

Parent & Caregiver Levels of Child Supervision and Attention to Signage at Beach Areas:

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An Observation and Interview Study

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Executive Summary

Manitoba children have an increased risk of drowning relative to other Canadian children. Adult supervision is one of the key ways to protect infants and toddlers from drowning at public waterfronts. This research project was designed to assess patterns of parental supervision of infants and toddlers at public waterfronts, as well as parental knowledge and perceptions of supervision and safety practices for infants and young children near water. Study methodology included paired observations of child supervision at public waterfronts (proximity to the parent and visual supervision lapses) and subsequent interviews with observed parents to ascertain their knowledge of water safety recommendations, awareness of signage, and supervisory practices.

Highlights of the study results include: (1) poor adherence to the *within arm's reach* guideline for toddlers (44%) when compared to infants (93%); (2) low rates (11.5%) of personal flotation device use by infants and toddlers near water; (3) the fact that one-quarter of

caregivers were not attentive to their children when they were in or near water; and (4) a small proportion (1.2%) of toddlers were supervised by older children or teens at waterfronts. The latter was a contributing factor in a toddler drowning at a Manitoba beach earlier in the season. In addition, children were found to be poorly visually supervised in 17% of cases, with caregivers not watching their young child for over 60 seconds; however most caregivers observed their child within 5-60 seconds (54%). Children who were in the water were accompanied by adults 66% of the time; this is unsatisfactory, given that the study population was infants and toddlers. This study also found that the presence of beach staff greatly increases the likelihood of caregivers being within arm's reach of infants and toddlers. These results are discussed in terms of adherence to national recommendations and proposed improvements at the individual, community, and provincial level.

Introduction

Current Knowledge

Childhood Drowning Statistics

Recent research has highlighted the need for greater attention to drowning prevention in Manitoba. Injuries are the leading cause of death for Canadians one to 44 years of age, with drowning being the second leading cause of injury death for Canadian children and youth.¹ A recent study documented that Manitoba has the highest child drowning rate in Canada.² This research identified First Nations children, boys, and toddlers as priority populations for drowning prevention initiatives in the province. For each pediatric drowning fatality, three children visit the Emergency Department for submersion-related injuries and about 40% of those are admitted to hospital.³ Manitoba data demonstrate that drowning is the leading cause of injury death for toddlers 1-4 years of age, and the second leading cause of unintentional injury death for children 5-9 years of age.⁴ In Manitoba, approximately eight children drown and 14 are hospitalized for drowning or near-drowning incidents each year.⁴ Research on child supervision practices at Manitoba waterfronts was also considered due to two recent drowning incidents and a subsequent provincial inquest, as well as the recent development of a Drowning Prevention Strategy for the province. Recommendations following the inquest included the need to inform the public about the risk of drowning and prevention measures as well as the need for continued patrol of waterfronts by Beach

Safety Officers at Provincial Park beaches as child supervision by parents/guardians is often inadequate.⁵

Drowning Risk Factors

The following is a summary of major risk factors associated with pediatric drowning incidents in Canada, and Manitoba specifically:

- In Canada, 28% of drowning incidents result from 'aquatic activities'.⁶ Teens drown related to swimming activities while toddlers and young children are at greater risk during wading.
- Lakes are the most common drowning location for the Prairie regions (52%) and the majority (91%) of incidents occur during June (24%), July (34%) and August (33%).⁶
- Adult males, youth, and young children are the age groups at greatest risk of drowning in Canada.⁷
- Toddlers drown more often in pools and large bodies of freshwater.^{8,9} This age group is at high risk of drowning as they are mobile, they cannot assess risks in their environment, and they lack the capacity for self-rescue.⁹
- Approximately eight toddler (1-4 years of age) victims of near-drowning are hospitalized each year in Canada with an average length of stay of 5.3 days.^{4,9}
- In Manitoba, 75% of paediatric drowning victims were without adult supervision at the time of the incident.¹⁰

- 83% of Canadian drowning fatalities, and 79% of Manitoba drowning victims are male, while 68% of water-related injury hospitalizations involve male victims.¹¹⁻¹³
- In Manitoba, the child drowning rate is 2-fold higher in males (3.9 vs. 1.9 per 100,000).²
- Drowning is over four times more likely among First Nations Manitobans (8.8 deaths per 100,000 vs. 2.0). This discrepancy magnifies to 6.5X greater when First Nations and non-First Nations children are compared (12.4 vs. 1.9 per 100,000 respectively).^{2,4}

Child Supervision

Infants and young children should never be left alone near water. To be effective, supervision must be constant and the supervisor should be within arm's reach of the child.¹⁴ The American Academy of Pediatrics recommends that when young children are around water "a supervising adult should be within an arm's length providing 'touch supervision'. The attention of the supervising adult should be focused on the child, and the adult should not be engaged in other distracting activities, such as talking on the telephone, socializing, or tending to household chores"¹⁵ Similarly, Canada's Lifesaving Society stresses that with young children "if you're not within arm's reach, you've gone too far", while the Canadian Paediatric Society recommends constant arm's-length adult supervision for infants and toddlers near water.^{16,17} It is also recommended that supervising adults learn cardiopulmonary resuscitation (CPR).¹⁴

Supervision by Adults

Supervision has been identified as a critical issue in preventing fatal injuries to young children, and is an injury prevention research priority issue, as per the Canadian and US Centers for Disease Control (CDC) national research agendas. Research on children's risk of injuries has demonstrated that the best injury predictors are the child's risk taking and parental protectiveness.³⁵ Young children cannot be relied upon to make safe decisions in or around water. Research on home injuries has shown that prevention strategies which rely on child factors (e.g. applying safety rules) never reduced, and often increased, injury risk in toddlers; while parental (e.g. increased supervision) and environmental strategies (e.g. hazard removal, access prevention) were protective of child injury risk.³⁶ A recent child supervision study concluded that physical proximity was the only form of supervisory behaviour (compared with visual or auditory supervision) that was protective for children.²⁵ These results support the recommendation that it is best to remain within arm's reach of a child who is in or near water.

The World Health Organization states that a lapse in adult supervision is the largest contributor to child drowning.¹⁸ In Manitoba, recent findings demonstrate that being alone at the time of the incident, often due to a momentary lapse of supervision, significantly contributed to child drowning incidents.^{11,19} Similarly, research has shown that drowning incidents were witnessed least often for children 0-4 years of age.²⁰ Another study concluded that the absence of supervision was

the primary contributing factor to dam deaths for children 0-5 years of age.²¹

Parents sometimes substitute older sibling supervision for adult supervision; this may be inadequate when the younger child is in or near water. Canadian data show that toddlers were supervised by a minor in 17% of drowning cases.²² Safe Kids Canada recommends against leaving a child less than five years of age with an older child, without adult supervision, in the vicinity of a water hazard. Adult supervision has also been deemed the best protection for children in or near water by the Canadian Red Cross Society.²³ Results of a telephone survey of risk factors for child drowning and near-drowning demonstrated deficits in knowledge of the importance of adult supervision.²⁴

The need for adult supervision around water is emphasized in most community drowning campaigns and water safety materials. The following organizations have highlighted the need for children to have constant, arm's-length adult supervision in and around water: American Academy of Pediatrics,^{15,26} Centers for Disease Control,^{27,28} Canadian Paediatric Society,¹⁶ Canadian Red Cross Society,^{7,9} Lifesaving Society (National & Manitoba),^{10,29,30} Manitoba Health,³¹ Safe Kids Canada,³² and the World Health Organization.^{18,33} A fact sheet from the Northern and Remote Water Safety Community Resource highlights the following issues surrounding child supervision (relevant to waterfronts):³⁴

- Adults are responsible for keeping children safe near water.
- Learn where water hazards are located.

- Adults should always watch children who are playing in or near water.
- If adults have to leave the water area, they should take the children with them.
- Alcohol, drugs or solvents should not be used by anyone responsible for watching children.
- Children should wear a lifejacket when playing near water.
- Toys should be kept away from water. Children will be attracted to them, and could wander into a dangerous area.
- Inflatable toys (e.g. beach balls, inner tubes or air mattresses) and devices (e.g. floaties) can be dangerous. They can lose air in seconds, which could be deadly if a child is using one to stay afloat in water. They can easily be blown by the wind and children will chase them into danger.

Supervision by Lifeguards

Areas without lifeguards are associated with higher drowning rates. A report published by the CDC states that trained, professional lifeguards have positively impacted drowning in the United States.³⁷ Supervision of public areas by lifeguards has led to fewer rule violations by swimmers.³⁸ Fewer rule violations also tended to occur when adult to child ratios were lower, indicating a positive association between parental monitoring and rule compliance. Lifeguard supervision, however, has not been found to directly decrease drowning rates. This could be the result of insufficient lifeguard coverage, poor lifeguard to patron ratios, or poor study design. It is recommended that when lifeguards are present, swimmers should remain in supervised areas.³⁹

Supervision Ratios

The Manitoba Lifesaving Society recommends having a ratio of one parent or childcare provider for every two young children (1:2), and one parent or childcare provider for each very young child or child with special needs such as epilepsy (1:1).³⁰ For teen supervisors the ratio should be no more than 1:1.

Other Pediatric Drowning Prevention Measures

Swimming Lessons for Young Children

Statements released by the Canadian Paediatric Society (CPS) and the American Academy of Pediatrics (AAP) regarding swimming lessons for young children highlight the fact that swimming lessons do not prevent drowning in children less than four years of age.^{16,26} The AAP recommends swimming lessons be postponed until after the fourth birthday.¹⁵ However, swimming and water safety programs are supported by both organizations, and have been associated with improved swimming ability.^{16,40} In isolation, swimming lessons do not provide sufficient protection against drowning; strong swimmers are a subset of drowning victims every year.⁴¹ Data from the Canadian Red Cross Society showed that non-swimmers and weak swimmers accounted for over half of the drowning incidents in children 5-14 years of age, where swimming status was known.⁶ These occurred more with activities involving wading or playing in water, falls into water, and swimming.

Use of Protective Devices

Personal Flotation Devices (PFDs) and life jackets can protect individuals of all ages from drowning. For this report, we use the term 'PFD' to refer to both devices. It is important that the PFD is the correct size, is in good condition, and is correctly fastened. For young children, PFD use is recommended at waterfronts as it provides an added buffer against drowning.³⁴ The World Health Organization recommends life jackets for children (and adults) with poor swimming skills when bathing or swimming in open waters.¹⁸ One potential issue is whether safety gear gives parents a false sense of security and therefore leads them to be less attentive to their children. A telephone survey of injury risk showed that parents would permit greater risk taking by their children when wearing safety gear versus not wearing the gear.⁴²

Gaps in Knowledge

Currently, child supervision patterns at Manitoba waterfronts are unknown. This problem has not been studied elsewhere. The Manitoba Coalition for Safer Waters is a group of over 30 key stakeholders concerned with all aspects of water safety. Beach safety and drowning prevention have been identified as priority issues by the Coalition. This research project has resulted from the Coalition's recognition of the need to further assess waterfront supervision practices by caregivers of young children. The findings of this study will be used as a basis for provincial beach safety and drowning prevention strategies, programming and planning efforts.

Objectives

This study has four key objectives:

- To investigate risk perceptions, practices and knowledge of parents and caregivers regarding waterfront supervision of infants and toddlers
- To determine parent/caregivers awareness of and response to drowning prevention signage in beach areas
- To identify factors associated with varying levels of child supervision among recreational beach users at Manitoba Provincial Parks
- To provide baseline data to relevant groups to help inform the development of a targeted water safety education campaign

METHODS

Subject and Site Selection

Observations were conducted at public waterfront sites: three that were staffed with Beach Safety Officers and three that were not staffed. Beach Safety Officers are responsible for providing public education, beach patrol, searching for missing people, inspecting the beach for hazards, and for providing first aid and water rescues.³¹ Unlike lifeguards, they do not supervise the swimming area, so patrons swim at their own risk. Eligible sites were selected with the assistance of local water safety experts and Manitoba Parks. The order of sites that were observed was based on weather forecasts, proximity, and time constraints, with attempts made to conduct visits on different days of the week and at periodic intervals throughout the study period. Waterfront sites that were used for observing child supervision practices included:

(a) Staffed waterfronts - Birds Hill Park's beach, Grand Beach, and Winnipeg Beach provincial parks

(b) Unsupervised waterfronts - Beaches at St. Malo, Falcon Lake, and West Hawk Lake provincial parks

Children eligible for observation included infants (defined as less than one year of age) and toddlers (defined as greater than 12 months and less than 4 years of age). Research assistants were trained by a pediatrician regarding age group identification and classification. Following the observation period, the observed child's caregiver was asked to participate in an interview. Adults eligible to complete a semi-structured interview included the apparent supervisory caregiver from any observed group who was 18 years of age or older and who consented to participate in the study.

All participants were given a laminated information and consent form to read and then provide verbal agreement.

At each site, the researchers sought to observe a minimum of 20 infants/toddlers per day. It was hoped that from this group 12-16 interviews would be conducted, assuming a participation rate of 60-80%.

Manitoba Conservation's Parks and Natural Areas Branch had recently installed new water safety signs, including drowning prevention messages, that were prominently displayed near waterfronts (see Figure 1). Interview questions were included to evaluate whether caregivers recalled reading these signs and subsequently changed their child supervision practices when at the beach.

safety signage. They were also asked about previous drowning and injury incidents which may have influenced their supervision practices. Researchers wore Health Sciences Centre photo identification and carried a letter from Manitoba Conservation and a letter from the University of Manitoba Health Research Ethics Board summarizing the research project, confirming Ethics Board approval, and containing contact information for the Principal Investigator. Supervisory park personnel were notified in advance of the research project and provided with a copy of the visit schedule. Park supervisors disseminated this information to their staff.

The study time frame included both weekdays and weekends in the months of July and August of 2005 with a preference for warm, sunny days. Observations were scheduled for all days of the week during daylight hours. Site location, date, site characteristics, and weather were recorded. An eligible group included one infant or toddler and the caregiver(s). For each group, researchers recorded: estimated age and gender of the observed child, estimated distance from supervisor to the child, activities being engaged in by the child, use of PFD by the child, estimated proximity of child to water, whether child was in the water, activities being engaged in by adults that were not supervisory (e.g. cell phone use, reading, preparing food, distant water play, resting/tanning etc.). For each observed child, age was estimated, and classified as: infant (<1 year), or toddler (12 months - 4 years of age).

Figure 1. New Beach Signage



Data Collection

Observations were conducted at Manitoba provincial park beaches. Researchers conducted these observations in pairs, with one researcher (Gemma Briggs) present at all site visits and conducting all interviews. For each group observed at the waterfront, an 'index child' less than four years of age was selected, who

was the observed subject. Researchers observed parental supervision practices for each index child and subsequently interviewed the consenting caregiver (one per observed child) regarding their risk perceptions, knowledge, and awareness and recall of water

During the observation period, park officials were notified of any dangerous behaviour and young children who appeared to be alone at the waterfront. In one case where no supervisory adult was apparent, the child was observed until a caregiver arrived.

Interview data included the age and gender of the caregiver, age, gender and caregiver relationship (parent, relative, friend etc.) for each child, the observed child's birth order, life saving training, frequency of waterfront visits, swimming capability and training for each child, caregiver risk perceptions regarding drowning likelihood for each child, knowledge/awareness of park signage and water safety recommendations, and recall of signage statements. Parents were questioned regarding whether their risk perception changed after viewing signage. They were also asked about prior drowning and injury experiences. Following the interview, participants were thanked for their participation and provided with Manitoba Conservation's *Beach Safety* pamphlet, the Lifesaving Society's *Within arm's reach* pamphlet, and a copy of the participant information and consent form. Those not consenting to participate were also offered these pamphlets. A business card was provided to participants enabling them to access the final report on the IMPACT website.

Data Analysis

Observational study data and interview data were entered into a database created in Microsoft Access™ and exported to NCSS 2004 for analysis. The proportion and ratios of adult-child supervision were determined. Inter-rater reliability tests were conducted to ensure that the researchers were coding observations in the same manner. Observations were described by child factors (e.g. age, gender, birth order, activities engaged in, proximity to water, number of children in group), supervisor factors (e.g. number of supervisors, distance from key supervisor to child, age and gender of supervisor, activities engaged in by supervisor), and site factors (e.g. location, weather, date, time). Descriptive, univariate, and qualitative analyses were completed to summarize supervision patterns. Factors related to supervision were summarized and the proportions of key motivational factors were determined. For open-ended questions, free text narratives were analyzed for common themes and summarized. Statistical models were determined for predicting within arm's reach and visual supervision.

RESULTS

Visits

Site visits were conducted on 19 visit days between July 15th and August 30th, 2005 with observations and interviews conducted between 10:00 a.m. and 3:30 p.m. Several other visit days were scheduled and cancelled due to poor weather. Two trips to Winnipeg Beach resulted in no data being collected and two visits to the Whiteshell included trips to both Falcon Lake and West Hawk Lake beaches on account of low numbers at each site and their close proximity. Two weekday and one weekend day were completed per site with the exception of St. Malo beach, which was initially flooded and

therefore visited only in August. At St. Malo three weekday visits were conducted due to unfavorable weekend weather. Table 1 summarizes the number of observations and interviews per site. As shown the proportion of caregivers agreeing to complete an interview was very high (89%).

Two researcher pairs conducted all of the observations. These observer pairs consisted of the primary researcher paired with two different partners. One partner served as the second observer for 58% of cases and the other observed the remaining 42%. The largest proportion of observations were completed on

Saturdays (28%), followed by Tuesdays (27%), and Fridays (24%) with no visits on Sundays (all cancelled due to poor weather). Air temperature ranged from 20 to 32 degrees Celsius with a mean of 25.6 °C. For one site visit (7 cases) the thermometer was not functioning so temperature was not recorded. Weather conditions included mostly light cloud (62%), no clouds (37%) and heavy clouds for 2% of observations. Rain, mist or fog was not present during any of the visits.

Table 1. Data Collected By Site

Site Name	Number of Observations (%)	Number of Interviews (%)*
Staffed Beaches		
Birds Hill	67 (27)	55 (82)
Grand Beach	55 (22)	51 (93)
Winnipeg Beach	26 (10)	24 (92)
Total Staffed	148 (59)	130 (88)
Non-Staffed Beaches		
Falcon Lake	35 (14)	32 (91)
St. Malo	40 (16)	38 (95)
West Hawk Lake	29 (11)	23 (79)
Total Non-Staffed	104 (41)	93 (89)
TOTAL	252 (100)	223 (89)

*Interview percentages are the proportion of observed participants who

Observations

Results from the inter-rater reliability testing showed that there was high agreement (over 75%) between the raters using the Kappa reliability test (1.0 represents 100% agreement) and high association for observers on the group composition variables, assessed using Pearson's Correlation Coefficient (1.0 indicates 100% agreement). The following statistics were obtained:

<u>Variable</u>	<u>Kappa reliability test</u>
Age of Index Child	0.939
Sex of Index Child	0.934
Observed Child Wearing a PFD	0.939
Age of Caregiver	1.00
Sex of Caregiver	0.800
Caregiver within arm's reach	0.883
Visual Supervision	0.739
<u>Group Composition (Pearson's r)</u>	
Number of Adults	0.917
Number of Infants	1.00
Number of Toddlers	0.867
Number of Children	0.973
Number of Teenagers	1.00

Given that these results documented very high agreement between the observers, only the primary observer's data were used to analyze data for the observational component of the study as this individual was present for all observations. Two-hundred and fifty-two children were observed with 93% of children coded as being 'in water' which is not surprising as

researchers sought to observe children in water first, then children adjacent to water, and finally those children closest to the water. Table 2 shows the group composition for the observed subjects, as identified by the researchers.

In 89% of observations the observed child was a toddler, and in 11% the observed child was an infant. Slightly more observed children were female (55%). Only 11.5% of these young children were wearing a PFD. There were four (1.6%) children who wore water wings and another five (2%) who wore flotation swimsuits. For two toddlers (1%) a caregiver could not be readily identified and later appeared or was determined with the assistance of a Beach Safety Officer. The caregiver was coded as an adult for 98.8% of observations with two teen (0.8%), and one child (0.4%) caregiver. The child and teen caregivers were supervising toddlers. Caregivers were female most often (63%) with 29% males and 8% having both a male and a female adult present. Caregiver activities are summarized in Table 3.

Table 2. Group Composition Proportions*

Individual (%)**	One	Two	Three	Four
Adults (99)	39%	44%	12%	4%
Infants (19)	100%			
Toddlers (91)	83%	14%	3%	
Children (52)	63%	21%	7%	4%
Teens (3)	87.5%			

** Numbers in brackets are the proportion of observations where these individuals were present.

Table 3. Caregiver Activity

Caregiver Activity	Number (%)
Beside the child in water	106 (42)
Resting/Tanning/Socializing/Playing e.g. sand castles (6% far away)	54 (21)
Holding the child in/by water (12 (30%) holding child's hands)	40 (16)
Beside child at shore/on beach	20 (8)
Sitting/standing on shore	14 (6)
Setting up their beach area	9 (4)
Attention on other children (e.g. distant water play)	6 (2)
Watching from far away	3 (1)

For 66% of observations the caregiver was with the child and was coded as being 'beside the child in water', 'holding the child in water' or 'beside the child at shore/on beach'. One quarter of caregivers were viewed as inattentive/distracted as they were resting/tanning/socializing/playing (e.g. making sand castles) or setting up their beach area. The remainder of the caregivers had their attention on other children, were sitting/standing on shore, or watching from afar. Proximity to the child is outlined in Table 4 with visual supervision summarized in Table 5. Parents appeared to be much more vigilant with infants. Proportions were very similar when only children 'in water' were considered. The proportion of children found to be within arm's reach at each beach site is summarized in Table 6. Here, within

arm's reach was coded as a yes/no variable.

Children who were not in water (8%, 19 cases) were sitting 37% of the time and standing/walking 63% of the time. These children were with at least one adult and often older children in 72% of instances with the rest accompanied by 1-3 children. Here two children were over eight feet from the water and the remainder ranged from 0.5 to 5.0 feet with a mean of 1.7 feet.

Children in the water were most often wading (72%) with some of these sub-categorized as running/walking in and out of the water (16%) or playing/fetching water (14%). The remaining 28% of observed children were carried (6%), on a flotation device (9%), sitting in the water (11%), swimming (1%), or walking (1%). Table 7 illustrates the child's status in terms of adult accompaniment, with ratios of adults to children.

Table 4. Caregiver-Index Child Proximity

Proximity	All (%)	Infants (%)	Toddlers (%)
Within arm's reach	124 (49)	26 (93)	98 (44)
6 feet or less	34 (14)	1 (3.5)	33 (15)
Over 6 feet	93 (37)	1 (3.5)	92 (41)

Table 5. Visual Supervision Lapses

Visual Supervision	All (%)	Infants (%)	Toddlers (%)
Constant	24 (9.5)	7 (25)	17 (8)
Less than 5 seconds	49 (19.5)	7 (25)	42 (19)
5-60 seconds	135 (54)	12 (43)	123 (55)
Over 60 seconds	43 (17)	2 (7)	41 (18)

Table 6. Within Arm’s Reach Per Site

Site Name	Observed Child Found to be Within Arm’s Reach
STAFFED BEACHES	
Winnipeg Beach	77%
Grand Beach	58%
Birds Hill	56%
UNSTAFFED BEACHES	
West Hawk Lake	55%
St. Malo	28%
Falcon Lake	23%

Interview Data

Only 11% of observed caregivers declined interview participation,

a very high response rate. When provided, reasons for declining included “I don’t have time”, “I have lots of children to watch”, “you shouldn’t distract someone caring for a child”, and language barriers. 71% of interviewed caregivers were female, 27% were male, and both participated in 2% of cases. Most had visited a Manitoba provincial park 2-4 times (35%), with 26% visiting only once, 21% visiting over ten times and 18% visiting 5-9 times. The remainder had made ten or more visits. A significant difference was not found for staffed versus non-staffed beaches and the categorical variable visitation frequency. Preliminary data for the six beaches visited indicate that the most popular beach for parents with young children is Grand Beach, followed by Birds Hill, Falcon Lake, West Hawk Lake, St. Malo, and Winnipeg Beach. However, these data are not adjusted for site interview rate or weather, and many had visited other provincial park beaches over the summer (see Appendix A). Individuals were most often responsible for two children (45%) at the beach, with 24% responsible for one child, 23% responsible

for three children, and 8% responsible for four or more children. The observed child was less than one year old in 6% of groups with the remaining 94% being toddlers. For birth order, the observed child was most often the second child in the family (41%); 35% were the first child, 19% were the third child, and 5% being fourth or higher. The mean ages of children, age range, and percent that were female is summarized in Table 8. Of, note, the other children have a range beginning with 0 as some were a twin of the observed child or an infant who did not approach the water (hence not selected as the observed child).

Table 7. Group Composition and Supervision Ratios for Children in Water

#Adults	#Children	#Teenagers	Proportion	Ratio*
No Adults Present				
0	1	0	21%	0:1
0	2	0	9%	0:2
0	3	0	2%	0:3
0	4	0	1%	0:4
0	1	1	1%	0:1
Adults Present				
1	1	0	38%	1:1
1	2	0	11%	1:2
1	3	0	3%	1:3
2	1	0	5%	2:1
2	2	0	3%	2:2
2	3	0	3%	2:3
2	4+	0	0.86%	2:4+
3	1	0	0.86%	3:1
3	3	0	0.42%	3:3
4	1	0	0.86%	4:1

*The ratio is the number of adults to children

Order	Number	Mean Age (years)	Range	Percent Female
Observed Child	223	2.2	0-4	57%
Other Child(ren)	1657	6.32	0-17	58%

Supervision Practices

Caregivers were asked to describe how they supervise the observed child near water. The responses were coded into the following categories:

- **Stay beside/always nearby/close supervision/an adult is with him/her (36%)**
e.g. “ I stay within close proximity”, “I stick with her”, “I’m always with her as she can’t stand well in water”, “one adult supervises each child”
- **Within Arm’s Reach/Hold hand/Hold Child or within arm’s reach & watch (19%)**
e.g. “Watch constantly, I was told by the Beach Safety Officer to stay within arm’s reach, so I do that”, “He’s always held”, “I stay within arm’s reach”, “I don’t let go of her”, “I hold his hand always”
- **Always watch/always in sight/watch closely (15%)**
e.g. “I watch him, he doesn’t like the water much”, “I watch him, he’s taken swimming lessons”, “I watch her at the shore”, “watch all the time”
- **Always watch and nearby/with child (9%)**
e.g. “I watch him and go in with him”, “I watch like a hawk, I’m right there”
- **Wears PFD (accompanied by adult 5%) 8%**
e.g. “He usually wears a PFD, I sit close to the water”, “She wears a PFD or I stand close by”, “A PFD is worn, she’s supervised by an adult”, “I watch her all the time, she wears a PFD”
- **Stand/Sit/Chair at Shore (2%)**
e.g. “I sit beside the water”, “stay at edge”, “I put my chair near the shore”
- **Other Responses (8%)**
 - - Conditional supervision 4%
 - - 10 feet or less from the child 3%
 - - Within 15 or 20 feet from child 1%

Conditional supervision refers to caregivers who alter their practices based on certain factors (e.g. child's depth in water, how crowded it is). Examples include "I watch her closely and hold her if it's deeper", "If the water is above his waist I'm within arm's reach, at the knees - I sit on the shore, if it's busier I stay closer", "I'm right beside her, if she's in past her knees I hold her hand".

35% of parents stated that their supervision practices differed between the observed child and his/her siblings, while another 35% stated that they did not differ, for some the observed child was their first child (27%), and for a few (3%) the sibling was a young infant who did not approach the water. Comments were not requested but those that were given were recorded (n=35). Most caregivers with differing practices for their children were more cautious with the observed child. Reasons for this often pertained to the other children's ability to swim or having taken lessons (41%), more/less freedom (35%) for instance "for [older] we're more lenient, she's allowed in up to her waist", "he can go in further", "he's within arm's reach but not held". Ability/practices/fears pertained to the remainder of responses (24%) for example "he's afraid of water", "the infant doesn't go in water, "the older one is a bit more independent", "she's older and listens to instructions", "the older one is more aware of the dangers", "he's younger and less

capable". Of those responding, 98% (n=72) do not supervise differently as a result of gender differences; the one who did stated that "he's more likely to take off". One-fifth (21%) treated the observed child differently than their first child [n=118]. Reasoning [n=25] included personality differences (64%, e.g. fear/dislike of water, ability) for example, "[observed child] is scared of water", "he's more cautious", and "she's [child] more attentive". Twenty per cent were more lax with later children e.g. "we're more lenient", "I'm less uptight with the second child"; and another 16% alluded to the decreased ratio of adults to children with more children in the family e.g. "now there's two to watch", "before it was 2 adults and one child now it's 2 adults and three children", "there's more competition for attention".

Relationship

For most children (88%) the caregiver was their parent. A relative was the next most common relationship (8%), followed by parent/relative (2%) where at least one child was their own, and friend or parent/friend (2%). Parents most often supervised two children (44%), followed by one (27%) or three (23%), with 4+ accounting for 6%. Friends (n=7) tended to be in charge of one (86%) or two (14%) as did relatives (n=27), with 48% taking one child and 37% with two and 15% with 3+ children. Relatives were most often aunt/uncle (43%), grandparents (39%), step/foster mom (11%) or siblings/step-siblings (7%).

Awareness of Signage

Just over half (52%) of caregivers noticed water safety signs on the beach. When asked what they recalled about the messages responses often included multiple statements and therefore were categorized into each (partial) statement. Overall 112 statements were made with the following breakdown (n=140 partial statements):

- Colored Flags (meanings): 31 (22%)
- Watch your children/you’re responsible: 6 (19%)
- No lifeguards on duty: 23 (16%)
- Swimming is unsupervised/at own risk: 21 (15%)
- Drowning is preventable: 8 (6%)
- E-coli/Environmental (e.g. alcohol, debris): 7 (5%)
- Beach safety rules: 6 (4%)
- Stay within arm’s reach/within arm’s length: 4 (3%)
- Inflatables are dangerous (when windy): 3 (2%)
- Know your limits: 3 (2%)
- No dogs on the beach: 3 (2%)
- Boating safety: 2 (1.4%)
- Phone location: 2 (1.4%)
- Beach safety station: 1 (0.6%)

3.6% of respondents made reference to lifeguards. Two individuals commented on the fact that the sign claims that there are no lifeguards on duty (e.g.”It says no lifeguard, yet there are lifeguards”, and “They say no lifeguard on duty, but there is”.) A third stated “I did see the lifeguard strolling by” and

another said “there’s a lifeguard on duty”. These individuals are obviously not aware of the distinction between lifeguards and Beach Safety Officers.

Risk Ratings

Caregivers were asked to rate the likelihood of each child drowning if unsupervised before and after having read the signs on the following scale:

Very Low Very High
 1-----2-----3-----4-----5

For 44% of respondents, only a prior rating was given as they had not read the signs or could not recall the content of the signs. A paired t-test showed that the difference between pre- and post-ratings is not statistically significant, therefore sign awareness did not significantly modify parental risk ratings. This is not surprising given the large proportion who provided matching scores pre- and post-signage. Table 9 summarizes the paired (prior and after reading the signs) ratings. Caregivers with a change in their risk ratings before and after viewing the water safety signs had a higher post-rating. This indicates that they viewed a greater risk of their child drowning if unsupervised after having read the signs. One volunteered explanation for the change in ratings was “I watch closer if there’s a yellow

Table 9. Change Scores for Parental Ratings of Child Risk

Participant Type	Number	Change (Post Rating minus Pre Rating)			
		0	1	2	3
Observed Child	100	97%	1%	1%	1%
Other Child	126	98%		2%	

or red flag”. Four caregivers refused to provide ratings as they claimed that there would not be an instance where their child(ren) is/are unsupervised at the beach (e.g. “she’s never alone”, “my children are never unsupervised”).

Swimming Ability and Training

Swimming training was determined by caregiver self-report on a categorical scale including: none, basic training, advanced training, or having completed a ‘lifeguard/competitive’ level. Caregivers most often reported basic training (38%), followed by advanced training (30%), none (17%), and lifeguard competitive training (15%).

The caregiver assessed swimming ability for themselves and the children with them based on a categorical scale of non-swimmer, poor/weak swimmer, average swimmer and strong swimmer. These assessments are summarized in Table 10.

Table 10. Swimming Ability of Caregivers and Their Children

	Non-swimmer	Poor/Weak	Average	Strong
Self (caregiver)	7%	5%	46%	42%
Observed Child	91.8%	7.7%	0.5%	
Other Child	32%	35%	27%	6%

Recall of Water Safety Information

Caregivers were asked whether they recalled general recommendations for supervising infants and young children in or near water. 69% recalled general recommendations and 149 respondents provided one or more sources for a total of 214 sources. When this analysis was separated by the presence of staffing there was a slight increase in the proportion of respondents recalling messages at staffed beaches (see Table 11), yet this was not statistically significant.

The most popular information source was television (39%), followed by the newspaper (22%), magazines/pamphlets (11%), radio (10%), pool/YM/YWCA swimming lessons (9%) and miscellaneous (10%). The last category includes friends and family, daycare, the doctor’s office, books, work, and posters/signs. 151 responses were provided when parents were asked to state the recommendations; these resulted in 214 partial statements, as some statements noted multiple recommendations.

Table 11. Staffing and the Recall of General Recommendations

Site Staffed	Recall of General Recommendations		Total
	No	Yes	
No	30 (33%)	61 (67%)	91
Yes	38 (30%)	91 (70%)	129
Total	68	152	220

The following categories were discussed, with the remaining 10% summarized in Appendix B.

- Supervision (22%) e.g. “supervise your children at all times”, “don’t leave them unattended”
- Within Arm’s Reach/Within Arm’s Length (19%) e.g. “children should be within arm’s reach”; “if you’re not within arm’s reach you’ve gone too far”
- Watch your children (18%) e.g. “always keep an eye on them”, “watch them at all times”
- Incident Reports (10%) e.g. “when there’s an incident they talk about supervision”
- “reports on drownings with recommendations”
- PFD/Life jacket (8%) e.g. “wear a PFD”, a quarter (2%) mentioned this only when boating
- Children can drown in very shallow water/bathtubs, it only takes a second (6%)
- Stay close to your children (3%)
- E-coli warnings (2%)
- Inflatable objects can be dangerous (2%)

Life Saving Training

Nearly three-quarters of those interviewed (73%) had received formal life saving training with 161 responses with specific training noted. The following results list the proportion of respondents mentioning each course:

Basic CPR	94%
Basic First Aid	25%
Nurse/Paramedic/Instructor	
St. John Ambulance/Triage	7%
Advanced Cardiac Life Support (ACLS)	5%
Lifesaving/Rescue training	4%
Child/Infant CPR	2%
Bronze cross, Bronze medallion	2%
Emergency First Aid	1%

Drowning and Near-Drowning Incidents

Participants were asked whether a drowning or near-drowning experience had occurred “within your family or friends” at the home, private or public pool, or in open water. Nearly a quarter of interview respondents (24%, n=54) reported knowledge of a drowning or near-drowning incident. Of these, only three (6%) did not wish to describe the incident. When descriptions were provided they were fairly brief. Some respondents described the location while others focused on the activity.

Responses are grouped below along with the percent that were expressed as fatal.

Location

- Pool - 12 cases, 4 were fatal (33%)
- Open Water - 13 cases, 4 were fatal (31%)
- Bathtub/puddle (shallow) - 2 cases, one fatal (50%)
- Hot Tub - one fatal case (100%)

Activity

- Fall/Fell in when fishing - 10 cases, 3 fatal (30%)
- Inflatables (noodle, air mattress) - two cases, none fatal
- Diving - two cases none fatal, both severe injuries (e.g. paralysis)
- Boating - two cases, both fatal (100%)

Other

- Drowning without specifics - 4 cases
- Near drowning without specifics - 3 cases

When asked if this led caregivers to change their behavior, 27 caregivers (53%) responded that it did. Examples included requiring the use of a PFD from then on (4 cases), with one additional caregiver stating “I bought PFDs for the children immediately”, and another stated “they use floating devices”. Nine individuals said that the incident made them more cautious/careful/diligent or attentive, while another seven were more aware of the risk for injuries and drowning near water. Four others mentioned staying with the child (e.g. “I stay close near water”, “I’m always with them”). One parent was proactive in terms of child education “I go over the guidelines with the children”. Statements from those who did not change their behavior included: “I’m always fairly careful”, “I’m always within arm’s reach”, “It was due to a miscommunication”, and “it was boating”.

Prior Injuries Requiring a Visit to the Emergency Department

Twenty-nine percent of caregivers reported and described previous injuries to their children that led to an Emergency Department visit. Sixty-three examples were provided which included the following injuries:

- Fall - 55% (playground-related 11%)
- Banged/Cut head - 14%
- Horseplay - 8% (e.g. “punctured neck running with stick”, “jumped off couch to chair, missed”)
- Ingestion (choking, poisoning, items up nose) - 6%
- Arm pull - 5%
- Burn/scald - 3%

- Sports Injury - 3% (e.g. skateboarding, hockey)
- Pinching - 2% (e.g. “pinched finger on boat”)
- Slipped in Tub - 2%
- Tripped on a toy - 2%

Only 30% of these caregivers changed how they supervise children following the injury. These included changing specific practices/rules (42%, e.g. “keep certain hazards out of reach”, “no longer sit him on high surfaces”, “changed house rules, different guidelines”); being more aware/attentive/ vigilant (37%), and watching more closely (21%). Those who provided explanations for not changing their behaviour explained: “I was right there”, “I wasn’t with her at the time”, “he knows not to”, “accidents happen, I’m always close”, “it was an accident”, “she was being watched”, as well as mentioning that the child had developmental disorders (FAS, ADHD). Viewing injuries as accidents leads parents to conclude nothing could have been done to prevent the incident; in most cases this conclusion is erroneous.

Regression Analyses

Further statistical analyses (logistic regression) were performed for two outcomes of interest: (a) being within arm’s reach - recoded as ‘1’ yes and ‘0’ no (≤ 6 ft, >6 feet); and (b) having Good Visual Supervision - recoded as ‘1’ for yes (constant or <5 seconds) and ‘0’ for no (5-60, >60 seconds). Logistic regression helps to determine what predicts certain behaviours, while taking into account a number of other factors. Here, the two behaviours we are trying to predict are whether the child is within arm’s

reach and whether visual supervision is adequate.

For predicting visual supervision, our findings were not statistically significant. However other statistical analyses (Chi-square =6.685, $p < .01$) showed a significant difference between visual supervision and age (infant/toddler) with more toddlers lacking good visual supervision (Table 12).

Table 12. Visual Supervision and Child's Age

Child's age	Visual supervision lapses		Total
	<5 seconds	≥5 seconds	
Infant	14 (50%)	14 (50%)	28
Toddler	59 (26%)	164 (74%)	223
Total	73	178	251

For being within arm's reach, the predictors that were examined were site staffing (yes/no), air temperature (celcius), day (day or weekend), index child's age, observed child's sex, PFD use, caregiver sex, whether the

Table 13. Within Arm's Reach and the Presence of Beach Safety Officers

Site Staffed	Within Arm's Reach		Total
	No	Yes	
No	69 (54%)	35 (28%)	104
Yes	58 (46%)	89 (72%)	147
Total	127	124	251

Additional analyses are summarized in Appendix C.

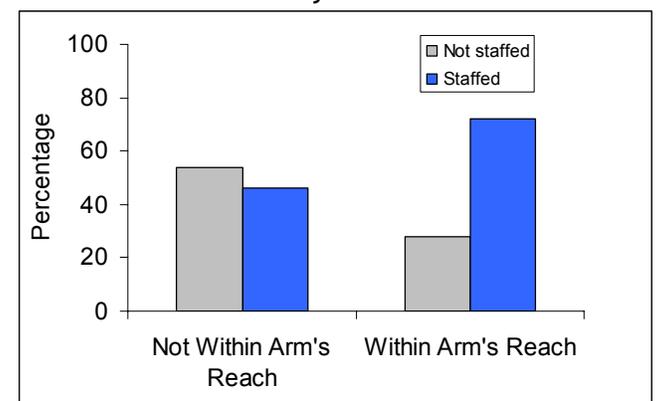
caregiver had noticed signs (yes/no), self swimming ability (none vs. some/a lot), child's swimming ability (none vs. some/a lot), swimming training (none, basic, advanced), lifesaving training (yes/no), Drowning/Near-Drowning experience (yes/no), and child previously injured (yes/no) were examined. Only two variables were significant predictors, with the following odds ratios:

Odds Ratios:

Observed Child's age OR = 0.503 95%CL (-1.071, -0.305)
 Site Staffing OR = 3.093 95% CL (0.535, 1.722)

This shows that younger children were more likely to be within arm's reach. Infants and toddlers were three times more likely to be within arm's reach at a staffed waterfront relative to a non-staffed waterfront for the six parks that were studied. (Specifically, for every year increase in age the child is half as likely to be within arm's reach.) Results for staffing are summarized in Table 13 and Figure 2.

Figure 2. Being Within Arm's Reach and the Presence of Beach Safety Officers



Summary and Discussion

This research has a number of implications for drowning prevention. Most notably, the statistical analyses identify the fact that for toddlers in particular, the international “within arm’s reach” recommendation is not being followed; only 44% of toddlers were observed with an adult within arm’s reach. For young children observed in the water, 34% were not accompanied by an adult. It is possible that caregivers were relying on the “buddy system” as 12% of these children were accompanied by other children; however, the buddy system is not a satisfactory supervisory strategy for children in this age group. The fact that 21% of children were completely alone in the water is a grave problem, as is the reliance on older children or teens to supervise toddlers at waterfronts. In the summer of 2005, a toddler drowned at Delta Beach in Manitoba, where a teen was supervising several young children by herself. Regarding the Lifesaving Society’s proposed supervision ratio of one adult per two young children, the remaining 66% of adults adhered to this in most cases (only 6% were 1:3 or 1:4+). Visual supervision was found to be lax in 17% of cases (over 1 minute lapse) and somewhat lax in 54% (5-60 seconds). This illustrates that more constant visual supervision is needed.

The results also show that staffed beaches have a greater within arm’s reach adherence by caregivers. This may have resulted from parents receiving instruction from the Beach Safety Officer and/or the anticipation of such instructions. It is also possible that the three staffed sites that were observed have better parental supervision related to other factors (socioeconomic and cultural characteristics of the patron population, placement and number of safety signs, etc.).

Caregivers did not appear to be significantly influenced by beach signage, given that nearly half did not notice the signs (48%) and only 6% recalled the message that drowning is preventable. The messages “watch your children”, “you are responsible”, “swimming is unsupervised” were recalled by 15-19% of respondents. The most commonly recalled sign information was the colored flags (22%). Signage also did not appear to influence parental perception of the risk of drowning for their child. Future signage should be developed and evaluated in terms of its potential for behaviour change, with input from parents and other caregivers.

Relevance of Project Findings

These results identify a need to improve the supervision of toddlers at public waterfronts. Increasing appropriate supervision could be accomplished by:

Parents/Caregivers

- Parents should be familiar with drowning prevention practices (i.e. constant within arm's reach supervision by an adult, use of PFD for toddlers playing in and near water).
- This should be communicated to all other caregivers (babysitters, grandparents and other relatives, child care providers).

The Manitoba Coalition for Safer Waters

- Explore means to raise public awareness and knowledge of the importance of arm's reach adult supervision for infants and toddlers at public waterfronts.
- Collaborate with coalition partners to investigate and evaluate methods to increase the proportion of caregivers who practice within arm's reach supervision of infants and toddlers at public waterfronts, such as signage and other public education strategies.

Manitoba Conservation

- Educate Beach Safety Officers regarding the findings of this report so they are more aware of current observed patterns of supervision and areas in need of improvement.
- Consider further investigation and evaluation of signage and other methods to increase the proportion of caregivers demonstrating appropriate supervision of infants and toddlers in and near water.

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Appendix A – Beach Site Responses for “Other”

Other Parks	Count	Percent
Assessippi 7X	1	2.33
Betula lake 1X	1	2.33
Betula lake 5X	1	2.33
Blue Lake 5X	1	2.33
Brereton lake 1X	1	2.33
Gimli 2X	2	4.65
Gimli 2X, Camp Morton 2X	1	2.33
Gimli 2X, Whiteshell 1X	1	2.33
Gimli 4X	1	2.33
Gimli 4X, Spruce Woods 1X, Green Bay 3X	1	2.33
Gimli 8X	1	2.33
Grindstone 3X	1	2.33
Hecla 1X, Sunset Bay 1X	1	2.33
Hecla 2X	1	2.33
Jessica Lake 1X, Whiteshell 2X	1	2.33
Killarney/Turtle mountain 1X	1	2.33
Lac du Bonnet 2X	1	2.33
Lester Beach 3X, TwinLake Beach 3X	1	2.33
LesterB 6X	1	2.33
Matlock 5X	1	2.33
Moose Lake 1X	1	2.33
Nutamik 2X	1	2.33
Nutamik 1X	1	2.33
Otter falls 1	1	2.33
Paint Lake 8X+	1	2.33
Patricia Beach 1X	2	4.66
Patricia Beach 2X	1	2.33
Patricia Beach 4X	1	2.33
Spruce Woods 1X	3	6.98
St. Ambrose 1X	1	2.33
Star Lake 4X	1	2.33
Stevenfield 2X, Morden 1X	1	2.33
Victoria Beach 1X	1	2.33
Victoria Beach 2X	1	2.33
Whiteshell 1X	2	4.66
Whiteshell 5X	1	2.33
Whiteshell 6X	1	2.33
Whiteshell 9X+	1	2.33

Appendix B - Remaining Responses for Recommendations

Statement	Count
Don't trust lifeguards to watch your kids/the beach is not fully supervised/some beaches have no lifeguards	3
Children drown as people don't know CPR	3
One parent per child or per 2 children/swim with a grown-up/one adult shouldn't watch too many kids	3
Stay in the shallow area/test the waters	2
Learn water safety/Children should know the dangers of water	2
Drowning is preventable	1
Children should wear water wings	1
No lifeguard on duty/the BS people are not lifeguards	1
You are responsible	1
The risk of toddler drowning is the second highest cause of death	1
Diving and UV safety	1
Use the buddy system for older children	1

Appendix C – Results of Chi-Square Analyses

Secondary Analyses

Further analyses were completed to examine the unique impact of some of the predictors on the main outcome variables. Graphs below depict the relationships between levels of these variables on being Within Arm’s Reach and having Good Visual Supervision. Ascertaining the components of these relationships that are statistically significant can be a challenge and therefore this information is used as preliminary information to consider and evaluate in future studies. Initially, univariate Chi-squared analyses were run for all main variables and the

binary (0,1) coded WITHIN ARM’S REACH dependent variable. Tests were found to be significant for visit frequency [$\chi^2=8.48$, $p<.037$], noticing signs [$\chi^2=4.19$, $p<.041$], and life saving training [$\chi^2=4.96$, $p<.026$] (see Figures 3-5). The same Chi-squared analyses were run with all main variables and the binary (0,1) coded visual supervision dependent variable. Analyses were found to be significant for presence of staff [$\chi^2=6.10$, $p<.014$], index age [$\chi^2=6.69$, $p<.01$], noticing signs [$\chi^2=6.03$, $p<.049$], and life saving training [$\chi^2=7.93$, $p<.048$] (see Figures 6-9).

Figure 3. Within Arm’s Reach & Visit Frequency

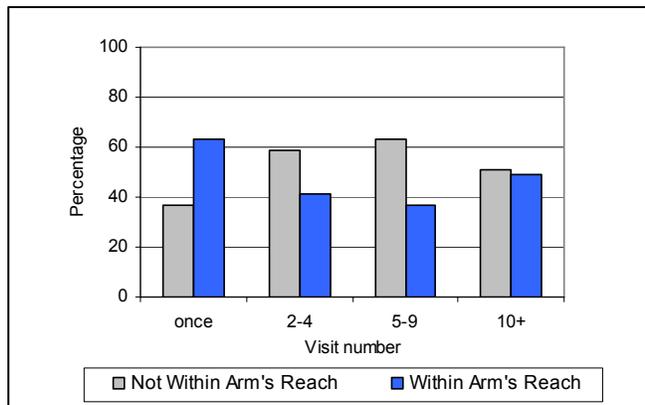


Figure 4. Within Arm’s Reach and Noticing Signs

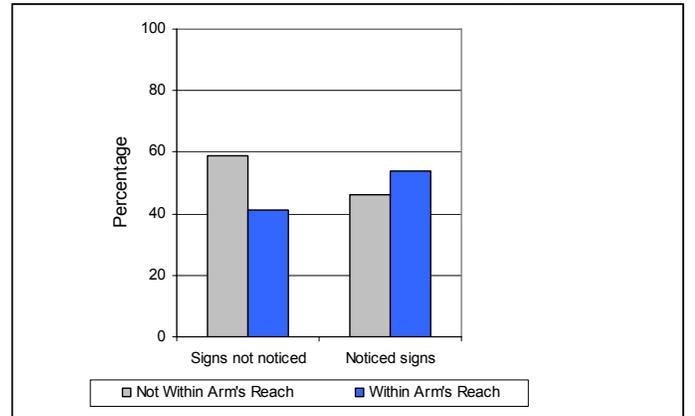


Figure 5. Within Arm's Reach & Life Saving Training

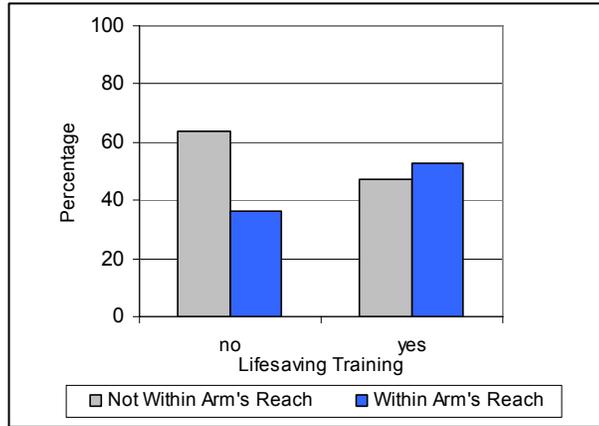


Figure 6. Visual Supervision & Staffing

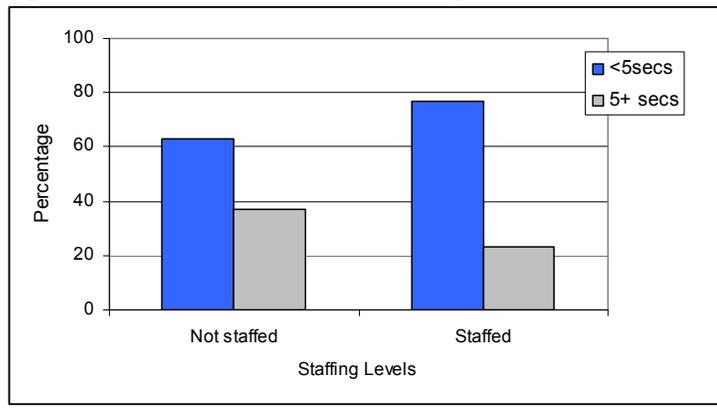


Figure 7. Visual Supervision & Observed Child's Age

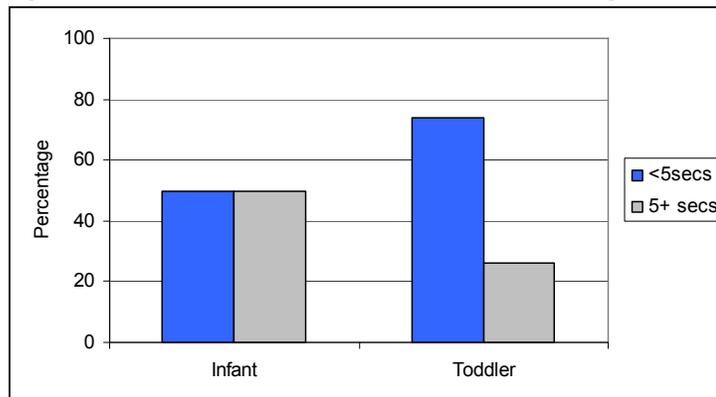


Figure 8. Visual Supervision & Birth Order

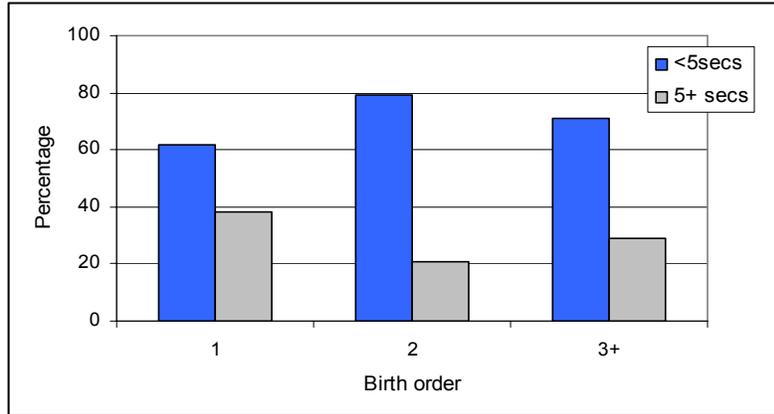


Figure 9. Visual Supervision & Caregiver Swimming Ability

