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Healthy Camps: Initial Lessons on Illnesses and Injuries From a Longitudinal Study

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More than 11 million children attend more than 12,000 summer camps in the United States each year. The challenges to keeping children and the staff healthy and safe can be daunting. To better understand the types of illnesses and injuries common to the camp environment, the American Camp Association (ACA) has undertaken a 5-year study to document these occurrences. The purpose of this study is to monitor illness and injury among campers and staff at U.S. summer camps and identify risk and protective factors associated with such adverse events. The research questions addressed are: (a) What are the benchmarks for accident and illness rates for campers and staff at summer camp? (b) Are there any differences based on camp demographics?

Review of Literature

The majority of previously published research related to summer camp health issues focused on training of healthcare staff (Walton, Maio, & Hill, 2004), outbreak investigations (McLaughlin, Gessner, Lynn, Funk, & Middaugh, , 2004), or investigations of the specific needs of ill children attending specialty camps (Martiniuk, 2003). Unfortunately, such publications offer little assistance to camp health officers hoping to reduce camper adverse-event incidence and severity through improved health services and prevention strategies. Early epidemiologic descriptions tended to center on either illnesses or injuries and were often simple reviews of camp Health Center records (Rauckhorst & Aroian, 1998). More recent surveillance studies had limitations including short follow-up periods and small sample sizes (Elliott, Elliott, & Bixby, 2003).

Methodology

All U.S. summer camps were eligible for participation in the Healthy Camp Study. Information about the study was distributed throughout the camping community through formal and/or informal presentations at camp conferences, information in newsletters, targeted mailings to non-ACA camps, postings on the ACA website, and through word of mouth. Summer camps were asked to complete a camp demographics survey and designate a reporter. In return for participating, enrolled camps received a summary report along with an individualized report that they can use to compare patterns of adverse events at their camp to patterns occurring nationally. Each reporter completed 10 weekly exposure reports during summer 2006. Exposure reports collected exposure information (number of camper and staff camp-days) and the number of adverse events sustained by campers and staff that met the study definition. For each adverse event, reporters completed an illness or injury report form that detailed information about the affected individual (age, gender, location/housing, etc.), the illness (signs, symptoms, severity, etc.) or the injury (site, type, severity, etc.), and the circumstances associated with the illness or injury (date and time of onset, use of protective equipment, etc.). Data were collected through the RIO (Reporting Information Online) and analyzed with descriptive and inferential statistics for this initial year.

Results

Of the 186 U.S. camps enrolled in the study, 140 of them provided data from the summer of 2006. Thirty-seven percent of the camps were day camps and 63% were resident camps. Overall accident and illness rates were low with an average of 0.75 adverse-event rates (illnesses and injuries/1,000 exposures) in day camps and 1.49 for resident camps. These rates can be compared to other youth activities such as boys' football (4.36), boys' soccer (2.43), girls' soccer (2.36), and girls' volleyball (1.64). When analyzed by type of camp (day/resident) and participant (campers/staff), statistical differences were found (see Table 1). The analysis showed that campers and staff were more likely to be ill at camp than to be injured. Day camps reported the highest percentage of illnesses and injuries occurring during scheduled activities. During free time, injuries were more likely to occur than illnesses. Injuries at resident camps were more likely to occur during scheduled activities when compared with occurrences during free time or evening programs. Illnesses were more likely to be reported during free time followed by overnight and camp activities. Injuries were most likely to occur on the second day of camp for both day and resident campers. Staff were more likely to report injuries at the end of the week. Other types of results included:

- Communicable diseases accounted for 32% of day-camp illnesses among campers (33% of illnesses among day-camp staff) and 40% of resident camp illness among campers (51% for staff).
- Head injuries explained 41% of the injuries to day campers and 21% of injuries to resident campers.
- In day camps, for events in which wearing protective equipment was applicable, it was not being worn in 56% of reported situations.
- In resident camps, failure to wear protective equipment was reported in 29% of incidents.
- Trips and falls were the most common causes of injury in all groups: campers and staff, day and resident.

Table 1
Adverse Event Rates by Type of Camp and Participant

	Adverse event rate per 1,000 camp-days		
	All adverse events	Illness	Injury
Overall	**1.25**	**0.82**	**0.43**
Camper	1.24	0.81	0.43
Staff	1.20	0.82	0.38
Day Camps	**0.75**	**0.48**	**0.27**
Camper	0.69	0.46	0.23
Staff	0.83	0.51	0.32
Resident Camps	**1.49**	**0.98**	**0.50**
Camper	1.54	1.00	0.54
Staff	1.33	0.93	0.40

Discussion

One of the goals for this study is to make the camp experience healthier and safer. The good news is that camp is a safe activity when compared to other activities in which children participate. However, much can be learned from the data that will improve practices and behaviors at camp. For example:

- Nearly 25% of the adverse events happened in unsupervised time while almost half of the injuries happened in supervised and scheduled activities. An analysis of when and where incidents occurred in camp could be helpful to camps as they implement new ways of addressing these concerns.

- Because a significant number of injuries for both campers and staff were related to a trip/fall, camps may want to review their guidelines regarding footwear (close-toes shoes are always safest) and watch for injury patterns related to physical activities and where they are done.
- Head injuries can often be prevented by following some tips, such as using well-fitting and activity-specific helmets, having at least 12 inches of safety materials around play equipment, using bunk-bed rails, and using equipment appropriate for the age and developmental level of the participants.
- Illness management in our camp communities needs to center on maintaining resilience (rest, hydration, nutrition, etc.) and implementing practices that minimize illnesses (appropriate hand washing and/or use of hand sanitizers, etc.)

The most powerful benefit of the Healthy Camps Study will be its ability to track trends over time. Not only will the individual camps learn valuable information to help them make their camps safer and healthier, but the trends will offer opportunities to develop "best practices" for all camps to consider as we continue to offer quality programs built on solid information.

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