A Prospective Study of School Preparedness for Medical and Traumatic Emergencies

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Citation

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Abstract

Objective: The purpose of this study was to determine if schools have resources and essential equipment to deal with a medical or traumatic emergency.

Methods: This was a prospective survey of all public schools in a local county.

Results: 323 schools surveyed with 47.6% response. A nurse was present in 97% of schools. 94% and 96 % of schools had a staff member, other than the nurse, with first aid or CPR training, respectively. Advanced equipment/resources: 22% cervical-spine immobilizer, 29% self-inflating resuscitation device, 51% oxygen, 56% nebulizer, and 73 % had epinephrine pens. 97% had an automatic external defibrillator (AED); in 26% of all schools the AED was available in the field during sports with 56% in high schools.

Conclusions: The schools were well equipped with basic emergency supplies and training. The schools were lacking in advanced equipment. A high percentage of schools have an AED with variable location.

INTRODUCTION

The purpose of this study is to determine if schools have essential resources and equipment to deal with a medical or traumatic emergency. There are recommendations from the American Academy of Pediatrics, the American College of Emergency Physicians, the American Heart Association, American National Red Cross, National Association of School Nurses, National Association of State EMS Directors, National Association of EMS Physicians, National Association of Emergency Medical Technicians, Program for School Preparedness and Planning, National Center for Disaster Preparedness, Columbia University Mailman School of Public Health and the National Consensus Group Report regarding resources and equipment necessary for schools in the presence of a school nurse and when non health-related personnel are available. [1,2,3,4,5,6,7,8]

METHODS

Design: This study was a prospective survey that enrolled all public schools in Nassau county, a suburb of New York City. The study was approved by the Institutional Review Board of the participating institution.

Setting And Population: This study was conducted in a suburban public school system outside New York City. We included all public schools in Nassau county as published in the Boces directory. Boces is a resource link for school districts in Nassau and Suffolk counties on Long Island .

Study Protocol: This was a prospective survey sent to all school administrators of all public schools in Nassau county in September 2004 regarding essential health resources and equipment in the schools. The surveys were completed by the school principal or school nurse. The survey was mailed only once with a stamped return envelope. There were no exclusions.

Participants were informed in standardized way about how to complete the survey. To ensure anonymity the top of the survey contained a statement indicating that this was an anonymous survey of the school's preparedness to deal with medical and traumatic emergencies. We also asked the person filling out the survey not to include their name or the school's name on the survey to maintain anonymity.

The survey asked for the following information: person filling out the survey (principal or school nurse), if there is a nurse in the school, number of students, and the type of school (i.e., elementary, middle school, high school). There were 2 lists of items as recommended by a National Consensus Group Report {$_7$}, as well as several questions, regarding AED in the schools such as training, where it is kept, and if it brought to the field during sports.

Data Analysis: We obtained frequencies on all variables. Descriptive statistics were employed for the majority of data analysis.

RESULTS

The survey was sent to 323 schools with 154 schools responding (47.6%): Elementary 97 (63%), Middle 18 (12%), High 29 (19%), Middle & High 1 (0.7%), Early Childhood 1(0.7), and missing 8 (5.2%). A school nurse was present in 97% of schools. We obtained the following responses for essential minimum equipment and resources: 87% of schools reported emergency information cards on all staff, 96% had emergency information cards on all students, and 81% had an established relationship with local EMS personnel. 94% of schools had a staff member, other than the nurse, who had first aid training and 96 % of schools had staff, other than nurse, with CPR training. (Table 1)

Figure 1

Table 1

Minimal Essential Emergency Equipment and Resources for Schools **Without a School Nurse** Present	# (%) N=154
Accessible keys to locked supplies, if school nurse is not available	145 (95)
Accessible list of phone resources	148 (97)
Biohazard waste bags	131 (86)
Blunt scissors	148 (97)
Clock with a second hand	147 (96)
CPR trained staff on-site when students are on the premises	150 (98)
Disposable blankets	78 (51)
Emergency cards on all staff	138 (87)
Emergency cards on all students	147 (96)
Established relationship with local EMS personnel	124 (81)
Ice (not cold packs)	117 (76)
Individual care plans for students with specialized heath care needs	131 (86)
First-aid tapes	137 (90)
Nonlatex gloves	141 (92)
One-way resuscitation mask	140 (92)
Phone	151 (99)
Posters with CPR/Heimlich instructions	124 (81)
Refrigerator or cooler	150 (98)
Resealable plastic bags	141 (92)
School wide plan for emergencies	149 (97)
Soap	149 (97)
Source of oral glucose (i.e. frosting)	111 (73)
Splints	132 (86)
Staff (not nurse) that have received basic first-aid training	144 (94)
Staff (not nurse) that has CPR training	147 (96)
Variety of bandages and dressings	151 (99)

Regarding advanced equipment and resources in schools with nurses the following was reported: 15% suction equipment, 22% cervical-spine immobilizer; 29% self-inflating resuscitation device, 51% oxygen, 59% albuterol inhalers and/or 56% nebulizer, and 73 % reported having epinephrine pens. (Table 2) While 97% of schools reported having automatic external defibrillator (AED) in the schools, 66% reported having pediatric pads and cables available. The AED is available in 26% of schools in the field during sports. AED are kept in the school gym in 21% of schools,

in the health room in 25% of schools and in other, central location in 78% of schools. In the schools, 97% of the school nurses are trained to use the AED, 61% of the school principals, 55% of the teachers, 73% of the coaches and 1% students. The data for high schools regarding AED is as follows: 93% reported having AED, 56% bring the AED to the field during sports events; it is kept in the gym in 33% of schools, in the health room in 33% and in a central location in 85%; 96 % of high school nurses are trained to use it, 52% of principals, 70% of teachers, 89% of coaches, 7% of students.

Figure 2

Table 2

Additional Minimal Essential Emergency Equipment and Resources for Schools **With a School Nurse**	# (%) N=154
C (cervical)-spine immobilizer	33 (22)
Glucose monitoring device	66 (43)
Medication: albuterol	90 (59)
Epinephrine pen	112 (73)
Medical items: oxygen	78 (51)
Nebulizer	86 (56)
Penlight	146 (95)
Self inflating resuscitation device in two sizes (500 mL and 1L) with appropriate-sized masks to meet needs of population being served	44 (29)
Sharps container	135 (88)
Stethoscope	148 (97)
Suction equipment (does not have to be electric, i.e., turkey baster)	23 (15)

LIMITATIONS

This is a self reported study which may be limited by the geographic and socio-economic population of this area. The local laws in a particular region may also influence whether equipment or staffing is present.

DISCUSSION

School-based health services have evolved from primarily controlling communicable diseases to comprehensive programs with direct services, education, and improvement of the school environment.{9} The school health services have to deal with a wide spectrum of acute and chronic illnesses: anaphylaxis, asthma, developmental disabilities, diabetes, drug reactions, infection and infestations, syncope, seizures; trauma related injuries (sports, violence, guns, fights and abuse), lab injuries (burns, explosions, poisonings, eye injuries), and behavioral management (drugs, school phobia, mass hysteria, stress debriefing, suicide attempts). {1,2,3,4,5,6,7,8}The Medical Emergency Response Plan for Schools {1,2,3,4} encourages every school to develop a program that reduces the incidence of life-threatening emergencies, and maximizes the chances of intact survival from an emergency. Such a program will have the potential to save the greatest number of lives, with the most efficient use of school personnel and equipment.

The equipment is variable in schools. In a study of public schools in a rural state it was found that emergency equipment available varies widely: oxygen 20%, artificial airways 30%, cervical collars 22%, splints 69%.{10} In our study, we found that schools were well equiped with basic emergency supplies and resources such as first-aid/CPR training. However, we found the schools lacking equipment such as suction devices, cervical-spine immobilizer, self-inflating resuscitation device, oxygen, albuterol inhalers and/or nebulizer, and epinephrine pen.

Another issue of interest is the presence of AED in schools. In May 2002, Governor George Pataki signed legislation (N.Y. Education Law, Article 19, § 917, S. 10577) requiring schools in New York State to have AED available for use no later than December 2002. Although sudden cardiac arrest has been reported in non-athletic adolescents during sedentary activities, the risk of sudden cardiac arrest appears to be lower in high school students who do not play competitive sports than in athletes{11,12,13} When data from the EMS systems are examined, the risk of sudden cardiac arrest in elementary school-age children appears to be much lower than that reported in non-athletic high school-age students, and substantially lower than that reported in high school athletes. {14} From the limited available information regarding AED use in the pediatric population it appears that high school students who participate in competitive sports would benefit the most from the availability of AEDs. In our study we found that 93% of high schools reported AED in the schools, but only 56 % of schools bring the defibrillator to the field during sports. There seems to be a need to evaluate the best place to keep an AED in the school: a central location so that everyone knows where it is, since adult teachers as well as visitors may well make use of the AED far more than the even the highest risk group of students; or, at sporting events, which is problematic since there could be several events taking place at the same time. Physicians can provide insight into early defibrillation programs {15} and can play an important role in the success of AED programs by providing training, and insight into the implementation program.

CONCLUSIONS

We found that the schools were well equipped with basic emergency supplies and training. However, the schools were lacking in advanced equipment. We found most schools to have AEDs, but not all schools were compliant with the mandate to have AEDs in every school. The AEDs are kept in different locations, depending on the school, and in some cases brought to the field during a sports event.

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