

Exposure of Athletic Trainers to Potentially Infectious Bodily Fluids in the High School Setting

David A. Middlemas, MA, ATC; K. Brian Jessee, ATC;
Diane K. Mulder, MS, ATC; Robb S. Rehberg, ATC, EMT

Objective: To examine the incidence of exposure to potentially infectious bodily fluids by athletic trainers in the high school setting in the performance of their daily responsibilities. We also looked at the actions of officials in dealing with athletes with bleeding injuries.

Design and Setting: Athletic trainer contact with athletes and incidents of exposure to potentially infectious bodily fluids were recorded at 18 high schools in northern New Jersey during the fall 1994 athletic season. The number of times officials removed an athlete from the game or required a change of uniform, or both, was also counted. The data were analyzed with descriptive statistics.

Subjects: Eighteen athletic trainers and 3537 student-athletes at 18 high schools in northern New Jersey.

Measurements: Number of contacts with athletes; number of contacts with potentially infectious bodily fluids; age of

athlete; sport of athlete; whether the contact was in a practice or game; if in a game, whether the athlete was removed from the game by the official; and whether or not the athlete was required to clean or change the uniform.

Results: Of the athletic trainer contacts with athletes, 4.10% involved potentially infectious bodily fluids. The incidence of exposure to potentially infectious fluids was 12.9% of the athlete contacts. Athletes in game situations were required to change or clean a uniform in 23.7% of the bleeding incidents, and officials removed an athlete from a contest in 1.7% of the game-related bleeding incidents.

Conclusions: Universal precautions and personal protective equipment should be used in the athletic setting. Further study into the application of rules by officials governing the participation of athletes with blood-stained uniforms is needed.

Key Words: bloodborne pathogens, hepatitis B, HIV

In recent years, increased attention has been drawn to the possibility that health care workers might be exposed to infectious bodily fluids in the course of providing care. Noted in the literature as being particularly important in the sports medicine environment are the following: concerns about exposure to potentially infectious fluids and materials, protection of the athletic trainer while caring for athletes with bleeding injuries, and the disposal of potentially infectious medical waste.¹⁻⁷ The athletic trainer has the potential to come in contact with blood and other bodily fluids while providing first aid and follow-up care for participants.

The number of new cases of human immunodeficiency virus (HIV) each year in the United States has been reported to be in the range of 40,000 to 50,000.⁵ Approximately 10,000 health care workers are being infected with the hepatitis B virus (HBV) annually.^{8,9} As more information concerning the transmission of HIV and HBV has become available, most athletic associations and regulating bodies have enacted rules regarding players who are bleeding.^{3,5,10-12} These rules cover care of bleeding injuries, changing and cleaning of uniforms, removal from competition, and eligibility to return to play.

Policies concerning the health care provider in athletics have also been enacted. These include the use of personal protective equipment, housekeeping procedures, and procedures for the

disposal of waste materials.^{1,2,5,7,13-17} All procedures for health care workers are based on guidelines determined by the Occupational Safety and Health Administration (OSHA).¹⁶

There were several purposes of this study: to examine the rate at which the athletic trainer in the high school setting is exposed to potentially infectious bodily fluids; to determine the total number of potential exposures in game and practice situations; to record the number of times athletes were removed from competition by an official for a bleeding injury; and to survey the number of times a uniform change or cleaning was required before the athlete was allowed to return to competition.

METHODS

For the purpose of this study, an athlete contact was defined as any time the athletic trainer touched an athlete for the purpose of taping, wound care, assessment, and/or treatment of an injury. Removal of the athlete was defined as any time the contest was stopped by the official as a result of a bleeding injury and the official required the athlete to leave the contest. Required change or cleaning of the uniform was defined as any time a change or cleaning of the uniform was requested or required by the official before an athlete was allowed to return to competition.

Data Collection

Athletic trainers at 18 high schools in northern New Jersey collected data on athletes during the fall athletic season of

David A. Middlemas is Athletic Training Program Director, William Paterson University of New Jersey, Wayne, NJ 07470. K. Brian Jessee lives in San Jose, CA. Diane K. Mulder is an athletic trainer at Ferris High School in Jersey City, NJ. Robb S. Rehberg is affiliated with Kessler Physical Therapy and Rehabilitation, West Orange, NJ.

Table 1. Total Contacts, Total Exposures, and Exposure Rates by School

School	Athletes	Total Contacts	Total Exposures	Exposures per 100 Athletes	Exposures per 100 Contacts
1	153	289	15	9.80	5.19
2	321	1289	37	11.53	2.87
3	143	1009	21	14.69	2.08
4	88	319	14	15.91	4.39
5	173	565	25	14.45	4.42
6	110	99	10	9.09	10.10
7	384	2274	57	14.84	2.51
8	110	541	22	20.00	4.07
9	209	1460	38	18.18	2.60
10	66	261	13	19.70	4.98
11	126	875	39	30.95	4.46
12	140	563	9	6.43	1.60
13	260	1689	12	4.62	0.71
14	428	156	23	5.37	14.74
15	262	1332	11	4.20	0.83
16	87	699	12	13.79	1.72
17	207	682	24	11.59	3.52
18	270	649	19	7.04	2.93
	3537	14751	401	12.90	4.10
	(Total)	(Total)	(Total)	(Average)	(Average)

1994. Information was compiled on a data collection form that was distributed to each site by the researchers. The following items were recorded: athlete contacts, athlete's age, athlete's sport, whether or not the contact involved a potentially infectious bodily fluid (as defined by OSHA¹⁶), and whether the contact occurred in a practice or a game. If the contact occurred in a game, whether or not the official removed the athlete from the game and whether a change or cleaning of the uniform was required before the athlete was allowed to return were also recorded.

Data Analysis

Data from the 18 high schools were collected and tabulated. Calculations consisted of totals for each school and for the entire sample; the proportion of total contacts that involved exposure to potentially infectious bodily fluids; the number of potential exposures per 100 athletes contacted; and the number of potential exposures per 100 athletes participating. A Pearson product-moment correlation coefficient was calculated to determine evidence of a relationship between the exposure rate

for athlete contacts and the exposure rate for athletes participating.

RESULTS

The response rate from the 18 high schools in the study was 100%. A total of 3537 athletes (age range, 14 to 18 years) participated in athletics during the study period, with a mean of 196.5 athletes per high school (Table 1). The number of athletes per high school ranged from 66 to 428. Athletic trainers were exposed to potentially infectious bodily fluids 401 times; when comparing the number of potentially infectious exposures with the total number of athlete contacts, the overall exposure rate was 0.041. When comparing the total number of potentially infectious exposures with the total number of athletes in the study, the exposure rate was 0.129.

Of the 401 potentially infectious exposures, 177 occurred in game situations and 224 occurred in practices (Table 2). The only sports in this study in which exposures required cleaning or change of uniform were football, men's soccer, and women's tennis. The only sports in which athletes were removed from competition by an official for bleeding injuries were football and men's soccer.

The rate of potentially infectious exposure was 12.90 per 100 athletes. The incidence of potentially infectious contact was 4.10 per 100 athlete contacts. The correlation between number of exposures per 100 athletes and number of exposures per 100 athlete contacts was -0.07 , indicating little relationship between these two variables.

DISCUSSION

Federal agencies, national and state athletic organizations, and professional organizations recommend that athletic training programs have infection control plans, provide personal protective equipment for staff, and have appropriate means for disposing of potentially infectious waste materials.^{2,4,5,10-16} Athletic trainers in this study were exposed to potentially infectious bodily fluids in 4.10% of their contacts with athletes while performing their job responsibilities. Although the risk of infection appears to be negligible in athletics, there is a theoretical risk of infection.¹ The existence of risk appears to be supported by the data in this study, which demonstrate that athletic trainers are exposed to potentially infectious bodily

Table 2. Exposures to Potentially Infectious Fluids, Uniform Changes Required, and Removals By Referee from Games by Sport

Sport	Total Exposures	Game Exposures	Practice Exposures	Uniform Changes	Referee Removals
Football, men	315	132	183	32	2
Volleyball, women	19	11	8	0	0
Soccer, men	37	26	11	9	1
Soccer, women	8	4	4	0	0
Field hockey, women	3	2	1	0	0
Cross country, men	16	1	15	0	0
Cross country, women	0	0	0	0	0
Gymnastics, women	1	0	1	0	0
Tennis, women	2	1	1	1	0
Totals	401	177	224	42	3

fluids at an exposure rate of 12.9 per 100 athletes. It seems appropriate to conclude from the data that the athletic trainer should be prepared for the possibility of an exposure at any time. The more than 460,000 cases of AIDS reported in the United States in the period from June 1991 through June 1995 reinforce the need for athletic trainers to use appropriate precautions when engaged in athletic injury care.¹⁷ In addition, policies, protocols, and Federal guidelines also support the vaccination of athletic trainers and other health care providers against HBV.^{13,15,16}

CONCLUSIONS

It is important to note that exposure to potentially infectious bodily fluids is not limited to game situations. Although the actual number of total contests and practices was not counted for the original purposes of the study, it is interesting to note that, of the incidents recorded in the athletic programs studied, 44% of the potential exposures occurred in game situations, with the rest occurring in practices. These findings suggest that the athletic trainer has a significant chance of coming in contact with blood or other potentially infectious bodily fluids in both game and practice situations. Study into the rates of exposure in game versus practice situations is needed to determine conclusions about which situation actually provides the higher rate of exposure to potentially infectious bodily fluids.

The athletic trainer should use universal precautions in caring for athletic injuries. The rate of exposure of 4.10 per 100 contacts and 12.90 per 100 athletes includes all athletic trainer-athlete contacts. These numbers, combined with the ongoing moral and ethical dilemmas surrounding the testing of athletes for HIV and who would have access to the results of the testing, reinforce the need to use personal protective equipment.¹⁸ In this study, the athletic trainers' contacts for the purpose of taping and preparation for participation were not separated from those for postinjury assessment and care. It would be appropriate and interesting to further examine the nature of these contacts to determine if the rate of exposure to potentially infectious bodily fluids increases when examining the athletic trainer-athlete contacts involving only postinjury assessment and care.

It is worth noting that in only three incidents over the course of this study did officials remove an athlete from a game. The period included an entire fall sports season at the high school level and nine sports. With 177 of the exposures to potentially infectious bodily fluids occurring in game situations, officials removed only 1.7% of the athletes who required attention from the athletic trainer for bleeding or potentially infectious bodily fluids. From these results, the question arises as to whether all of the athletes who should be removed from competition because they have potentially infectious fluids on their uniforms are, in fact, being removed from the games by the officials for the purpose of cleaning or changing of uniforms. Further study into the officials' understanding of the rules regarding removal of bleeding athletes from games, the nature of officials' interpretation of the rules, and other factors affecting the decisions of officials regarding whether it is appropriate for an athlete to stay in a game with a bleeding

injury would provide additional information as to whether officials' decisions are appropriate and in line with policies established by athletic regulating bodies.

Further study is needed in the area of actual exposure of athletic trainers to potentially infectious bodily fluids. This study covered only the fall athletic season. It would be appropriate to expand the study over an entire year. Additional research on wrestling, basketball, lacrosse, hockey, baseball, softball, and track would provide information as to whether the exposure patterns revealed in this study occur on a consistent basis in all sports.

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