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Work-Related Injury and Management Strategies Among Certified Athletic Trainers

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Context: Health care workers have high rates of musculoskeletal injuries, but many of these injuries go unreported to workers' compensation and national surveillance systems. Little is known regarding the work-related injuries of certified athletic trainers (ATs).

Objective: To determine the 12-month incidence and prevalence of work-related injuries and describe injury-reporting and -management strategies.

Design: Cross-sectional study.

Setting: Population-based online survey.

Patients or Other Participants: Of the 29 051 ATs currently certified by the Board of Certification, Inc, who "opted in" to research studies, we randomly selected 10 000. Of these, 1826 (18.3%) ATs currently working in the clinical setting were eligible and participated in the baseline survey.

Main Outcome Measure(s): An online survey was e-mailed in May of 2012. We assessed self-reported work-related injuries in the previous 12 months and management strategies including medical care, work limitations or modifications, and time off work. Statistics (frequencies and percentages) were calculated to describe injury rates per 200 000 work hours, injury prevalence, injury characteristics, and injury-reporting and -management strategies.

Results: A total of 247 ATs reported 419 work-related injuries during the previous 12 months, for an incidence rate of 21.6 per 200 000 hours (95% confidence interval = 19.6, 23.7) and injury prevalence of 13.5% (95% confidence interval = 12.0%, 15.1%). The low back (26%), hand/fingers (9%), and knee (9%) were frequently affected body sites. Injuries were most often caused by bodily motion/overexertion/repetition (52%), contact with objects/equipment/persons (24%), or slips/trips/falls (15%). More than half of injured ATs (55.5%) sought medical care, 25% missed work, and most (77%) did not file a workers' compensation claim for their injury. Half of injured ATs were limited at work (n = 125), and 89% modified or changed their athletic training work as a result of the injury.

Conclusions: More than half of AT work-related injuries required medical care or work limitations and were not reported for workers' compensation. Understanding how ATs care for and manage their work-related injuries is important given that few take time off work.

Key Words: work task, occupational injury, mechanism, survey, athletic training, workers' compensation

Key Points

- Work-related injuries were frequent among athletic trainers, yet few took time off work or reported their injuries for workers' compensation. Understanding how athletic trainers manage and care for their injuries is important for prevention efforts.
- Athletic trainers' injury frequency varies by practice setting and work task and activity, so prevention strategies must address these factors.

Since its beginning more than 60 years ago, the athletic training profession has evolved considerably in both setting and scope of practice. In the 1960s and 1970s, athletic trainers (ATs) were primarily employed in secondary school, collegiate/university, and professional sport settings and were often dual trained and employed as teachers and coaches.[1] The athletic training profession has now expanded beyond schools into a variety of practice settings, including hospitals, medical and therapy clinics, fitness and sports centers, government and military training centers, and industry worksite clinics. The Bureau of Labor Statistics estimated that more than 25 400 ATs were employed in 13 industries in 2014.[2] This is likely an underestimate given that, in 2014, 45 695 ATs were certified by the Board of Certification (BOC), Inc.[3] Employment is expected to increase by 21% over the next decade, particularly in schools, health care settings, and fitness and recreation sports centers.[2] With this growth and expansion, it is important to understand the occupational exposures and hazards of these workers.

Athletic training encompasses "the prevention, diagnosis and intervention of emergency, acute and chronic medical conditions involving impairment, functional limitations and disabilities."[4(p1)] As health care professionals, ATs have a

unique set of work exposures. Similar to emergency medical technicians (EMTs), ATs provide emergency care to injured and ill patients in a variety of locations and environmental conditions. In contrast to EMTs, the work of an AT extends beyond the management of the emergency. Athletic trainers also engage in clinical care tasks similar to those of physical therapists and nurses, including patient assessment, evaluation, treatment, rehabilitation, and education. Athletic training work tasks require sustained, awkward postures; lifting and handling of both equipment and patients; exposure to blood and body fluids; and a high level of psychological stress.[5] Because ATs work in a variety of practice settings, their job tasks vary depending on the setting and the patient population. For example, ATs in school settings work both outside and inside, covering practices and games and in treatment centers. In clinic and hospital settings, ATs may work solely in the clinic with 1 patient at a time, or they may provide outreach services to a school and be responsible for the care of upward of 200 patients (athletes). In professional or performing arts settings, ATs' duties can extend to strength and conditioning training.

With these variable and unique work environments, tasks, and exposures comes potential risk for work-related health concerns. Burnout, stress, and attrition are well-documented problems for the athletic training profession.[6–10] In similar professions, such as nursing and physical therapy, a great deal is known about work-related injuries and management strategies.[11–17] Despite some general knowledge of the work settings and responsibilities,[18,19] little is known about ATs' injury experiences and particularly about how ATs report and manage these injuries. The authors of a previous study[20] described self-reported injuries among 103 ATs employed in Taiwan. Half of the ATs reported an injury over the course of their entire career (48.5%). Injuries were most frequently to the low back (42%), finger (38%), and shoulder (26%) and classified as overuse (68%), sprain (30%), or tendinitis (24%). This was a small cross-sectional study of early-career ATs in Taiwan, and the results are not generalizable to US ATs. Studies of ATs in the United States[6–10] have often been small-scale, cross-sectional surveys limited to particular regions, collegiate divisions, or occupational settings. Therefore, little is currently known about occupational injuries among ATs on a national scale.

Understanding the full scope of ATs' injury experiences, including whether they report their injuries and how they manage them, is important for learning how to prevent them. Underreporting of injuries is common among workers in general.[21,22] Underreporting may be particularly prevalent in sport and rehabilitation settings where work-related injuries are often viewed negatively by care providers.[12] Health care workers often put the health of their patient before their own,[23] and if injured, they tend to manage the injury themselves.[13] As such, injury statistics from national organizations such as the Bureau of Labor Statistics and workers' compensation entities do not capture the full picture because they rely on reporting from the worker, the employer, or the insurer. Further, increasing our understanding of the characteristics and work-related factors of athletic training-related injuries can guide future prevention measures. Therefore, the purpose of our study was to determine the self-reported prevalence and incidence of work-related injuries and to describe the frequency and nature of individual management strategies after a work-related injury (including whether workers' compensation was filed), receipt of medical care, and time off work.

METHODS

Population and Study Design

This population-based cross-sectional study was part of a 3-year national research study, the Work-Related Risks of Certified Athletic Trainers (WRROCAT) study. The overall goals of the WRROCAT study were to determine the prevalence and incidence of work-related injuries, musculoskeletal disorders, and illnesses among ATs and to better document and describe their work-related exposures and injury-management strategies. The current analysis focuses on the subset of work-related injuries.

Data Collection

Data Source. In 2012, the BOC provided a database of all currently certified, active ATs (ie, not retired or resigned) who "opted in" to research studies (n = 29 051). We selected a random sample of 10 000 ATs and invited them to participate in the study by completing an initial baseline survey.

Recruitment and Eligibility. To ensure the best response rate, we used methods known to improve participation, such as prenotices, personalized salutations, multimode surveys, and multiple reminders.[24–28] A general notice was placed in the National Athletic Trainers' Association weekly newsletter announcing the WRROCAT study and providing a link to the Web site (http://sites.duke.edu/wrrocat/). This prenotice was followed by an initial e-mail to the 10 000 individuals randomly selected to participate. Packets were mailed a few days later to these 10 000 individuals containing a study brochure with information about the WRROCAT study, a letter of support from the BOC, and a letter instructing the ATs to expect an e-mail from Qualtrics (Provo, UT) survey software with a personalized link to the survey. Online survey links for the baseline survey were e-mailed a week later on May 17, 2012. Approximately every 2 to 3 weeks, a reminder e-mail was sent as needed, for a total of 3 reminders. Paper surveys were mailed to participants on request. To be eligible for the current study, ATs had to have some patient contact and be working as an AT in their current job setting.

Of the 10 000 ATs invited to participate, 2608 (26.1%) responded to the invitation, either by an e-mail to the investigators or by logging on to the survey Web site; 1984 participated in the survey (19.8%). Of these participants, 1826 (92%) had some patient contact, worked as an AT in their current job setting, and were eligible for our analysis (Figure 1). Out of 1826, 170 (9.3%) did not finish all of the questions in the survey. However, the demographic and occupational characteristics did not differ between those who completed the survey (n = 1736) and those who started the survey (n = 1826). Therefore, results were provided for the entire population of 1826 respondents. Where possible, information from the BOC database was used to complete missing values for sex (n = 167), age (n = 171), and practice setting (n = 79). All study procedures were reviewed and

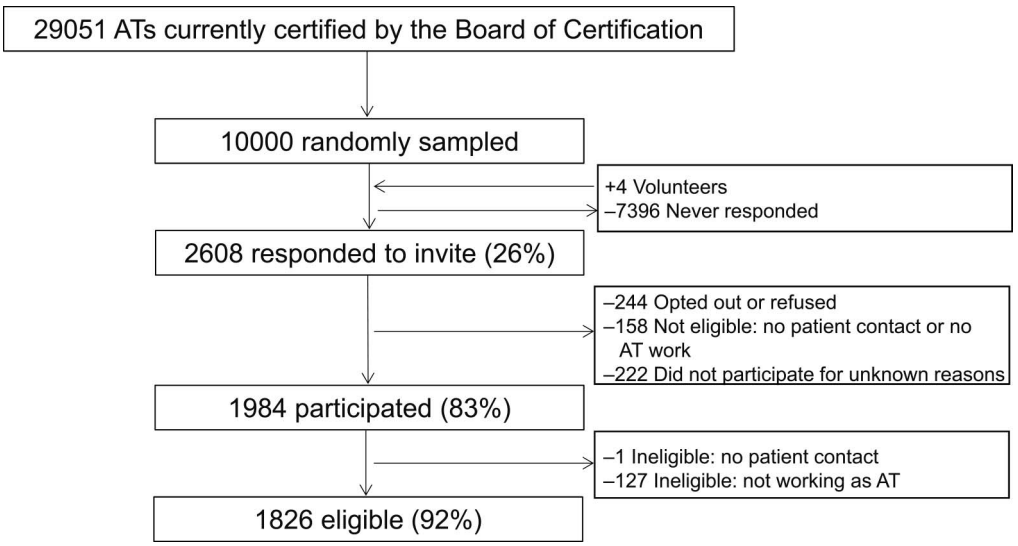

Figure 1. Survey recruitment and inclusion flowchart. Abbreviation: AT = athletic trainer.

approved by the Duke University Medical Center Institutional Review Board.

Survey Development. The survey contained both closed- and open-ended items from previous studies and original items developed by our research team. The survey comprised 130 questions in the following 9 domains:

- Job and setting demographics
- Present job setting information
- Work injury and illness
- Blood and body fluid exposures
- Work-related musculoskeletal symptoms
- Job task and demands
- Second job information
- General health
- Personal demographics

A draft paper survey was pilot tested by 2 certified ATs (1 male, 1 female; 1 college level, 1 clinic/high school level; both had >10 years' athletic training experience) and edited for content, clarity, and length based on their feedback. The paper survey was converted to a Web-based survey and pilot tested with 19 AT volunteers (58% female, mean age = 38 ± 6.1 years [range = 29–54 years], with 15 ± 5.0 years of athletic training experience [range = 8–30 years]), whose work settings consisted of 32% college/university, 32% secondary school, 16% clinic, and 20% other). We reviewed the pilot survey data along with pilot tester feedback and subsequently edited the survey for clarity and length. The final survey is available from the primary author (K.L.K.) upon request.

Outcomes, Characteristics, and Factors

The main outcomes of interest for this analysis were self-reported work-related injury in the previous 12 months that (1) required care beyond minor first aid, (2) resulted in limitations (inability to perform normal or expected work tasks), or (3) required 1 or more days away from work. Participants provided detailed information on the injury that they considered the most severe, including when and where it occurred, injury characteristics (ie, body part, injury type, mechanism), and severity and management strategies (ie, medical care, work limitations or modifications, time off work, and filing a workers' compensation claim). Open-ended narrative responses to the question "Tell us about what happened" were reviewed to determine the source of the injury (US Bureau of Labor Statistics Occupational Injury and Illness Classification System [OIICS] codes) and the work task (eg, patient care) and specific activity (eg, lift patient) the AT was engaged in at the time of the injury. Task and activity variables were coded using a classification strategy Kucera et al[29] developed for workers' compensation claim analyses. Injured body part, nature or type of injury, mechanism of injury, and source of injury were categorized according to OIICS codes. Other factors were personal factors (sex and age), census region, and occupational factors such as current work setting (clinic/hospital, college/university, secondary school, contractor, or other), years with current employer, length of work contract, years of experience as a certified AT (0 to 5, >5 to 10, or >10 years), and average hours worked per week. Where possible, information from the BOC database was used to complete missing values for sex (n = 167), age (n = 171), and practice setting (n = 79).

Data Analysis

Statistics (frequencies and percentages) for self-reported injuries described the 12-month prevalence, demographic and occupational characteristics, and reporting and management strategies. Chi-square tests were used to determine statistical differences ($\alpha = .05$) between survey participation status (participant versus nonparticipant) and injury status (injured versus not injured) by covariates. We used Cochran-Armitage trend tests to determine whether the injury prevalence increased as the average number of hours worked increased (ordinal variable, $\alpha = .05$). The rate of work-related injuries per 200 000 work hours (or 100 full-time equivalent [FTE] ATs) during the 12-month period was calculated along with 95% confidence intervals (CIs). Work hours were estimated from the average hours worked per week reported by the individual during the same 12-month period. Hours were adjusted for the length of the work contract (eg, 9 months, 12 months) and any variability

Table 1. Demographic Characteristics of 1984 Survey Participants Compared With Nonparticipants

Characteristic	Group, n (%)			χ^2 (Test Statistic, *P* Value)[a]
	Survey Participants (n = 1984)	Nonparticipants (n = 8020)	Random Sampled (n = 10 004)	
Sex				
Female	946 (47.7)	3655 (45.6)	4601 (46.0)	
Male	951 (47.9)	3893 (48.5)	4844 (48.4)	1.3
Unknown	87 (4.4)	472 (5.9)	559 (5.6)	*P* = .26
Age, y				
<30	564 (28.4)	2233 (27.8)	2797 (28.0)	
30–49	1193 (60.1)	5026 (62.7)	6219 (62.2)	
≥50	227 (11.4)	760 (9.5)	987 (9.9)	8.1
Unknown	—	1 (<0.01)	1 (<0.01)	*P* = .02
Experience as certified athletic trainer, y				
1–4	446 (22.5)	1735 (21.6)	2181 (21.8)	
5–9	521 (26.3)	2169 (27.0)	2690 (26.9)	0.9
≥10	1017 (51.3)	4116 (51.3)	5133 (51.3)	*P* = .64
Current work setting				
Clinic/hospital	388 (19.6)	1978 (24.7)	2366 (23.7)	
College/university	508 (25.6)	1514 (18.9)	2022 (20.2)	
Secondary school	627 (31.6)	2141 (26.7)	2768 (27.7)	
Other	348 (17.5)	1868 (23.3)	2216 (22.2)	92.3
Student (graduate assistant)	113 (5.7)	519 (6.5)	632 (6.3)	*P* < .0001
US census region[b]				
Northeast	400 (20.2)	1708 (21.3)	2108 (21.1)	
Midwest	564 (28.4)	2393 (29.8)	2957 (29.6)	
South	667 (33.6)	2575 (32.1)	3242 (32.4)	
West	349 (17.6)	1335 (16.7)	1684 (16.8)	4.0
Other	—	4 (0.1)	4 (<0.01)	*P* = .26
Unknown	4 (0.2)	5 (0.1)	9 (0.1)	

[a] Chi-square statistic and *P* value assess statistically significant differences by participation status.

[b] US census regions: Northeast: CT, MA, ME, NH, RI, VT, NJ, NY, PA; Midwest: WI, MI, IL, IN, OH, MO, ND, SD, NE, KS, MN, IA; South: DE, MD, DC, VA, WV, NC, SC, GA, FL, KY, TN, MS, AL, OK, TX, AR, LA; West: ID, MT, WY, NV, UT, CO, AZ, NM, AK, WA, OR, CA, HI; Other: GU, PR, VI.

in average work hours by month (hours varying by ±10 hours per week during that month). For example, estimated hours for an AT working, on average, 40 hours per week on a 10-month contract with an average increase of >10 hours per week during August and September would be 1680 ([40 hours/week × 4 weeks] × 10 months) + (10 hours/week × 8 weeks).

Characteristics of the injury (ie, body part, type of injury, mechanism, source, task, and activity) were described for the 4 levels of injury: all injuries, medical care injuries, lost work-time injuries, and injuries filed with workers' compensation. Substantive differences between strata were determined by lack of overlap of the 95% CIs for the proportions; this is a conservative approach, which makes certain that the probability of rejecting a true null hypothesis is less than .05. Responses to open-ended questions regarding the injury description, limitations and modifications at work, and reasons for not reporting the event to workers' compensation were reviewed and included to provide context for the quantitative results.

RESULTS

Survey participants (n = 1984) were similar to nonparticipants (n = 8020) by sex, number of years certified, and geographic region but were more likely to be 50 or more years of age and to work in college/university (25.6% versus 18.9%) or secondary school (31.6% versus 26.7%) settings and less likely to work in clinic/hospital (19.6% versus 24.7%) or other (17.5% versus 23.3%; Table 1) settings. The AT respondents were distributed over 4 geographic (census) regions: 20.2% Northeast, 28.4% Midwest, 33.6% South, and 17.6% West.

Demographics and Work History

The 1826 survey participants who had some patient contact and worked as ATs in any setting were eligible and included in the following analyses. Half of the participants were female; the majority were 30 to 49 years old (62.2%) and had more than 10 years' experience as a certified AT (58.1%; Table 2). Employment settings were secondary school (35.8%), college/university (28.5%), clinic/hospital (19.3%), other (13.8%), and independent contractors (2.6%; Table 2). College/university and secondary school ATs reported working more hours on average during the spring and fall months (Figure 2). Most ATs worked on average greater than 40 hours per week (64.2%). A plurality had worked 0 to 5 years with their current employer (42.1%), mostly with 12-month contracts (65.9%).

Injured ATs were similar to noninjured ATs by age, years of experience as a certified AT, years worked with current employer, and length of work contract (Table 2). Compared with uninjured ATs, injured ATs were more likely to be

Table 2. Demographic Characteristics of Surveyed Athletic Trainers Stratified by Injury Status

Characteristic	Group, n (%)			χ^2 (Test Statistic, *P* Value)[a]
	Injured (n = 247)	Uninjured (n = 1579)	Total (n = 1826)	
Sex				
Male	99 (40.1)	808 (51.2)	907 (49.7)	10.0
Female	145 (58.7)	759 (48.1)	904 (49.5)	*P* = .002
Missing	3 (1.2)	12 (0.8)	15 (0.8)	
Age, y				
22–29	62 (25.1)	403 (25.5)	465 (25.5)	
30–49	149 (60.3)	987 (62.5)	1136 (62.2)	1.4
≥50	36 (14.6)	189 (12.0)	225 (12.3)	*P* = .51
Years worked as certified athletic trainer				
0–5	34 (13.8)	245 (15.5)	279 (15.3)	
>5–10	68 (27.5)	419 (26.5)	487 (26.7)	0.53
>10	145 (58.7)	915 (58.0)	1060 (58.1)	*P* = .77
Employment setting				
Clinic/hospital	30 (12.2)	323 (20.5)	353 (19.3)	
College/university	68 (27.5)	452 (28.6)	520 (28.5)	
Secondary school	109 (44.1)	545 (34.5)	654 (35.8)	
Other	35 (14.2)	216 (13.7)	251 (13.8)	13.7
Independent contractor	5 (2.0)	43 (2.7)	48 (2.6)	*P* = .01
Years with current employer				
0–5	114 (46.2)	655 (41.5)	769 (42.1)	
>5–10	69 (27.9)	445 (28.2)	514 (28.2)	2.1
>10	63 (25.5)	461 (29.2)	524 (28.7)	*P* = .35
Missing	1 (0.4)	18 (1.1)	19 (1.0)	
Length of work contract, mo				
12	157 (63.6)	1046 (66.2)	1203 (65.9)	
9–11	83 (33.6)	448 (28.4)	531 (29.1)	2.1
<9	7 (2.8)	46 (2.9)	53 (2.9)	*P* = .35
Missing	—	39 (2.5)	39 (2.1)	
Average h/wk				
<20	9 (3.6)	104 (6.6)	113 (6.2)	
20–29	10 (4.1)	82 (5.2)	92 (5.0)	
30–39	20 (8.1)	125 (7.9)	145 (7.9)	
40	36 (14.6)	229 (14.5)	265 (14.5)	
41–49	69 (27.9)	434 (27.5)	503 (27.6)	
50–59	63 (25.5)	380 (24.1)	443 (24.3)	6.8
≥60	40 (16.2)	187 (11.8)	227 (12.4)	*P* = .34
Missing	—	38 (2.4)	38 (2.1)	
Variable work hours (average h/wk vary by ≥10 h/wk)?				
Yes	192 (77.7)	1068 (67.6)	1260 (69.0)	7.0
No	55 (22.3)	469 (29.7)	525 (28.7)	*P* = .01
Missing	0	42 (2.7)	42 (2.3)	

[a] Chi-square statistic and *P* value assess statistically significant differences by injury status.

female, work in secondary school settings, work 60 or more hours per week, and work variable hours (hours varying by 10 or more hours per week) and were less likely to work in clinic/hospital settings and work fewer than 20 hours per week.

Work-Related Injury Incidence and Prevalence

A total of 247 ATs reported 419 work-related injuries during the previous 12 months, for an incidence rate of 21.6 work-related injuries per 200 000 work hours (100 FTE ATs; 95% CI = 19.6, 23.7). The injury incidence rates varied by work setting and were highest for secondary school settings and lowest for clinic/hospital settings (Table 3). Most participants (63.2%) reported only 1 injury event; others reported 2 (27.1%) or 3 or more events (9.7%).

The prevalence of any work-related injury during the previous 12 months was 13.5% (95% CI = 12.0%, 15.1%). The prevalence of injury was higher among females (16.0%), ATs working 9- to 11-month contracts (15.6%), and ATs working >60 hours per week (17.6%). Those ATs in clinic/hospital settings had a lower frequency of injury (8.5%). The prevalence of injury tended to increase as the average hours worked per week increased (*P* for trend = .02). Those with variable work hours (hours varying by 10 or more hours per week [15.2%]) also had a higher prevalence than those who said their hours did not vary (10.5%). The prevalence of injury with 1 or more days of lost work (2.9% [95% CI = 2.1%, 3.7%]) and injury claim filed with workers' compensation (3.1% [95% CI = 2.3%, 3.9%]) was low. The prevalence of injuries with lost work

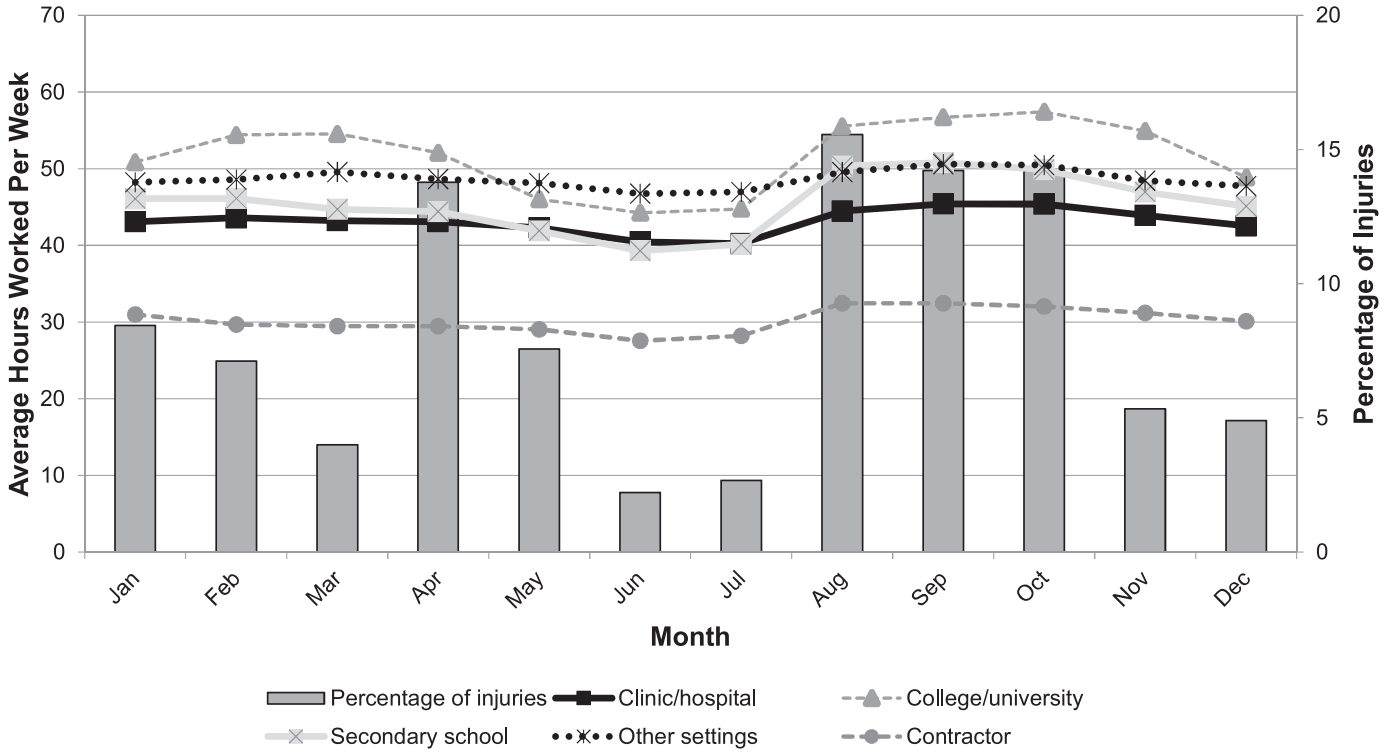

Figure 2. Average work hours per week stratified by practice setting (n = 1826) and percentage of injuries by month (n = 247). Average hours adjusted for length of work contract and monthly variability.

time ($P = .21$) and workers' compensation ($P = .52$) did not vary significantly by practice setting.

Work-Related Injury Characteristics

Participants provided detailed information on the injury they considered the most severe. The frequency of injury varied by month ($P < .0001$; Figure 2). Overall, injury events were more frequent during the months of August (15.6%) and September, October, and April (14% each) and least frequent during June (2%), July (3%), and March (4%; Figure 2). Prevalence of injury was highest among those in secondary school settings during the months of August, September, and October (data not shown). Injury events most commonly occurred in outdoor (40.1%) or indoor (20.2%) event locations, in the clinic or treatment center (19.4%), in other locations (15.4%), or in missing or unknown locations (4.9%). Almost half of the injuries occurred between 2:00 and 6:00 PM (44.9%), whereas the remainder occurred between 6:00 and 8:00 AM (6.9%), 9:00 AM and 1:00 PM (18.6%), or 7:00 PM and later (16.6%).

The most frequently injured body parts were the trunk (30.8%), lower extremity (25.9%), and upper extremity (18.2%; Table 4). Specifically, the low back (25.9%), hand/fingers (8.9%), and knee (8.5%) were affected most often. Traumatic injuries (76.9%) were the most common type of injury and included injuries to the muscles, tendons, ligaments, and joints (43.7%), followed by injuries to the bones (11.7%), bruises (10.1%), and open wounds (7.7%). The mechanisms of work-related injury were attributed to body motions, overexertion, and repetitive motion (52.2%); contact with objects, equipment, or persons (23.5%); and slips, trips, or falls (14.6%). The most frequent sources of injury (per OIICS codes) were persons, plants, animals, and minerals (36.8%); containers (20.2%); and tools, instruments, or equipment (10.5%).

For the 156 body-motion and overexertion injuries, 23.1% were due to handling water coolers and ice chests; 23.7% were due to body motions (or reactions) of the ATs themselves; 12.2% were chronic or overuse conditions; and 7.0% were from handling patients. For the 58 injuries involving contact with objects or equipment, 22.4% were

Table 3. Incidence of Work-Related Injury per 200 000 Work Hours (Equivalent of 100 Athletic Trainers Working Full-Time) in the Past 12 Months Stratified by Current Work Setting (n = 1826)

Work Setting	Hours Worked	No. of Injuries	Injury Incidence Rate (95% CI)	Rate Ratio (95% CI)
All settings	3 875 700	419	21.6 (19.6, 23.7)	—
Clinic/hospital	723 340	43	11.9 (8.3, 15.4)	1.00
College/university	1 225 440	122	19.9 (16.4, 23.4)	1.67 (1.18, 2.37)
Secondary school	1 305 750	190	29.1 (25.0, 33.2)	2.45 (1.76, 3.41)
Other settings	559 000	58	20.8 (15.4, 26.1)	1.75 (1.18, 2.59)
Independent contractor	62 170	6	19.3 (3.9, 34.7)	1.62 (0.69, 3.81)

Abbreviation: CI, confidence interval.

Table 4. Distribution of Characteristics of Work-Related Injuries Experienced by Athletic Trainers in the Past 12 Months

Characteristic	Injuries (n = 247), % (95% Confidence Interval)
Injured body part	
Head	8.5 (4.8, 12.2)
Neck and throat	4.0 (1.4, 6.7)
Shoulder	5.7 (2.6, 8.8)
Upper extremities	18.2 (13.2, 23.2)
Trunk	30.8 (24.8, 36.7)
Lower extremities	25.9 (20.2, 31.6)
Multiple and other body parts	2.4 (0.5, 4.3)
Missing	4.5 (1.7, 7.2)
Nature or type of injury	
Traumatic injuries to bones, nerves, and spinal cord	11.7 (7.5, 16.0)
Traumatic injuries to muscles, tendons, ligaments, joints, etc	43.7 (37.3, 50.1)
Open wounds	7.7 (4.2, 11.2)
Surface wounds and bruises	10.1 (6.2, 14.1)
Intracranial injuries	3.2 (0.8, 5.6)
Nervous system and sense organ diseases	4.5 (1.7, 7.2)
Musculoskeletal system and connective tissue diseases and disorders	4.5 (1.7, 7.2)
Digestive, infectious, and parasitic disease	2.8 (0.6, 5.1)
Other	2.0 (0.1, 4.0)
Missing or unclassifiable	9.7 (5.8, 13.6)
Mechanism of injury	
Contact with objects and equipment	23.5 (18.0, 29.0)
Falls, slips, and trips	3.6 (1.1, 6.2)
Bodily reaction and exertion	63.2 (56.9, 69.4)
Exposure to harmful substances or environments	3.2 (0.8, 5.6)
Transportation accidents	2.4 (0.3, 4.6)
Other events or exposures	1.6 (0.4, 4.1)
Missing or unclassifiable	2.4 (0.3, 4.6)
Source of the injury[a]	
Containers	20.2 (15.0, 25.5)
Furniture and fixtures	4.0 (1.4, 6.7)
Machinery	1.2 (0.3, 3.5)
Persons, plants, animals, and minerals	36.8 (30.6, 43.1)
Structures and surfaces	6.9 (3.5, 10.2)
Tools, instruments, and equipment	10.5 (6.5, 14.6)
Vehicles	3.2 (0.8, 5.6)
Other sources	4.5 (1.9, 7.0)
Unclassifiable	12.6 (8.2, 16.9)
Work task[a]	
Patient care	11.7 (7.5, 16.0)
Event (pre, post, coverage)	31.2 (25.2, 37.2)
Setup and cleaning	21.5 (16.1, 26.8)
Strength, conditioning, and prevention	2.8 (0.6, 5.1)
Traveling	2.8 (0.6, 5.1)
Other	4.5 (1.7, 7.2)
Unclear	18.6 (13.6, 23.7)
Missing	6.9 (3.5, 10.2)
Work activity[a]	
Patient care	18.6 (13.6, 23.7)
Handling/moving patients	6.1 (2.9, 9.3)
Handling/moving equipment	25.5 (19.9, 31.1)
Driving motorized carts, vehicles	2.0 (0.1, 4.0)
Teaching and demonstrating	4.0 (1.4, 6.7)
Setup, cleaning, and tearing down	4.9 (2.0, 7.7)
Idle	5.3 (2.3, 8.3)
Other	8.5 (5.0, 121.0)
Unclear	18.2 (13.2, 23.2)
Missing	6.9 (3.5, 10.2)

[a] Values for source of injury, work task, and work activity coded from text provided in open-ended questions (“What happened?”).

Table 5. Injured Athletic Trainers' Responses to Work-Related Injuries, With Details and Comments

Athletic Trainers' Responses to Injury	n (%)	Details and Injured Athletic Trainer Comments
Sought medical care	137 (55.5)	"Moving water coolers/aggravated old low back injury (herniated disc)/strained hip doing same/self-treatment, hobbled around for a few days to week or so."
Modified their work	111 (44.9)	Lifting/moving equipment: "Could not lift anything over 20 lb"; "Could not carry any coolers for 2 weeks"; "Had to ask for help."
		Lifting/moving patients: "Could not assist in lifting any patients."
		Rehabilitation: "Modify how I performed stretching/mobilizations/exercises with patients."
		Other: "Had to modify athlete position and my own position while taping."
Did not file a workers' compensation claim	191 (77.3)	"Didn't want to make a fuss."
		"I wanted to select the physicians, not the WC [worker's compensation] coordinator."
		"It's part of the job. I'm not disabled by the injury, just painful. I can modify."
		"Paperwork sucks. I did not want to use industrial doctors to treat it."
		"High cost of medical care."
		"Though I did not, we should always report such events."
		"Felt it was injury that was work related over time, not specific incident."
		"Felt stupid, my own fault."

from contact with athletic equipment (eg, balls) and 17.2% were from contact with other persons (players, patients).

At the time of the injury, the tasks ATs were most often engaged in were event preparation and coverage, setup and cleanup, and direct patient care-related tasks (Table 4). The work activities most commonly associated with injury were handling/moving equipment (25.5%) followed by patient care activities (24.8%) including immediate care, handling/moving patients, and rehabilitation.

Medical Care, Time Off Work, Workers' Compensation, and Work Limitations

Half of the injured ATs sought medical care (n = 137; Table 5). Care was provided by the ATs themselves (31.2%), private health providers (30.8%), coworkers (23.9%), employer health care providers (9.7%), or a hospital/emergency room (4.0%).

Twenty-two percent missed work (n = 53) due to the injury: of those, 45.3% missed 1 to 3 days, 20.8% missed 4 to 7 days, and 34.0% missed 8 or more days. Injured ATs took time off through sick leave (60.4%), workers' compensation (37.7%), vacation (17.0%), or a combination of these.

Most of the injured ATs did not file a workers' compensation claim (77.3%, n = 191; Table 5) because they were able to manage their work-related injury themselves (71.2%), the injury did not meet filing requirements (20.4%), they were concerned about the effect filing would have on their job (12.6%), they were concerned about confidentiality (4.7%), and other reasons (15.7%, detailed in Table 5).

Half of the injured ATs were limited at work (50.6%, n = 125): of these, 88.8% (111/125) modified or changed their athletic training work as a result of the injury. Modifications included changing work techniques (71.2%) or duties (28.0%), decreasing patient contact hours (17.6%), and changing the type of patient usually treated (8.8%). The ATs most often described restrictions in lifting, carrying, and moving equipment (eg, "could not lift anything over 20 lb," "could not carry any coolers for 2 weeks," "had to ask for help") and patients (eg, "could not assist in lifting any patients"), assisting with rehabilitation (eg, "modified how I performed stretching/mobilizations/exercises with patients"), or taping (eg, "had to modify athlete position and my own position while taping").

Injury characteristics varied according to whether the AT sought medical care, whether a day of work was missed, whether a claim was filed for workers' compensation (determined by lack of overlap of the proportion CIs between 2 strata; see Appendix Table). Fewer trunk injuries (14.3% [95% CI = 4.2%, 24.3%]) were filed with workers' compensation compared with all injuries (30.8% [95% CI = 24.8%, 36.7%]). A greater proportion of lower extremity injuries were filed with workers' compensation (41.1% [95% CI = 27.3%, 54.8%]) compared with all injuries (25.9% [95% CI = 20.2%, 31.6%]). Traumatic injuries to the bones, nerves, and spinal cord were more likely to receive medical care (19.7% [95% CI = 12.7%, 26.7%]) compared with all injuries (11.7% [95% CI = 7.5%, 16.0%]). Traumatic injuries to muscles, tendons, ligaments, and joints were less likely to result in the AT missing a day of work (24.5% [95% CI = 12.0%, 37.1%]) or filing with workers' compensation (28.6% [95% CI = 15.8%, 41.3%]) compared with all injuries (43.7% [95% CI = 37.3%, 50.1%]). Injuries to the nervous system were more likely to result in time off (15.1% [95% CI = 4.5%, 25.7%]) compared with all injuries (4.5% [95% CI = 1.7%, 7.2%]). Fewer container-related source injuries were filed with workers' compensation (8.9% [95% CI = 0.6%, 17.3%]) compared with all injuries (20.2% [95% CI = 15.0%, 25.5%]). Small cell sizes hampered comparisons for some strata.

DISCUSSION

In this analysis, 13.5% of working certified ATs with patient contact experienced a work-related injury in the 12 months before the study. The frequency of injury among ATs varied by practice setting, location, time of day, and season. Compared with ATs in other practice settings, ATs in secondary schools reported higher injury prevalences corresponding to higher frequencies of injuries occurring in the fall and spring and in outdoor locations during event preparation, setup, and coverage. Among all ATs, traumatic musculoskeletal injuries due to overexertion and contact with objects or equipment were the most common types of

injury; low back, hand/finger, and knee injuries were the locations affected most often. More than half of the injuries required some medical care, but few ATs took time off work or filed a workers' compensation claim. However, a majority (88.8%) of injured ATs modified or altered their work.

The ATs' prevalence of injury in the previous year (13.5%) was similar to that in population-based surveys of the general working population and of physical and occupational therapists (13.1%[22] and 13.5%,[13] respectively). However, the ATs in our study had a lower prevalence compared with ATs practicing in Taiwan (28.7%)[20] and a US study of physical therapists and therapy assistants (33%).[14] These differences are likely due to the different injury definitions and the time periods for reporting used in these 2 studies (eg, injuries over the course of the AT's entire career versus over a 2-year period for physical therapists and therapy assistants). Taking the severity of injury (measured by lost work time) into account, the prevalence of an injury with lost work time in our study (2.9%) was lower than that of surveyed EMTs (9.5%).[30] However, we do not know if this is because ATs experienced fewer severe injuries compared with EMTs, successfully modified their work tasks, or had less ability to take time off work.

The incidence of injuries filed with workers' compensation in this study (3.1 per 100 FTE ATs) was consistent with a previous study[29] of workers' compensation claims filed by ATs (2.3 per 100 FTE ATs). In addition, the characteristics of the injuries filed with workers' compensation were surprisingly similar between the studies (overexertion/body motion injuries from equipment and patient handling; contact with objects and equipment), providing some evidence for the types of events that are reported for workers' compensation.

Groups with a higher frequency of injury in this study were females, ATs practicing in school settings, and ATs working >60 hours per week or 9- to 11-month contracts. Working more than 40 hours per week was associated with an increased injury risk in Taiwan ATs,[20] and injury frequency varied by practice setting in a previous study[14] of physical therapists and therapy assistants. Females and ATs practicing in school settings had higher workers' compensation claim injury rates compared with males and ATs in other settings, respectively.[29] These characteristics may be related to increased exposure or the hazards experienced by females or those working in school settings. Earlier authors[31] found differences in occupational exposures between men and women within the same occupation. These differences may also reflect the ability or tendency (or both) to report injuries by sex and work setting.

In this study, the average number of hours worked per week and injury frequency varied over the course of the year among all settings but particularly for ATs in school settings. The ATs in school settings were more likely to have a seasonal component to their work corresponding to the sports that they covered. Those ATs who had a seasonal component to their job were more likely to engage in healthy habits, such as physical activity, when they were out of season compared with ATs who did not have a seasonal component to their work (ie, had consistent job demands across the year).[32]

Previous researchers[6] found that ATs working a greater number of hours beyond expected were at increased risk of burnout. In our study, injuries were more frequent during months with greater work hours and during the afternoon, suggesting that fatigue and burnout may be factors in athletic training work-related injuries. In secondary school and collegiate settings, ATs are preparing athletes for practice, hauling equipment and water out to fields, and covering practices and games during the afternoon hours. Both the number of work hours and injury frequency were higher in the fall and spring, which corresponds to busier times for sport coverage (eg, football and baseball and softball seasons). The ATs working >60 hours per week and those on 9- to 11-month contracts had increased frequencies of injury, providing evidence for the potential negative effects of these types of work schedules. Compressing more work into a shorter period of time can result in mental and physical fatigue, which in turn may lead to being less able to recognize potentially injurious situations. These types of schedules may also promote overuse injuries. Other occupations with seasonal and daily variations include commercial fishing and agriculture.[33,34] Previous work[35] with small-scale southeastern commercial fishermen demonstrated variability in injury rates by type of fishing work performed and by month of the year. An understanding of and accounting for the organization and variations of the work demands and tasks by season and within the work day are critical to developing appropriate injury interventions for ATs across a variety of employment settings and responsibilities.

The low back, hand/finger, and knee were the most often injured parts, consistent with previous studies of ATs[20] and physical and occupational therapists.[13] Overexertion injuries due to lifting and sudden movements (or reactions) are common among other health care professionals and were also frequent among these ATs. Unique to the athletic training profession are the types of equipment lifted, with 40-lb (18-kg) water coolers and ice chests being the most common sources of overexertion lifting injuries; this finding is consistent with previous studies of ATs.[29] Injuries related to patient lifting occurred less often in this study, which was in contrast to research on other health care workers.[14,17] Compared with other professionals, ATs likely have a lower frequency of lifting patients and they lift patients under different circumstances (ie, removing a patient from the field versus the bed).[29] Patient-related activities such as immediate care and rehabilitation were common sources of injury for ATs, and this finding was consistent with a previous investigation of ATs.[20] The ATs in this study also reported injuries related to athletic event coverage, such as being hit by a ball or struck by a player on the sidelines. Transportation-related events due to operating or riding in motorized carts or vehicles were rare but tended to be more severe, requiring time off work.

The ATs' responses to injury in this study (seeking medical care, modifying work, missing work, or filing a claim) were generally consistent with those noted in research[13,14,20] on ATs and other health care providers. As in studies of physical and occupational therapists,[13,14] most ATs preferred to self-treat or received treatment from a colleague for their injury. They reported working despite their injury and were more likely to alter aspects of their techniques or body positions than to reduce patient contact

hours or types of patient. Despite similar strategies, many physical therapists reported having to change work settings or even leave the profession as a result of their musculoskeletal disorders.[12,36] Capel[8] observed that ATs left the profession due to long hours, low salary, poor work conditions, and conflict. Only 3 injured ATs in this study left their jobs due to their injuries; however, because of this low number, we cannot say with accuracy how many ATs left the profession entirely due to an injury.

A majority of ATs did not file workers' compensation claims for their work-related injuries (77%). Underreporting of work-related injuries[11,22] has been noted in other occupations. Researchers[29] looking at ATs' injuries filed for workers' compensation noted an incidence of 2.3 claims per 100 FTEs (95% CI = 2.1, 2.4), which is comparable with our result of 3.1 claims per 100 FTEs (95% CI = 2.3, 3.9). Given that injuries filed for workers' compensation represent the "tip of the iceberg," it is important to understand how many injuries are reported versus how many occur and are not reported. Although some injuries were not reported because they were deemed not to meet the criteria for filing or because ATs managed the injuries themselves, it is clear that lack of reporting was also due to other reasons, including the inconvenience of filing, fear of retribution, and wanting to choose their own medical provider. These reasons were consistent with those cited by physical therapists who experienced difficulties filing claims and feared they would be viewed as incompetent in their profession or not employable.[12,36]

Strengths and Limitations

Our analysis had several strengths. First, it addressed a question that had been the subject of little previous research.[20,37] Second, it described the characteristics of and ATs' management strategies regarding these injuries, which will inform future injury-prevention efforts for this unique and growing occupational group. Third, it consisted of a relatively large sample (n = 1826) representing a variety of work settings and geographic regions. Fourth, questions in the survey were pilot tested to ensure relevance for ATs. Finally, 3 study team members were ATs with experience working in a variety of settings.

Our analysis had several limitations as well. First, the survey response rate in this study was low (26% responded to the invitation and only 19.8% completed the survey) but was similar to the response rates of other recent surveys involving ATs (between 15% and 36%).[6,38,39] When recruiting participants, we used methods known to achieve better response rates, including a prenotice, personalized salutations, multimode surveys, and multiple reminders,[24–28] but e-mailed invitations and survey links may not have reached the intended participants due to e-mail filtering, accounts not being checked regularly, or potential participants not viewing the e-mail. Despite the low response rate, participants were similar to nonparticipants by sex, age, years of athletic training certification, and geographic region. Second, asking ATs to self-report injuries from the previous 12 months may introduce recall and social desirability bias. Given that we asked ATs to tell us about the injury they considered the most serious, it is possible they provided details on an injury that happened more than 12 months earlier. This would have resulted in an overestimate of the 12-month prevalence. However, our results were consistent with or lower than those in previous studies. Third, substantive variability of injury characteristics by injury severity was assessed via nonoverlap of the stratum-specific 95% CIs for the proportions. This is a conservative approach.

CONCLUSIONS

The athletic training profession in the United States is growing. In the last several years, media and public attention to the deaths of young athletes has spurred the introduction of youth sport safety legislation in all 50 states and calls for ATs to be employed in all high school settings.[40] The US Bureau of Labor Statistics predicted a 21% employment increase in the next 10 years—particularly in health care and secondary school settings.[2] With obesity on the rise and the promotion of physically active lifestyles in the United States, ATs' expertise in the care and prevention of activity-related injuries will be needed. Understanding the frequency and characteristics of athletic training work-related injuries—and ATs' responses to injuries—is important for ensuring the health, safety, and retention of ATs in the workforce.

As in other health care professions, the ATs in this study experienced exertional injuries due to handling and moving equipment and patients. Injuries more distinctive to ATs' work include exertional injuries due to handling 40-lb (18-kg) coolers of ice and water as well as injuries due to contact with objects and equipment: for example, being unintentionally struck by athletic equipment or an athlete. Intervention strategies are needed to target these activities, situations, and environments. Potential injury-prevention strategies include education in and awareness of safer manual materials handling (eg, using carts to transport coolers) and strategies for modifying work to reduce these exposures (eg, dividing the weight between 20-lb [9-kg] coolers), especially for the wide variety of current practice settings. Efficient and cost-effective strategies will be key given the limited resources for those in secondary school settings. More than 50% of work-related injuries required medical care or limitations at work; however, only 25% of ATs took time off work. Understanding how ATs care for and manage their work-related injuries is important for future monitoring and prevention efforts, especially given that few take time off work after these injuries. Future research directed at evaluating current injury-prevention methods used by ATs would increase our understanding of whether these methods reduce the biomechanical loads and subsequent injury risk. Investigations of both the implementation and outcomes of interventions known to reduce injuries in other health care settings and whether these apply to the athletic training setting are also recommended.

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Conclusions drawn from or recommendations based on the data provided by the BOC are those of the author(s) based on analyses

and evaluations of the author(s) and do not represent the views of the officers, staff, or certificants of the BOC.

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DISCLAIMER

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention or the National Institute for Occupational Safety and Health.

Appendix Table. Distribution of Characteristics of Work-Related Injuries Experienced by Athletic Trainers in Past 12 Months, Stratified by Severity[a] Continued on Next Page

Characteristic	% (Confidence Limits)			
	Any Injury (n = 247)	Injury Required Medical Care (n = 137)	Missed at Least 1 Day Due to Injury (n = 53)	Filed Workers' Compensation Claim (n = 56)
Injured body part				
Head	8.5 (4.8, 12.2)	8.0 (3.1, 12.9)	9.4 (0.6, 18.2)	12.5 (2.9, 22.1)
Neck and throat	4.0 (1.4, 6.7)	5.8 (1.5, 10.1)	7.5 (2.1, 18.2)	3.6 (0.4, 12.3)
Shoulder	5.7 (2.6, 8.8)	8.0 (3.1, 12.9)	5.7 (1.2, 15.7)	3.6 (0.4, 12.3)
Upper extremities	18.2 (13.2, 23.2)	18.2 (11.4, 25.1)	18.9 (7.4, 30.3)	19.6 (8.3, 30.9)
Trunk	30.8 (24.8, 36.7)	31.4 (23.3, 39.5)	32.1 (18.6, 45.6)	14.3 (4.2, 24.3)
Lower extremities	25.9 (20.2, 31.6)	24.8 (17.2, 32.4)	22.6 (10.4, 34.9)	41.1 (27.3, 54.8)
Multiple body parts	1.2 (0.3, 3.5)	0.7 (0.01, 4.0)	1.9 (0.01, 10.1)	1.8 (0.01, 9.6)
Other body parts	1.2 (0.3, 3.5)	1.5 (0.2, 5.2)	1.9 (0.01, 10.1)	1.8 (0.01, 9.6)
Missing	4.5 (1.7, 7.2)	1.5 (0.2, 5.2)	0 (0, 0)	1.8 (0.01, 9.6)
Nature or type of injury				
Traumatic injuries to bones, nerves, and spinal cord	11.7 (7.5, 16.0)	19.7 (12.7, 26.7)	18.9 (7.4, 30.3)	14.3 (4.2, 24.3)
Traumatic injuries to muscles, tendons, ligaments, joints, etc	43.7 (37.3, 50.1)	40.1 (31.6, 48.7)	24.5 (12.0, 37.1)	28.6 (15.8, 41.3)
Open wounds	7.7 (4.2, 11.2)	7.3 (2.6, 12.0)	5.7 (1.2, 15.7)	12.5 (2.9, 22.1)
Surface wounds and bruises	10.1 (6.2, 14.1)	2.2 (0.5, 6.3)	1.9 (0.01, 10.1)	8.9 (0.6, 17.3)
Intracranial injuries	3.2 (0.8, 5.6)	5.1 (1.1, 9.2)	9.4 (0.6, 18.2)	5.4 (1.1, 14.9)
Nervous system and sense organ diseases	4.5 (1.7, 7.2)	7.3 (2.6, 12.0)	15.1 (4.5, 25.7)	12.5 (2.9, 22.1)
Musculoskeletal system and connective tissue diseases and disorders	4.5 (1.7, 7.2)	5.8 (1.5, 10.1)	3.8 (0.5, 13.0)	5.4 (1.1, 14.9)
Digestive, infectious, and parasitic disease	2.8 (0.6, 5.1)	3.6 (0.1, 7.2)	9.4 (0.6, 18.2)	1.8 (0.01, 9.6)
Other	2.0 (0.1, 4.0)	1.5 (0.2, 5.2)	1.9 (0.01, 10.1)	1.8 (0.01, 9.6)
Missing or unclassifiable	9.7 (5.8, 13.6)	7.3 (2.6, 12)	9.4 (0.6, 18.2)	8.9 (0.6, 17.3)
Mechanism of injury				
Contact with objects and equipment	23.5 (18.0, 29.0)	19.7 (12.7, 26.7)	17.0 (5.9, 28.0)	32.1 (19.0, 45.3)
Falls, slips, and trips	3.6, (1.1, 6.2)	4.4 (0.6, 8.2)	5.7 (1.2, 15.7)	3.6 (0.4, 12.3)
Bodily reaction and exertion	63.2 (56.9, 69.4)	68.6 (60.5, 76.7)	66.0 (52.3, 79.7)	57.1 (43.3, 71.0)
Exposure to harmful substances or environments	3.2 (0.8, 5.6)	1.5 (0.2, 5.2)	1.9 (0.01, 10.1)	1.8 (0.01, 9.6)
Transportation accidents	2.4 (0.3, 4.6)	2.9 (0.8, 7.3)	7.5 (2.1, 18.2)	3.6 (0.4, 12.3)
Other events or exposures	1.6 (0.4, 4.1)	2.9 (0.8, 7.3)	1.9 (0.01, 10.1)	1.8 (0.01, 9.6)
Missing or unclassifiable	2.4 (0.3, 4.6)	0 (0, 0)	0 (0, 0)	0 (0, 0)
Source of the injury[b]				
Containers	20.2 (15.0, 25.5)	15.3 (8.9, 21.7)	17.0 (5.9, 28.0)	8.9 (0.6, 17.3)
Furniture and fixtures	4.0 (1.4, 6.7)	4.4 (0.6, 8.2)	3.8 (0.5, 13.0)	3.6 (0.4, 12.3)
Machinery	1.2 (0.3, 3.5)	1.5 (0.2, 5.2)	1.9 (0.01, 10.1)	0 (0, 0)
Parts and materials	0.4 (0.01, 2.2)	0.7 (0.01, 4.0)	0 (0, 0)	1.8 (0.01, 9.6)
Persons, plants, animals, and minerals	36.8 (30.6, 43.1)	43.8 (35.1, 52.5)	37.7 (23.7, 51.7)	39.3 (25.6, 53)
Structures and surfaces	6.9 (3.5, 10.2)	7.3 (2.6, 12)	7.5 (2.1, 18.2)	8.9 (0.6, 17.3)
Tools, instruments, and equipment	10.5 (6.5, 14.6)	8.8 (3.7, 13.9)	5.7 (1.2, 15.7)	16.1 (5.6, 26.6)
Vehicles	3.2 (0.8, 5.6)	3.6 (0.1, 7.2)	5.7 (1.2, 15.7)	5.4 (1.1, 14.9)
Other sources	4.0 (1.4, 6.7)	4.4 (0.6, 8.2)	3.8 (0.5, 13.0)	10.7 (1.7, 19.7)
Unclassifiable	12.6 (8.2, 16.9)	10.2 (4.8, 15.7)	17.0 (5.9, 28)	5.4 (1.1, 14.9)
Work task[b]				
Patient care	11.7 (7.5, 16.0)	15.3 (8.9, 21.7)	11.3 (1.8, 20.8)	19.6 (8.3, 30.9)
Event (pre, post, coverage)	31.2 (25.2, 37.2)	29.2 (21.2, 37.2)	26.4 (13.6, 39.2)	35.7 (22.3, 49.2)
Setup and cleaning	21.5 (16.1, 26.8)	19.7 (12.7, 26.7)	20.8 (8.9, 32.6)	14.3 (4.2, 24.3)
Strength, condition, and prevention	2.8 (0.6, 5.1)	3.6 (0.1, 7.2)	0 (0, 0)	3.6 (0.4, 12.3)
Traveling	2.8 (0.6, 5.1)	3.6 (0.1, 7.2)	7.5 (2.1, 18.2)	5.4 (1.1, 14.9)
Other	4.5 (1.7, 7.2)	5.8 (1.5, 10.1)	5.7 (1.2, 15.7)	7.1 (2.0, 17.3)
Unclear	18.6 (13.6, 23.7)	20.4 (13.3, 27.6)	24.5 (12.0, 37.1)	12.5 (2.9, 22.1)
Missing	6.9 (3.5, 10.2)	2.2 (0.5, 6.3)	3.8 (−2.3, 9.8)	1.8 (0.01, 9.6)

Appendix Table. Continued From Previous Page

	% (Confidence Limits)			
	Any Injury (n = 247)	Injury Required Medical Care (n = 137)	Missed at Least 1 Day Due to Injury (n = 53)	Filed Workers' Compensation Claim (n = 56)
Work activity[b]				
Patient care	18.6 (13.6, 23.7)	20.4 (13.3, 27.6)	15.1 (4.5, 25.7)	23.2 (11.3, 35.2)
Handling/moving patients	6.1 (2.9, 9.3)	6.6 (2.1, 11.1)	3.8 (−2.3, 9.8)	5.4 (1.1, 14.9)
Handling/moving equipment	25.5 (19.9, 31.1)	24.1 (16.6, 31.6)	24.5 (12.0, 37.1)	17.9 (6.9, 28.8)
Driving motorized carts, vehicles	2.0 (0.1, 4.0)	2.9 (−0.3, 6.1)	5.7 (−1.5, 12.8)	3.6 (0.4, 12.3)
Administrative	0.4 (0.01, 2.2)	0 (0, 0)	0 (0, 0)	0 (0, 0)
Teaching and demonstrating	4.0 (1.4, 6.7)	5.8 (1.5, 10.1)	5.7 (−1.5, 12.8)	3.6 (0.4, 12.3)
Setup, cleaning, and tearing down	4.9 (2.0, 7.7)	4.4 (0.6, 8.2)	1.9 (−2.7, 6.5)	1.8 (0.01, 9.6)
Idle	5.3 (2.3, 8.3)	5.1 (1.1, 9.2)	9.4 (0.6, 18.2)	14.3 (4.2, 24.3)
Other	8.1 (4.5, 11.7)	8.8 (3.7, 13.9)	9.4 (0.6, 18.2)	16.1 (5.6, 26.6)
Unclear	18.2 (13.2, 23.2)	19.7 (12.7, 26.7)	20.8 (8.9, 32.6)	12.5 (2.9, 22.1)
Missing	6.9 (3.5, 10.2)	2.2 (0.5, 6.3)	3.8 (−2.3, 9.8)	1.8 (0.01, 9.6)

[a] Column strata overlap and 1 event could have required both medical care and missing a day.
[b] Values for source of injury, work task, and work activity coded from text provided in open-ended questions ("What happened?").

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