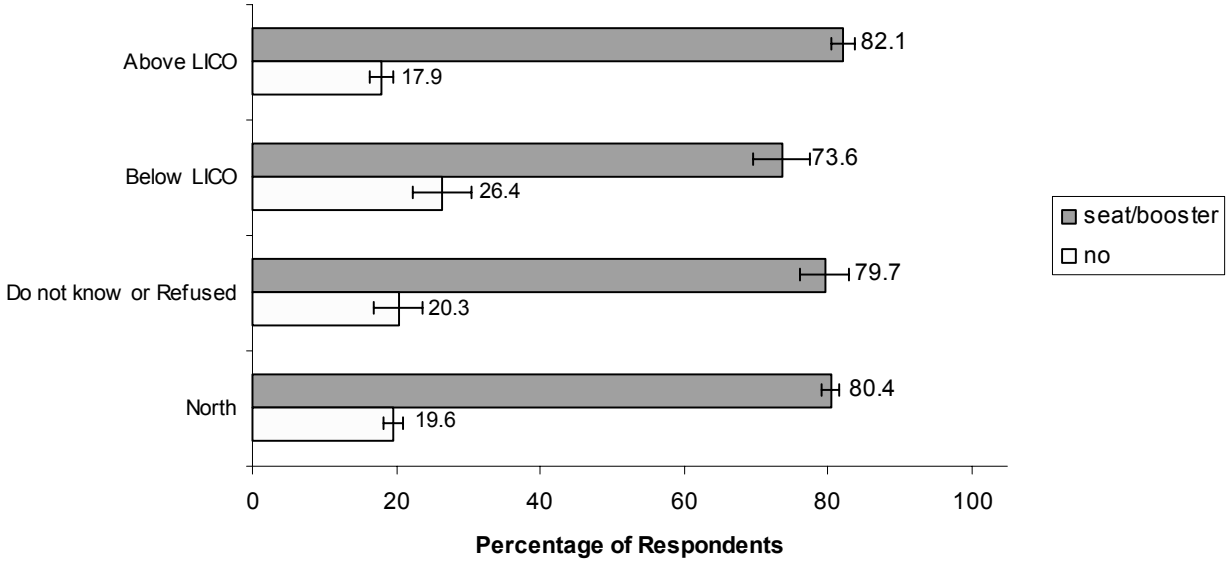
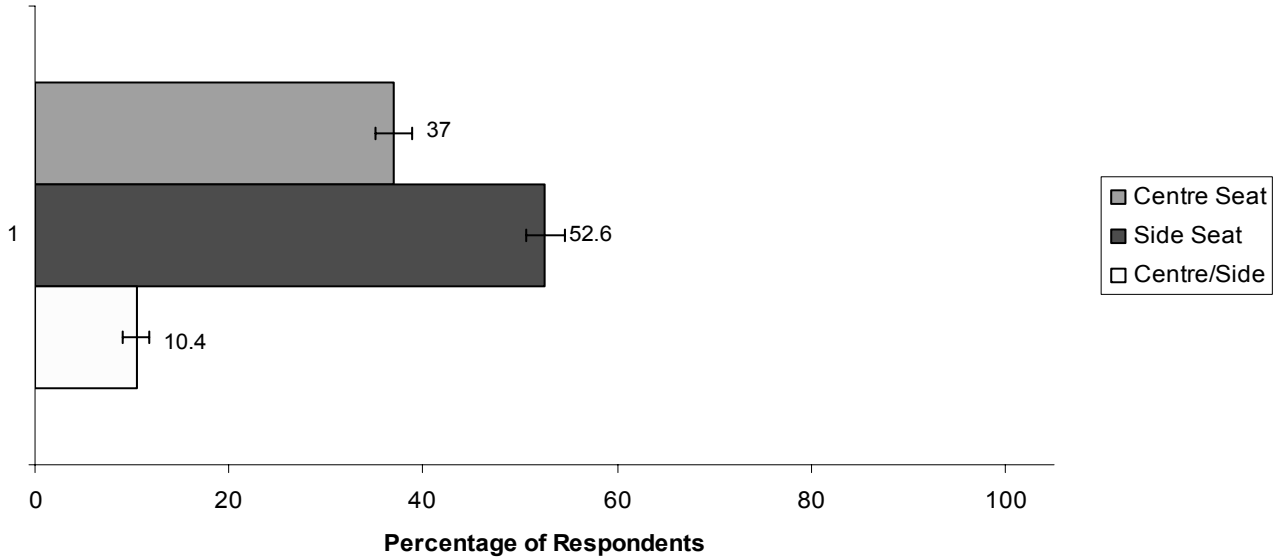


Figure 19 presents the percentage of respondents reporting the location of the 'target child' when sitting in the back seat. The 'target child' always sitting in the middle back seat was indicated by 37% of the respondents, 52.6% indicated the side back seat and 10% indicated a combination of the two choices. Safe Kids Canada recommends that children be placed in the middle back seat, because this area is the furthest away from the point of impact in every direction (Safe Kids Canada, 1997).

Figure 19. Response distribution by respondents reporting the location of the 'target child' when sitting in the back seat, all northern health units



SUN SAFETY

Figure 20 presents the percentage of respondents reporting that the 'target child' uses a hat to protect against the sun. Overall, 70% of respondents indicated that the 'target child' always wore a hat to protect against the sun. The proportion ranged from 64% for Northwestern Health Unit to 77% for Timiskaming Health Unit and Porcupine Health Unit, which was a significant difference.

Figure 20. Response distribution by respondents reporting that the 'target child' always uses a hat to protect against the sun, weighted data, by health units

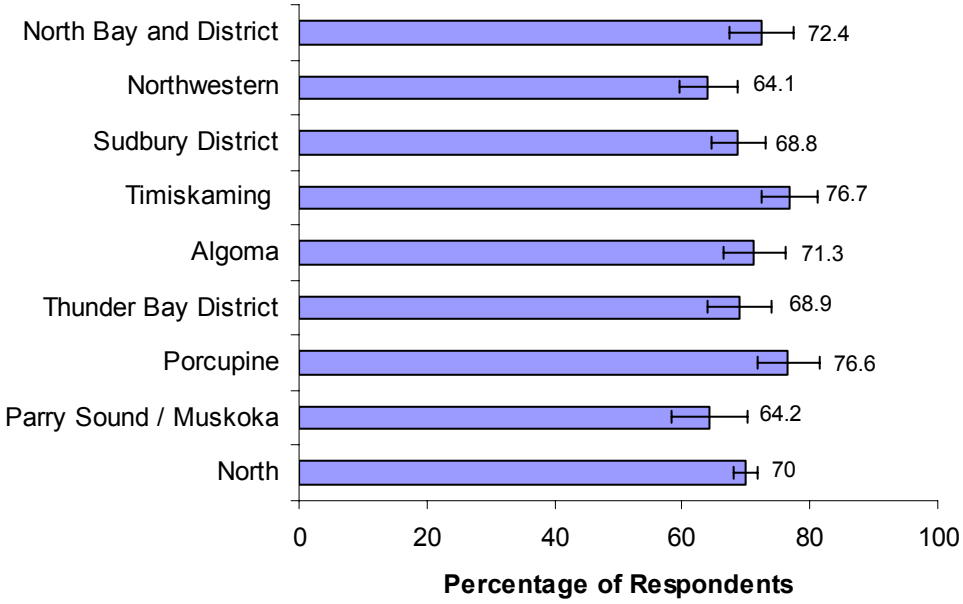


Figure 21 presents the percentage of respondents indicating that the 'target child' uses a hat to protect against the sun by sex. Overall, a significant difference was found between the male and female 'target children', at 75.7% and 63.9% respectively. Significantly more male children wear hats to protect against the sun. The differences by health unit were not found to be significant.

Figure 21. Response distribution by gender for 'target child' always uses a hat to protect against the sun, weighted data, all northern health units

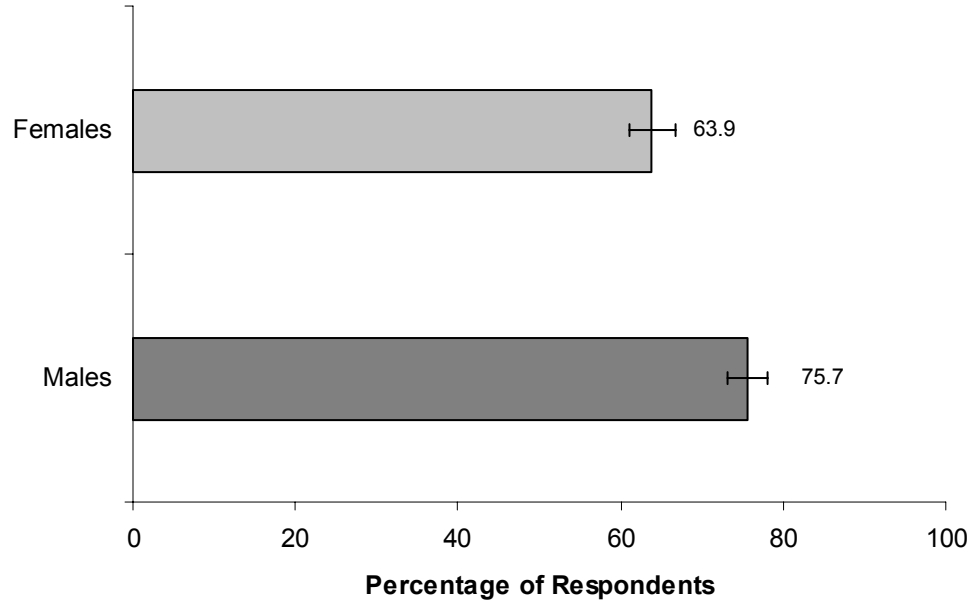


Figure 22 presents the percentage of respondents reporting that the 'target child' always uses a hat to protect against the sun broken down by age. A significant decline can be observed in the category "always uses a hat" from 89.9% of respondents for the 0 to under 1 year category to 49.2% for the 6 to under 7 years. Unfortunately, the cell sizes for this category were not large enough to allow for health unit level analysis by age.

Figure 22. Response distribution by respondents reporting that the 'target child' uses a hat to protect against the sun by age, weighted data, all northern health units

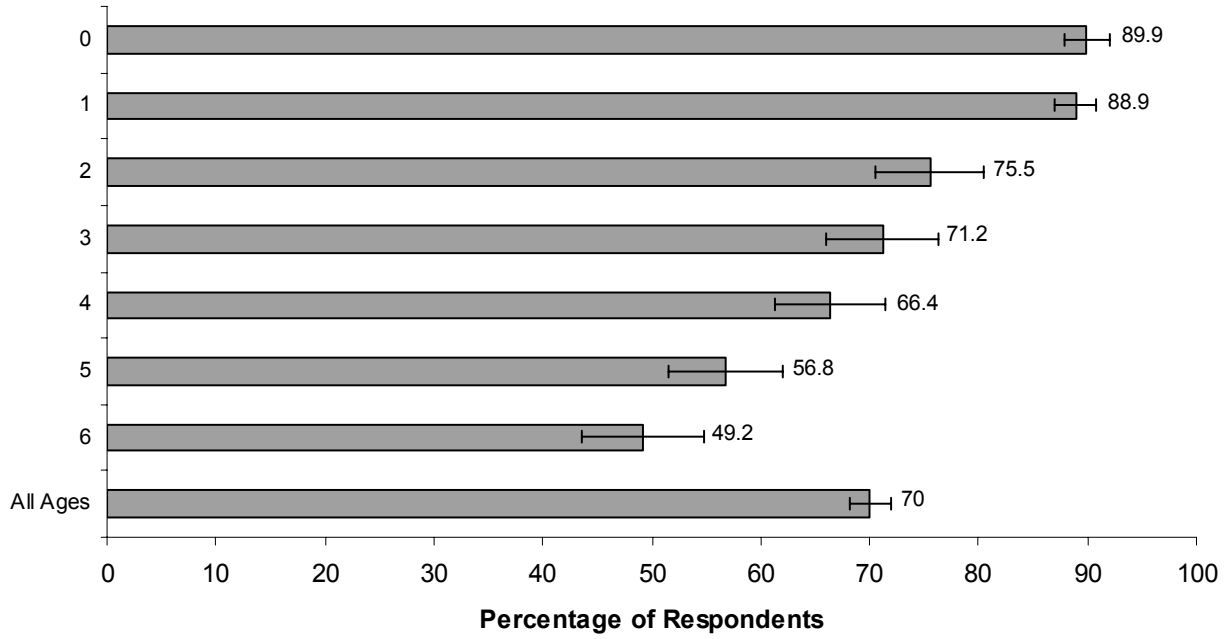


Figure 23 presents the percentage of respondents reporting that the 'target child' always uses a hat to protect against the sun broken down by LICO. The difference between sun hat use was marginally significant, with children in families living above LICO wearing hats more often than those below LICO.

Figure 23. Response distribution by respondents reporting that the 'target child' uses a hat to protect against sun by LICO, weighted data, all northern health units

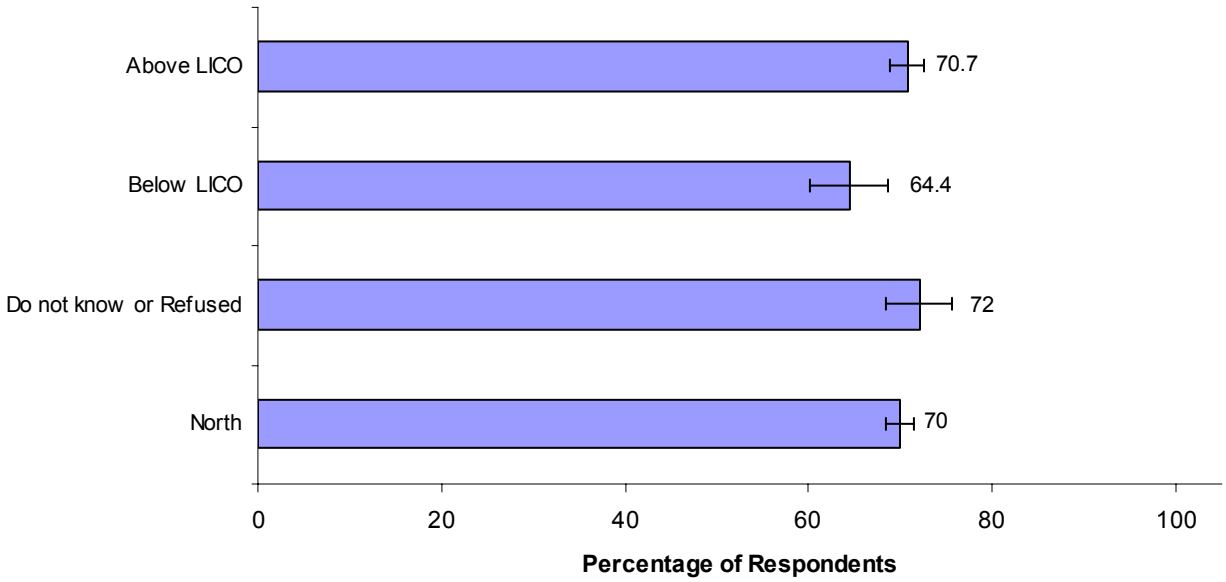


Figure 24 presents the percentage of respondents reporting that the 'target child' uses sun block to protect against the sun broken down by health unit. Approximately 80% of respondents answered questions regarding sun block use. The following descriptions are from those respondents. Overall, 59.4% of respondents indicated that the 'target child' always wore sun block to protect against the sun. The proportion ranged from 53.5% for Thunder Bay and District Health Unit to 67% for Timiskaming Health Unit. The difference between Thunder Bay and District and Timiskaming Health Units was found to be significantly different, as was the difference between Timiskaming and Northwestern. The remaining differences were not found to be significant.

Figure 24. Response distribution by respondents reporting that the 'target child' always uses sun block to protect against the sun, weighted data, by Northern Health Units

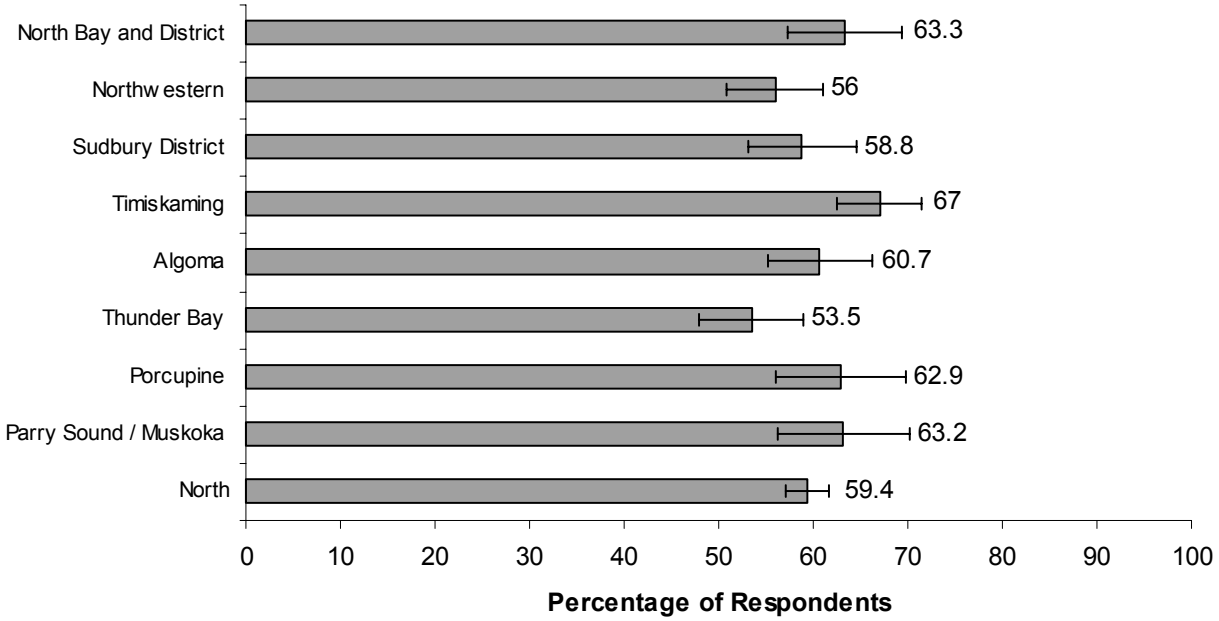


Figure 25 presents the percentage of respondents indicating that the 'target child' always uses sun block to protect against the sun broken down by sex. Sun block use was reported to be 57.5% for male children and 61.5% for female children, a difference that is not significant. The differences by sex for each health unit were not found to be significant.

Figure 25. Response distribution by gender for 'target child' always uses sun block to protect against the sun, weighted data, all northern health units

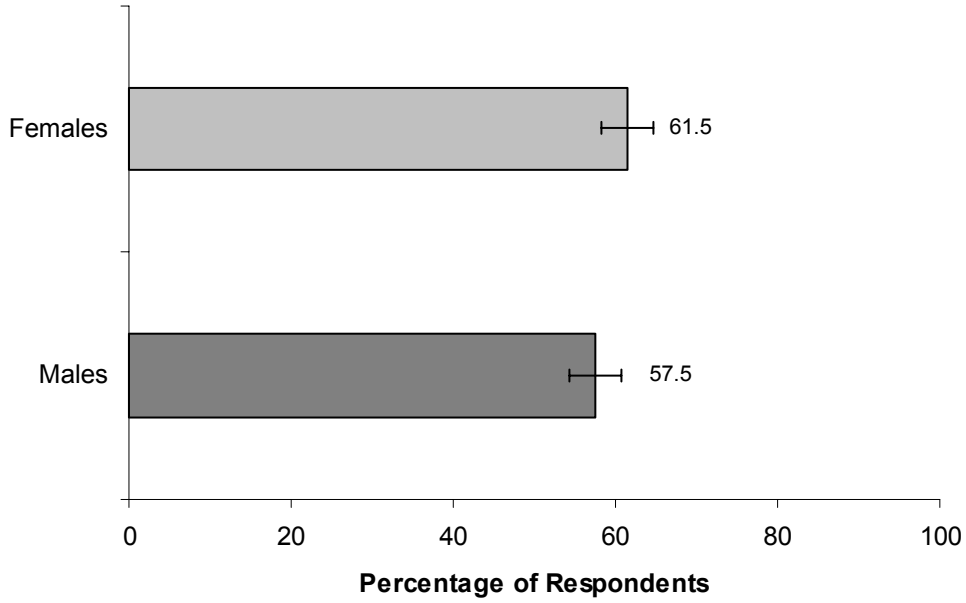


Figure 26 presents the percentage of respondents reporting that the 'target child' always uses sun block to protect against the sun broken down by age. The 1 to under 2 year category is found to be significantly different from many of the higher age categories. In general, there is a decline in the category "always uses sun block" as the child's age increases. Unfortunately, the cell sizes for this category were not large enough to allow for health unit level analysis by age.

Figure 26. Response distribution by 'target child' age for respondents reporting that the 'target child' always uses sun block to protect against the sun, weighted data, all Northern Health Units

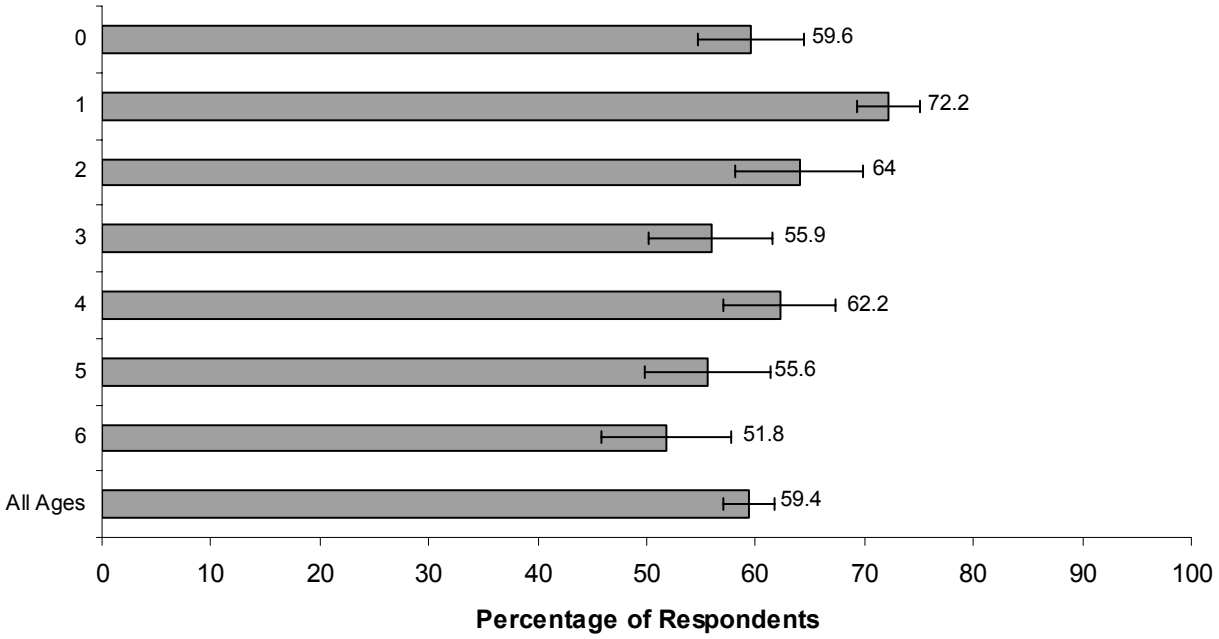
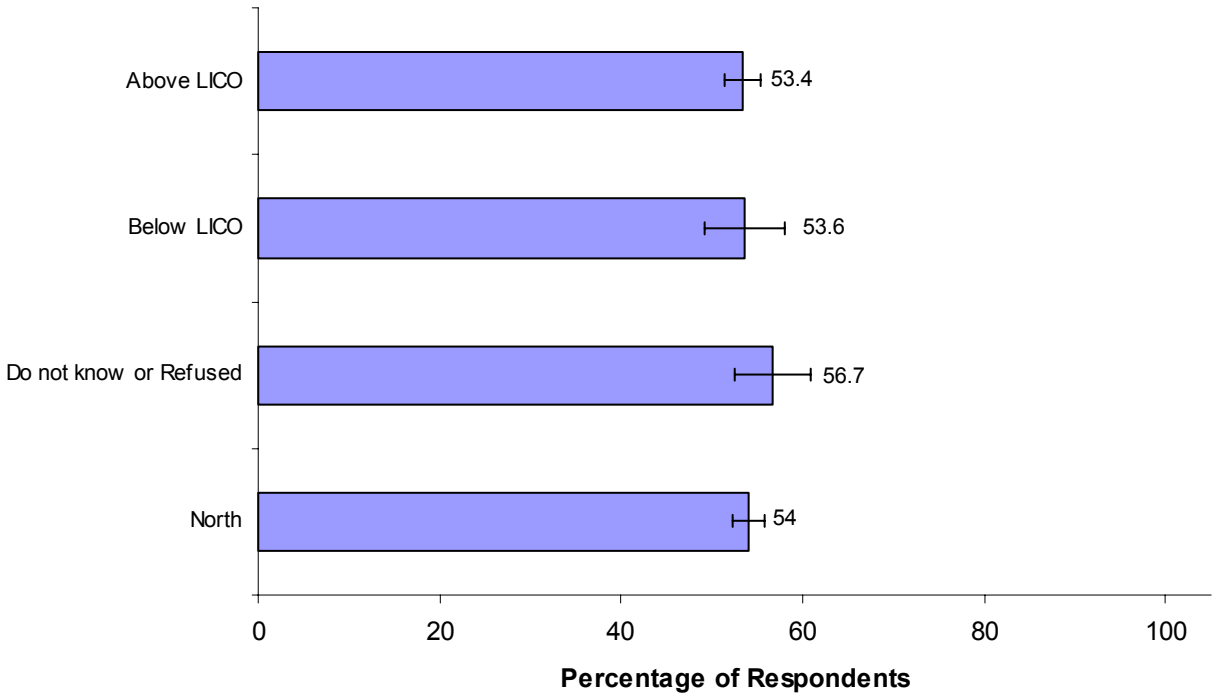


Figure 27 presents the percentage of respondents reporting that the 'target child' always wear sun block broken down by LICO. The difference between children in families living above and below the LICO was not significant.

Figure 27. Response distribution by LICO, for respondents reporting that the 'target child' always uses sun block to protect against the sun, weighted data, all northern health units



UNINTENTIONAL INJURIES

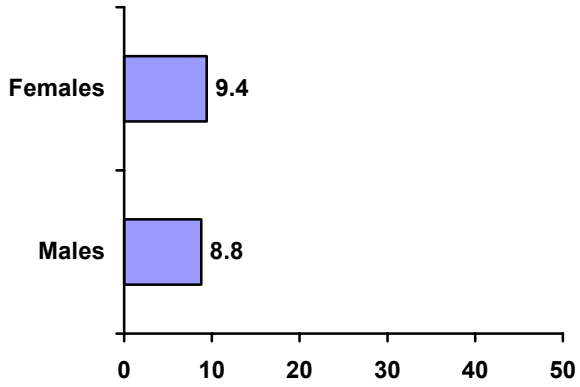
Injury is one of the leading causes of death in Ontario among children aged 6 years or younger (NHIP, 2002). Northern Ontario has been shown to have higher rates of childhood injuries as compared to Ontario as a whole (NHIP, 2002). The data in this section identify the proportions of falls and poisonings, analyzed when numbers permitted by sex, age and LICO.

Falls

Among all respondents, 9.1% reported that the 'target child' had suffered a fall that required medical attention in the previous 12 months. Of those respondents that indicated that their child had suffered a fall, 44.8% indicated that the injury was a cut, 22.8% indicated that the injury was a bruise and 20.5% indicated that the injury was a broken bone (categories were not mutually exclusive) and 81.2% had brought their child to a hospital. Unfortunately, the cell sizes for injury type and location of treatment were not large enough to allow any further analyses.

Figure 28 presents the percentage of respondents who indicated that the 'target child' had suffered a fall requiring medical attention in the past 12 months broken down by 'target child' sex. With confidence intervals of 7.4 - 10.2 for males and 7.5 - 11.4 for females, the rate of falls by child's gender was not found to be significantly different; 8.8% of male children and 9.4% of female children had falls in the last year. Unfortunately the cell sizes for this category were not large enough to allow health unit level analysis by target child sex.

Figure 28. Response distribution by sex, for 'target child' had a fall requiring medical attention in the last year, all northern health units



Because of small cell sizes, the estimates for falls by age are highly variable and cannot be reported. As a way of illustrating some age-related data, Figure 29 presents the percentage of respondents who indicated that the 'target child' had not suffered a fall requiring medical attention in the past 12 months, broken down by age. The difference between the 0 to under 1 year age category was found to be significantly different from the other age categories, with more young children not suffering a fall requiring medical attention. Although the percentages varied within the 1 year to 6 year age ranging from a low of 87.1% for the 2 to under 3 years category to a high of 91.5% for the 1 to under 2 years category, the differences were found not to be significant. From these data, it can be seen that falls increase significantly after the age category of 0 to under 1 years, but the remaining age categories stay approximately similar. Unfortunately, the survey responses for this category were not large enough to allow health unit level analysis by age.

Figure 29. Response distribution by respondents reporting that in the last 12 months, the 'target child' did not fall requiring medical attention by age, weighted data, all Northern Health Units

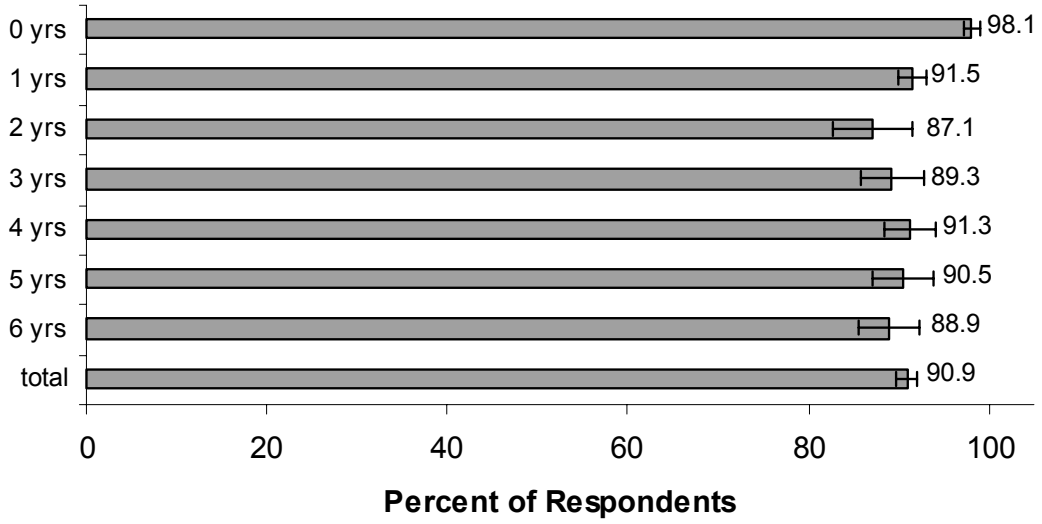
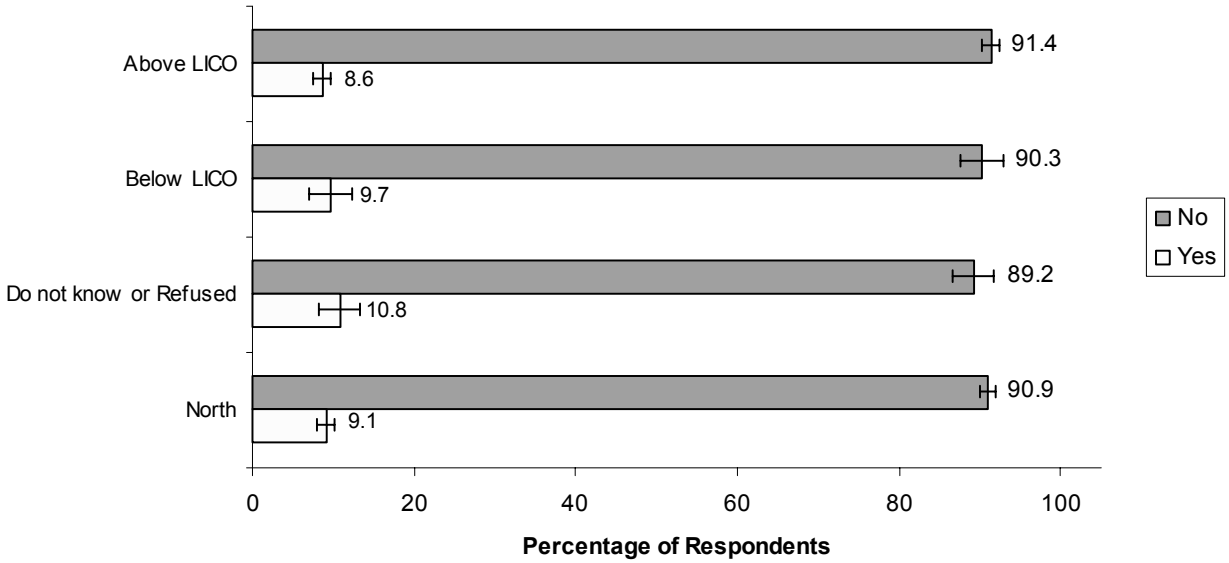


Figure 30 presents the percentage of respondents who indicated fall status of the 'target child', by LICO. Of the 'target children' whose families were above LICO, 8.6% had reported a fall and 91.4 had not reported a fall. Of the 'target children' whose families were below LICO, 9.7% had reported an injury and 90.3 had not reported a fall. These differences were not found to be significant.

Figure 30. Response distribution by respondents reporting the fall status for the 'target child' in the last 12 months by LICO, weighted data, all Northern Health Units.



Accidental Poisoning

Just under 2% of respondents reported that the 'target child' had been treated for an accidental poisoning and of those, approximately 81% of the children visited the emergency room of the hospital. Unfortunately, the survey responses for this category were not large enough to allow for health unit level analysis for either of these two variables. None of the children under one year of age were treated for an accidental poisoning. The survey responses were not large enough to allow for age category level analysis for this group.

DISCUSSION

CHILD SAFETY AND INJURY PREVENTION

This survey collected information on injury prevention behaviours by the parent and examined potential contributing factors such as geographic location, sex of 'target child', age of 'target child', or income level. The questions in this category measure self-reported behaviour data and could be influenced by social desirability.

It should be noted that the survey only collected information from the mother of the 'target child'. While the home is the location of a large percentage of child injuries, there are also other locations, such as childcare settings, where the child may incur injuries or be exposed to risky situations.

Storage of Medicines and Cleaners

Approximately 91% of respondents indicated that they stored medicines and cleaners in a safe place – either locked in cabinets or high, out of the child's reach. Geographic location did not affect the place of storage. Although this is a high rate, still close to 1 in 10 homes report not storing medication and cleaners safely, and this has implications for childhood poisonings. As the literature suggests, some parents may be over-confident that their children understand and will follow household safety rules.

Bicycle Safety

Responses were used from those respondents that indicated that the bicycle safety questions were applicable to them. Over 16% of the respondents indicated that their 'target child' does not wear a helmet when riding a tricycle and over 6% indicated that their 'target child' does not wear a helmet when riding a bicycle. Helmet use with tricycles or bicycles did not significantly vary with geographic location or sex. Age was a significant factor, with the highest use in the older ages. Income was related to helmet use when riding a bicycle alone, with children from families living above the LICO wearing helmets significantly more often. Over 10% of the respondents indicated that the 'target child' did not wear a helmet when riding as a passenger on the back of a bike and the results did not significantly vary with geographic location, sex or age. The question of whether the helmet is being correctly used is not ascertained by this survey. These findings suggest that helmet legislation could be better enforced, and that parents should be encouraged to promote helmet use.

Parents are important role models for safety behaviours, particularly helmet use. Parents should be encouraged to use helmets in all situations in which children are required to do so. One survey found that among parents who always wear a helmet while bicycling, 98% say their children also wear helmets. Among parents who never wear a helmet while bicycling, 75% say their children never wear a helmet (Canadian Safety Council, 2002).

Car Safety

Car seats were always used by 51.1% of respondents, and boosters seats were used by 28.9%. The question of whether the car seat or booster is being correctly used is not ascertained by this survey. "Uses a car seat or booster" did not significantly vary with geographic location or sex. Age differences were noted: Car seats are used almost exclusively from ages 0 to under 3 years and then usage declines rapidly as the child ages. Booster seat use begins at 2 to under 3 years and peaks at 4 to under 6 years. By 3 to under 4 years, not using a car seat or booster has begun and by 6 to under 7 years, it predominates. A significant difference was observed between families living above and below low-income cut-off levels, with more children living above the low-income cut-off using car seats or boosters. Most respondents indicated that they place their child in the side back seat.

Although it is preferable to use child weight and height as a guide for car seat use, the survey had more complete data on child age, and so child age was used to give an overall picture of the proportion of children using car seats and boosters. In general, children from ages 4-8 are recommended to use booster seats. Thus, in the present survey of mothers with children up to age 6, all children should probably still be using a car seat or booster. As can be seen in Figure 17, between 21.5% and 59.4% of 4-6 year olds are using neither car seats nor boosters.

Placement in the middle back seat is recommended in most vehicles (SafeKids Canada, 1997), but there are exceptions depending on the make and model of the car. Therefore, it cannot be concluded that all children who are not sitting in the middle back are improperly placed.

Sun Safety

Hat use varied with age, significantly declining with increasing age. Interesting sex and income-level differences were observed such that hat use was found to be significantly more common among male children than female children, and among children living in families above the LICO. Sun block protection also showed decline with age, with significant variation, but not as pronounced in pattern as the decline observed in hat use. The question of whether the hat or sun block is being correctly used is not ascertained by this survey.

UNINTENTIONAL INJURIES

According to Health Canada, injuries are the leading cause of death among children in Canada. Injury is a major cause of disability and death in Ontario, and particularly in Northern Ontario (NHIP, 2002). Mortality due to injury and poisoning in Northern Ontario children was more than double the provincial average at 19.6 deaths per 100,000 as compared to 8.8 per 100,000 (NHIP, 2002). Similarly, the injury morbidity rate is higher in Northern Ontario, at 67.2 per 10,000 as compared to 48.7 per 10,000 for the province (NHIP, 2002).

In terms of aetiology of injury mortality in children aged 6 or younger, the leading cause in both Northern Ontario and the province was motor vehicle crashes, at 24% and 28% respectively, of total injury mortality. Unintentional submersion, suffocation and choking on foreign bodies was the second leading cause of childhood injury death in the province, accounting for 26% of mortality, as compared to the Northern Ontario proportion of 16%. However, in the North, death due to fire and flames took more lives, at approximately 18% of injury mortality. The provincial proportion was 13% (NHIP, 2002).

The prevalence and costs of children's injuries has fostered a recent research interest in the determinants of unintentional childhood injuries. An underlying theme in the literature is evident: young children are exceptionally vulnerable to risks posed by physical and social environments because they may lack both the physical size and cognitive or behavioural development necessary to negotiate such risks successfully (Gilk, Kronenfeld, & Jackson, 1993). Therefore, young children must rely on others to decrease their vulnerability to risks. Research implicates parents as the primary resource for decreasing young children's vulnerability to risks (Gulotta & Finney, 2000; Greaves, Gilk, Kronenfeld & Jackson, 1994; Valsiner & Lightfoot, 1987).

In order to attempt to determine rates and the identity contributing factors affecting injuries, the analysis of the Northern Ontario Perinatal and Child Health Survey data examined geographic location, sex and age of 'target child', and income levels as reported by Northern Ontario families.

This survey collected information on only two types of injuries, falls requiring medical attention and unintentional poisonings. It must be remembered that the two categories examined would not reflect total injuries for children aged 0 to 6 years in the northern health units.

The questions in this category measure self-reported injury data and would be influenced by the parent's perception of what constitutes an injury, and how serious an injury need be in order to seek medical attention. Many factors may play a role in a parent's determination of these criteria, such as access to medical attention including physician availability, urban versus rural residence, and socio-economic status.

Most child injury data are drawn from hospital statistics. However, the results from this survey reveal that up to 1 in 5 falls requiring medical attention does not result in the child attending hospital. Therefore, the present statistic may be a more accurate reflection of the rate of falls in Northern Ontario than the rates drawn from hospital visits alone.

One limitation for this data set is that when stratifying for variables, cell sizes rapidly decreased to below the 30-response limit required for reporting. In order to work around this limitation, when possible, the results were then reported for the negative situation, e.g., 'target children' that did *not* suffer an injury.

Falls

Approximately 9% of respondents indicated that their 'target child' had sustained a fall serious enough to require medical attention in the past year – just over 80% of these reported that they brought the child to the hospital and approximately half of these respondents reported that the injury sustained was a cut. Child sex and LICO were not related to rate of falls.

Although most unintentional injury data show that male children experience higher levels than female children, the present survey showed no gender difference in the rates of falls for male and female children.

When the responses for 'target children' that did *not* suffer a fall were examined, age was found to have significant differences between the category 0 to under 1 year and the remaining categories, with younger children experiencing fewer reported falls.

Accidental Poisonings

Just under 2% of respondents indicated that their 'target child' had been accidentally poisoned and of those, over 80% were taken to the hospital emergency room. Unfortunately the numbers of responses for this category were so low that further analyses could not be performed.

LIMITATIONS

The NOPCHS survey had a number of associated limitations, beginning with the design. The survey used telephone self-reported data collection from mothers on potentially socially influenced topics. Respondents who did not have a phone or are living in institutions were excluded. Questions were asked regarding injury of the 'target child' and parental behaviours affecting the safety of their child. Such surveys may be subject to errors in recall, over or under-reporting due to social desirability and errors from proxy reporting.

As there are time limitations for a telephone survey, very few questions on injury and safety behaviours were included in this general survey. From all possible injury categories, only falls that required medical attention in the past 12 months and accidental poisonings were included, resulting in a narrow view of child injuries for this age group. From all the possible child safety behaviours for parents, only limited questions regarding storage of medicines & cleaners, helmet use, car seat use and sun safety measures were included.

The survey also could not take into account the variation in mother's perception of what is classified as an injury or the level of injury severity resulting from a fall that she perceived necessary to seek medical attention. In addition, the child could have been attending child care facilities where injurious behaviours by caregivers may have influenced whether that child sustained either a fall requiring medical attention or an accidental poisoning. The survey did not collect information on safety behaviours followed in childcare settings.

In many cases, subgroup comparisons were not able be performed due to small cell sizes. If possible, the alternative option was analyzed, e.g., analyzed 'not injured' if the numbers for injured were not large enough. In some cases, e.g., accidental poisonings, the numbers were too small to even use that option.

IMPLICATIONS FOR PRACTICE AND RESEARCH

IMPLICATIONS FOR PRACTICE

- There needs to be a strong commitment from all levels within society towards making parents and their children better risk managers. Strong involvement in social networks that clearly support effective management of the risks to children will serve to increase knowledge and awareness of optimal and risky behaviours, strengthen parental efficacy in the management of children's well being and risk-taking behaviours, and foster the adoption of better management strategies.
- Given the prevalence and costs of unintentional childhood injuries and the fact that young children rely on their parents to decrease their vulnerability to risks, current investments towards making parents better parents and risk managers would be both practical and cost effective.
- Given that 9% of mothers in this survey reported storing medicines and cleaners in unlocked or accessible locations, health units and other child and family agencies should continue and enhance promotion of child safety, including the safe storage of medicine and cleaners.
- Given that helmet use and sun safety are not always practiced, health units and other child and family agencies should continue and enhance promotion of child safety, including helmet use and sun safety. Efforts need to be sensitive to such influences as child's age, sex and geographical location, especially in areas such as sun safety. The fact that more male children wear hats to protect from the sun points to the need for increased awareness about acceptable methods of sun protection for female children.
- Community action on access to low-cost helmets, particularly for low-income families, might increase the proportion on children wearing helmets in all situations. Helmets can also make great gifts, and a campaign to "Give a helmet" might prove to be an effective way to ensure that all children have access to helmets.
- Public health units, hospital emergency rooms, and Ontario Early Years Centres are sites at which to make safety information available to parents in pamphlet or poster form. A coordinated campaign at all of these sites, perhaps in partnership with local Safe Communities Coalitions, would ensure consistent, up-to-date information is available to all parents.
- Given that car safety is not always practiced, health units and other child and family agencies should continue and enhance promotion of car safety, particularly among families with older children and those living below low-income cut-off levels.
- All families should be encouraged to ensure that the car seats and boosters they use are installed properly. The results of this survey do not address whether car seats are installed properly. Data from a car seat clinic at Sudbury & District Health unit suggest that between 80 and 90% of car seats examined are improperly installed. Research on car seat installation should be pursued, and

parents should have access to information about proper installation and options for inspection.

- Given that 9% of children in this survey had reportedly experienced a fall requiring medical attention in the last year, health units and other child and family agencies should continue and enhance injury prevention programs including fall prevention programs for children to 6 years. Efforts need to be sensitive to such influences as child's age, growth and development.
- Since unintentional injuries can occur in sites other than the home, advocate for policies and community action regarding playground maintenance and supervision.
- Government policies and legislation to promote child safety should be implemented. For example, although helmet legislation currently exists, enforcement is inconsistent. Increased promotion of helmet legislation requirements could serve to increase the likelihood of such safety practices being followed.
- Consider the distribution of home safety kits with Healthy Babies, Healthy Children program or possibly earlier, prior to pregnancy. This intervention is currently undergoing pilot-testing in some health units as part of an Early Years initiative.
- Educate Healthy Babies, Healthy Children staff and Parenting Partners regarding the findings from this report for injury and safety discussions with parents. The report could be useful as a source of evidence showing that the problems are common in the northern region and not singling out the individual.
- Prenatal and parenting classes, and Healthy Babies, Healthy Children home visits should include injury prevention information for parents. Home visits may also involve safety scans of common household hazards. Including low income and single parents in parenting classes is an ongoing challenge faced by health units and family agencies. The data in this report suggest that the children of these parents are at some decreased likelihood of using car seats. Therefore, efforts to reach these families with information they can use to become effective risk managers continue to be a priority.
- Injury levels are known to be higher among Aboriginal children. Although this survey was not able to analyze safety and injury data for Aboriginal children or for on-reserve residence, due to low numbers in the survey sample and incomplete data on these variables, Aboriginal initiatives on injury should be part of a comprehensive injury prevention strategy.
- Public health units do not have dedicated program funds allocated to unintentional injury prevention. Although the 2002 Chief Medical Officer of Health report focused on "Injury: Predictable and Preventable", an increased prominence for injury prevention efforts in health units is desirable.

IMPLICATIONS FOR RESEARCH

- Given that approximately one in five falls requiring medical attention will not appear in hospital statistics, there is a need for more comprehensive data on non-hospital-treated injuries. An additional limitation to hospital data is that the

specific nature of the injury (fall from stairs, fall from tripping, etc.) may not be available in statistics.

- In addition, further research is needed due to a lack of Northern Ontario and health unit-specific child injury data, especially regarding cause and environmental location (i.e., playground) of injury and safety behaviours for parents and/or caretakers.
- More research is needed to improve our understanding of parental influences on children's injury-liability and future risk-taking, with particular attention being paid to patterns of parents' perceived efficacy beliefs.
- Because these survey data do not address this issue, there is a need for data on whether injury prevention products are being used correctly, i.e., car seats, helmets, etc. Data on car seat use by child's weight and height, rather than age, are also needed.
- There is a need to develop reliable and content valid questions that can explore the reasons for non-use of injury prevention products such as sun block, cabinet locks, etc. It may be that competing influences are affecting the use of these products rather than lack of parental awareness of the need, such as use of mosquito repellent DEET for West Nile Virus prevention, which is contradicted with use of sun block containing oxybenzone.
- The recent development of injury prevention modules for the Rapid Risk Factor Surveillance System, sponsored in part by this Consortium, will prove to be a valuable source of ongoing injury prevention data, in areas where RRFSS is or will be in place (currently, Sudbury is the only northern health unit implementing RRFSS.)

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