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Athletic Trainer–Reported Prevalence of Mental Health, Substance Use, and Barriers to Health in Secondary Schools

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Context: Where a person lives can have a significant effect on health. Limited access to health care, food insecurity, lack of affordable housing, and violence increase a person's likelihood of poor health. Athletic trainers (ATs) can contribute to identifying and improving the determinants of health that affect student-athletes.

Objectives: (1) What were the current perceptions ATs had about the health behaviors (specifically mental health and substance use) of high school student-athletes? (2) What were the barriers that ATs experienced when providing health services to high school student-athletes? (3) How did the developed environment affect the health behaviors and barriers that ATs observed?

Design: Qualitative study.

Setting: Online survey.

Patients or Other Participants: Certified National Athletic Trainers' Association members employed in the secondary school setting.

Main Outcome Measure(s): Demographics of ATs were collected, and the ATs' perceptions of the health of student-athletes across developed environments, prevalence of mental health issues, tobacco and substance use, barriers to health care services, and housing and food insecurities among student-athletes were surveyed. Descriptive statistics for the outcome measures were reported.

Results: A total of 7600 electronic surveys were distributed to the ATs and 911 responded (females = 62%, average age = 36 years, average experience = 12.5 years). The school setting was identified by 82.5% as public and the environment as suburban by 43.7%, rural by 30.1%, and urban by 26.1%. Participants perceived a high average prevalence of mental health concerns (32%), e-cigarette use (31.7%), and marijuana use (26.9%) among student-athletes. Significant perceived barriers to health included limited access to transportation, poverty, and housing and food insecurities.

Conclusions: This study highlights the health disparities and barriers ATs observed when addressing the health care needs of student-athletes. Understanding the determinants of health in order to identify the causes of health disparities may better prepare ATs to manage the health needs of underserved student-athletes.

Key Words: population health, health disparities, health equity, social determinants of health

Key Points

- Screening for social determinants of health will assist athletic trainers in identifying health disparities that can lead to worse health outcomes.
- Using a population health framework allows for the identification of risk factors related to health determinants, shared decision making, and improved health outcomes.
- Training and education are needed to provide athletic trainers with the appropriate tools for identifying population health-level concerns that affect the health of the patients and populations they serve.

Population health programs aim to improve how the determinants of health affect large, homogeneous groups of individuals throughout a system. Population health relies on the coordination of a variety of interventions, including health promotion, prevention, and screening, to reduce or eliminate health disparities by promoting quality and equitable care.[1] Broad categories of determinants of health include policymaking, biology and genetics, social factors, health services, and individual behaviors. For athletic trainers (ATs), a focus on the social factors that determine health is important. This category is often referred to as *social determinants of health* and includes factors such as socioeconomic status, education, neighborhood and physical environment, employment, and social support and networks. These factors are often related to the conditions in which people are born, grow, live, work, and age.[2] Teaching ATs how to identify and address social determinants of health may help reduce health disparities that may be related to inequitable access to resources and structures that promote health.

Athletic trainers are allied health care professionals with expertise in injury and illness prevention, wellness promotion and education, emergent care, examination and clinical diagnosis, therapeutic intervention, and rehabilitation of injuries and medical conditions.[3] In our nation's secondary schools, ATs are well positioned to provide effective and efficient care pathways to student-athletes. Under the direction of or in collaboration with physicians, ATs supply care, serve as liaisons to the medical community,[4] and can work with student-athletes to find

appropriate solutions for addressing a wide variety of health-related concerns.[5] The National Federation of State High School Associations[6] reported that about 8 million adolescents participate in US high school athletics annually. The authors of a recent study[7] of AT placement found that approximately 66% of secondary schools employed an AT in either a full- or part-time capacity to provide health care to student-athletes. Understandably, ATs dedicate much of their time and many of their resources to providing direct medical care to student-athletes (ie, game and practice coverage and treatment and rehabilitation of injuries); however, increasing the time spent in areas that affect health outcomes (ie, social circumstances, individual behaviors, and physical environments) should be considered. Athletic trainers are often the first point of contact regarding health information for student-athletes, which may provide them with a unique perspective and insight into the individual- and community-level exposures that influence health behaviors and outcomes. This perspective, along with training in population health, can be used to inform prevention strategies, care pathways, and clinical decision making and reduce health disparities in the population they serve.

The US Department of Health and Human Services defined *health disparities* as "a type of health difference that is closely linked with social, economic, and/or environmental disadvantage.[8] Health disparities adversely affect groups of people who have systematically experienced greater obstacles to health based on their racial or ethnic group; religion; socioeconomic status; gender; age; mental health; cognitive, sensory, or physical disability; sexual orientation or gender identity; geographic location; or other characteristics historically linked to discrimination or exclusion."[8] Health disparities exist across diverse communities and developed environments (suburban, urban, rural), which can result in significantly different barriers to health for patients. Distinguishing among developed environments allows researchers to identify differences in health behaviors and outcomes across populations. Researchers[9–11] have found that the type of developed environment has important effects on individual health behaviors and outcomes. Factors such as the distance and time to health care services, access to transportation, and socioeconomic status greatly influence an individual's health outcomes. Poverty, limited educational opportunities, and economic distress are often related to negative outcomes.[12]

The purpose of our study was to identify the health behaviors and barriers to health that secondary school ATs were observing among the populations they served and how they responded to these population health concerns. We aimed to answer 3 primary questions:

(1) What were the current perceptions ATs had about the health behaviors (specifically mental health and substance use) of high school student-athletes?
(2) What were the barriers that ATs experienced when providing health services to high school student-athletes?
(3) How did the developed environment affect the health behaviors and barriers that ATs observed?

We predicted that the role of the developed environment would influence ATs' clinical practices and the types of health care services they could provide to reduce poor health outcomes among student-athletes.

METHODS

We developed a survey to collect data on ATs' perceptions of student-athletes' health behaviors and the barriers to health noted by these ATs. Preliminary focus groups with secondary school ATs were conducted to understand the current concerns ATs faced related to providing care to their patients who experienced health disparities and health barriers. The data collected from these focus groups were used to construct a more comprehensive national survey. This study was approved for Human Subjects Research by the Main Line Health System Institutional Review Board under exempt status.

The survey was sent to all Board of Certification–certified National Athletic Trainers' Association (NATA) members who reported their job setting to the NATA as *employed in a secondary school*. The NATA distributed the email with a link to the electronic survey (Qualtrics XM) during April 2019, with regular weekly reminders for 6 weeks. All survey responses were anonymous, and we followed the NATA guidelines for research and data exporting to protect the identity of and information provided by the ATs.

The survey consisted of multiple choice, sliding scale, and open-ended discussion questions to allow us to understand the full scope of how ATs were responding to a variety of health behaviors and barriers. Survey items were demographics of the AT (sex, race, age, employment type, school type) and the type of developed environment that best described the school setting. Additionally, the ATs estimated their time allocations based on social determinants of health factors such as medical care, social circumstances, individual behavior, and the physical environment.

Participants reported the percentage of their student-athletes they believed had used health care services (ie, a primary care visit within the past year or an emergency department visit for nonemergent health needs), engaged in poor health behaviors (tobacco and substance use), and experienced mental health concerns (eg, depression, anxiety, suicidality). Using sliding scales, the ATs rated how significantly they perceived certain factors were as barriers to health (transportation, distance to health care, insurance, housing and food insecurities, community safety, and poverty). Finally, the respondents were given the opportunity to share examples of situations they had experienced in their clinical practices relating to health disparities and social determinants of health.

Data Analysis

Demographics were summarized using the median (interquartile range) or frequency (percentage). Age and years of experience were summarized using the median, as these distributions were positively skewed. Survey responses were summarized as continuous variables using the mean $\pm$ SD and categorical variables as frequency (percentage). Responses were then analyzed by developed environment (suburban, urban, rural). Continuous responses were compared among the developed environments using a 1-way analysis of variance. If the analysis-of-variance overall F test value was significant, then we conducted post hoc

Table 1. Athletic Trainers' Demographics (N = 911)

Characteristic	No. (%)
Sex	
Female	564 (62.0)
Male	346 (38.0)
Missing	1
Race	
White	779 (85.8)
Black	38 (4.2)
Other (>1 race)	91 (10.0)
Missing	3
Age, y (median, IQR)	32 (27–44)
Minimum–maximum	21–74
Missing	9
Years of experience (median, IQR)	9 (4–20)
Minimum–maximum	0.5–45
Missing	3
Employment	
Contracted	400 (44.0)
School	482 (53.0)
Other	27 (3.0)
Missing	2
School type	
Charter	8 (0.9)
Private	151 (16.6)
Public	750 (82.5)
Missing	2
Developed environment	
Urban	237 (26.1)
Suburban	398 (43.8)
Rural	274 (30.1)
Missing	2

Abbreviation: IQR, interquartile range.

pairwise group comparisons with the appropriate Bonferroni corrections. Categorical responses were compared among the developed environments using a χ^2 test of independence. Similarly, if the χ^2 test value comparing the developed environments was significant, then additional post hoc pairwise comparisons were performed using a χ^2 test with Bonferroni corrections. Statistical significance was assessed at the .05 level, and all tests were 2 sided. The analyses were performed in Stata/MP 15.1 (StataCorp LP).

RESULTS

The survey reached more than 7067 NATA members who identified secondary schools as their primary employment setting. A total of 911 ATs responded, for a rate of 13%. For all categories surveying the ATs on health behaviors, barriers, and social determinants of health that affected student-athletes, the participants were asked to report their athletic trainer–perceived proportions.

Demographics of Respondents

Our participants represented diverse backgrounds in categories such as race, gender, and years of experience (Table 1). Of the 911 AT respondents, the majority (85.8%) were white (female = 62%, male = 38% male, average age = 36 years). Most ATs identified the public sector as their school setting (82.5%) compared with charter and private schools (0.9% and 16.6%, respectively). The ATs were predominantly practicing in suburban environments (43.8%), but many indicated a rural or urban environment (30.1% and 26.1%, respectively). The number of years in practice covered a wide range (range = 0.5–45 years, median = 9 years, interquartile range = 4–20 years). A total of 49 (5.4%) participants had $\leq$1 year of experience.

Where Athletic Trainers Were Spending Their Time

We asked the ATs about time allocation in their clinical practice. About half (47.7%) described spending most of their time on direct medical care, which included practice and game coverage care and treatment and rehabilitation of injuries. They reported significantly less time spent in the other areas that affect health outcomes, such as addressing individual health behaviors (ie, smoking cessation, nutrition education). These values are shown in the Figure (highlighted in black) and were compared with the percentage of an individual's overall health that the category was responsible for according to research by Choi and Sonin (highlighted in white).[13]

Health Across Developed Environments

Differences in health across the developed environments were also found. Compared with their suburban counter-

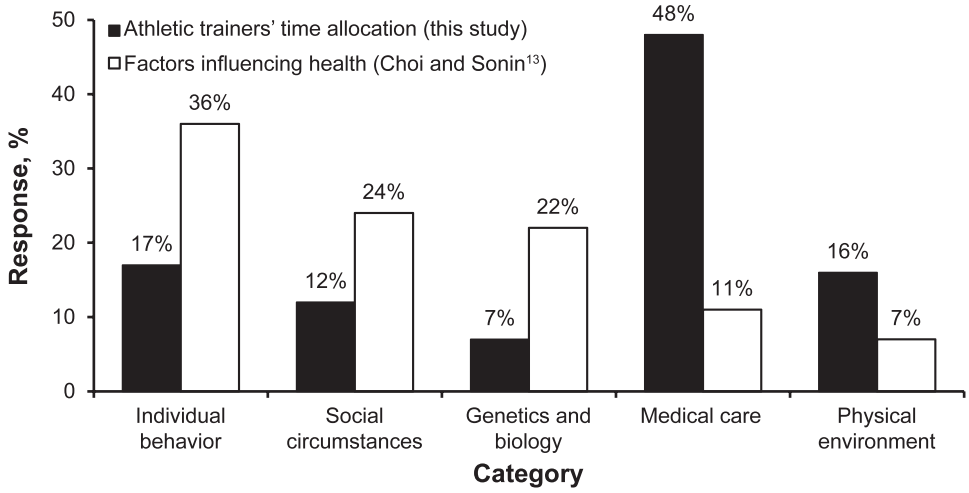

Figure. Self-reported breakdown of social determinants of health. From Choi E, Sonin J. Determinants of health. GoInvo. Updated April 14, 2020. Accessed April 26, 2019. https://www.goinvo.com/vision/determinants-of-health.

Table 2. Athletic Trainer–Reported Perceived Prevalence of Health Care Utilization by Student-Athletes

Athletes Who Have or Do	Total	Urban	Suburban	Rural	*P* Value[a]	Adjusted *P* Value From Pairwise Comparisons[b]
	Mean ± SD, % (No.)					
Health insurance	79.9 ± 18.5 (762)	77.7 ± 20.1 (199)	83.5 ± 16.1 (328)	76.7 ± 19.5 (235)	**<.001**[c]	U vs S = **.001**[c] U vs R = 1.000 S vs R = **<.001**[c]
Visit primary care physician <1x/y	73.2 ± 24.0 (764)	68.4 ± 26.6 (201)	78.6 ± 21.2 (328)	69.7 ± 23.9 (235)	**<.001**[c]	U vs S = **<.001**[c] U vs R = 1.000 S vs R = **<.001**[c]
Use emergency department for nonemergent care <1x/y, n	765	201	329	235	**.003**[c]	U vs S = **.027**[c] U vs R = .693 S vs R = **.006**[c]
	No. (%)					
Yes	462 (60.4)	131 (65.2)	173 (52.6)	158 (67.2)		
No	75 (9.8)	21 (10.5)	35 (10.6)	19 (8.1)		
Unsure	228 (29.8)	49 (24.4)	121 (36.8)	58 (24.7)		

Abbreviations: R, rural; S, suburban; U, urban.

[a] *P* value comparing all 3 geographic regions.

[b] Bonferroni-adjusted *P* values from pairwise comparisons.

[c] Bold values are significant at the .05 level.

parts, urban and rural ATs noted significantly more athletes without health insurance, who used an emergency room for nonemergent care, and who did not have a primary care physician or had not seen one within the past year (Table 2). Additionally, 57% of rural ATs commented that the nearest hospital was >5 miles away. Suburban ATs believed that on average, a larger percentage of their student-athletes visited a primary care physician within the past year (79% ± 21%) versus urban (68% ± 27%; $t_{527} = 4.9$, $P = .001$) and rural (70% ± 24%; $t_{561} = -4.7$, $P = .001$) environments. In rural and urban community settings, participants perceived greater emergency department use by their student-athletes in the past year compared with their suburban counterparts (suburban = 52.6% versus urban = 65.2% [$\chi^2 = 9.4$, $P = .027$] or rural = 67.2% [$\chi^2 = 12.3$, $P = .006$]). No differences were evident in emergency department use between urban and rural settings ($\chi^2 = 0.7$, $P = 1.000$; Table 2).

Athletic Trainer–Reported Perceived Prevalence of Behavioral Health Issues

The ATs estimated that 32.0% ± 23.5% of student-athletes had expressed feelings of sadness, anxiety, depression, or suicide in the past year (Table 3). This value did not differ among developed environments ($F_{2,689} = 0.01$, $P = .987$). Respondents reported working with Student Assistance Program leadership, school social workers, nurses, and administrators to identify student-athletes who needed counseling and support. The survey also offered ATs an open-ended text box to share how they were responding to behavioral health needs. Many ATs detailed open-door policies and regular communication with student-athletes about topics such as bullying, relationship violence, eating disorders, and anxiety and depression.

Table 3. Athletic Trainer–Reported Perceived Prevalence of Mental Health Concerns and Substance Use by Student-Athletes

Concern	Total	Urban	Suburban	Rural	*P* Value[a]	Adjusted *P* Value From Pairwise Comparisons[b]
	Mean ± SD, % (No.)					
Feelings of sadness, anxiety, depression, or suicide in past year	32.0 ± 23.5 (692)	32.2 ± 24.2 (184)	31.9 ± 24.0 (292)	31.9 ± 22.3 (216)	.987	NA
Tobacco product use	19.7 ± 18.4 (683)	17.2 ± 16.6 (183)	16.4 ± 17.1 (283)	26.2 ± 20.0 (217)	**<.001**[c]	U vs S = 1.000 U vs R = **<.001**[c] S vs R = **<.001**[c]
E-cigarette/vaping use	31.7 ± 22.5 (674)	28.0 ± 22.1 (176)	31.2 ± 22.9 (284)	35.3 ± 21.7 (214)	**.006**[c]	U vs S = .440 U vs R = **.005**[c] S vs R = .127
Marijuana use	26.9 ± 19.9 (680)	30.1 ± 21.5 (181)	26.4 ± 20.0 (288)	24.7 ± 18.0 (211)	**.025**[c]	U vs S = .163 U vs R = **.023**[c] S vs R = .986
Illegal prescription drug use	11.0 ± 11.9 (496)	11.5 ± 12.1 (127)	10.1 ± 12.0 (218)	11.7 ± 11.4 (151)	.374	NA
Illicit drug use	7.2 ± 10.7 (441)	7.6 ± 11.5 (118)	6.9 ± 12.0 (191)	7.2 ± 7.5 (132)	.880	NA

Abbreviations: NA, pairwise comparisons were not applicable; R, rural; S, suburban; U, urban.

[a] *P* value comparing all 3 geographic regions.

[b] Bonferroni-adjusted *P* values from pairwise comparisons.

[c] Bold values are significant at the .05 level.

Table 4. Athletic Trainers' Quotes About Student-Athlete Housing and Food Insecurities

Theme	Quotes
Housing insecurity	• 8% of our student population with this situation—we work with local agencies and our district programs to support them.
	• Several of my athletes have experienced homelessness, eviction, or "being kicked out" of their home.
	• Athlete placed in a shelter with mom and younger brother to get away from abusive stepfather.
	• Many students are homeless, living in dwellings with multiple families, sharing small living quarters.
	• Placed in foster situation from parents with opioid issues; homeless living in a car; couch surfing for a semester after parents kicked out of house for behavior (lesbian/gay).
	• A lot of parents of athletes are in jail, so they couch hop.
Food insecurity	• One patient did not have food at home, one was not receiving food due to neglect, many others have food insecurities.
	• Parents spent most if not all income on nonessentials. Student was noticeably fatigued, I inquired. Student and his brother, a fellow student, hadn't been eating at home for 3+ days.
	• There is a list of kids who qualify for the reduced or free lunches at school. When there is a holiday and school isn't in session, I've taken a collection of foods (PB [peanut butter], jelly, fruit cups, granola bars) from the high school staff, and I buy bread.
	• School provides food backpacks on Fridays for students who need extra food for the weekend.

Athletic Trainers' Reported Perceived Prevalence of Substance Use by Student-Athletes

Participants' perceptions of student-athletes' substance use prevalence are shown in Table 3. On average, ATs believed that tobacco use was more prevalent among rural student-athletes (26.2% ± 20.0%) than their suburban (16.4% ± 17.1%; $t_{498} = 5.9$, $P = .001$) and urban (17.2% ± 16.3%; $t_{398} = 4.8$, $P = .001$) counterparts. Rural ATs thought that the prevalence of e-cigarette use was higher among their student-athletes (35.3% ± 21.7%) than their urban counterparts (28.0% ± 22.1%; $t_{388} = 3.2$, $P = .005$), and although the difference was not statistically significant, they reported higher average use compared with suburban settings (31.2% ± 22.9%; $t_{496} = 2.0$, $P = .127$). It is noteworthy that e-cigarettes and vaping were believed to be the most prevalent substances used by secondary school student-athletes (31.7% ± 22.5%).

Marijuana use was also prevalent in the secondary school setting, used by an estimated 26.9% ± 19.9%) of student-athletes. Urban ATs described a higher estimate of student-athletes' marijuana use (30.1% ± 21.5%) than their rural counterparts (24.7% ± 18.0%; $t_{390} = -2.7$, $P = .023$). No differences were apparent between suburban (26.4% ± 20.0%) and rural areas ($t_{497} = -1.0$, $P = .986$) or urban (30.1% ± 21.5%) and suburban areas ($t_{467} = -1.9$, $P = .163$). Respondents estimated illegal use of prescription and illicit (such as cocaine, heroin, methamphetamines, and inhalants) drugs by 11.0% ± 11.9% and 7.2% ± 10.7%, respectively, of student-athletes. No differences were seen across developed environments ($F_{2,493} = 1.0$, $P = .374$ and $F_{2,438} = 0.1$, $P = .880$, respectively).

Athletic Trainers' Reported Perceptions of Student-Athlete Housing and Food Insecurities

The ATs expected that food insecurity and poor nutrition were higher among urban student-athletes (5.3% ± 3.0%) than their rural counterparts (4.2% ± 2.6%; $t_{286} = -3.1$, $P = .006$) and among urban (5.3% ± 3.0%) than their suburban counterparts (4.2% ± 2.8%; $t_{333} = -3.1$, $P = .005$). The perceived average percentage of student-athletes with housing insecurity reported by ATs was also higher in urban areas (4.4% ± 2.9%) compared with rural (3.4% ± 2.6%; $t_{271} = -3.2$, $P = .005$) and suburban (3.3% ± 2.8%; $t_{313} = -3.6$, $P = .001$) settings. Quotes from some of the ATs who reported housing and food insecurities in their environment are provided in Table 4.

Athletic Trainers' Reported Perceived Barriers to Health

Barriers to health perceived to be most significant to the ATs' practice were reported on a sliding scale of 1 to 10 (1 = *not significant*, 10 = *most significant*; Table 5). Limited access to transportation as a barrier to health was rated higher in urban than in suburban areas (5.2 ± 3.2 versus 4.1 ± 2.7; $t_{330} = -3.5$, $P = .001$). Distance to health care services was thought to be a greater barrier among rural than suburban (3.9 ± 2.8 versus 2.6 ± 2.7; $t_{337} = 4.3$, $P < .001$) student-athletes. Insurance as a barrier to health was the greatest estimated barrier (5.6 ± 3.1) and did not differ across developed environments ($F_{2,508} = 2.3$, $P = .103$). Community safety was seen as a greater barrier to health among urban settings compared with suburban (4.1 ± 3.0 versus 2.9 ± 2.9; $t_{303} = -3.8$, $P < .001$) and rural (4.1 ± 3.0 versus 2.7 ± 2.5; $t_{254} = -4.3$, $P < .001$) environments.

Poverty was reported as the second greatest perceived barrier to health (5.1 ± 3.1) and had potential influence over the other barriers. This factor was rated higher in urban than in rural (6.1 ± 3.0 versus 5.2 ± 3.0; $t_{290} = -2.6$, $P = .034$) and suburban (6.1 ± 3.0 versus 4.5 ± 3.1; $t_{331} = -4.6$, $P < .001$) environments. However, suburban and rural settings were not different ($t_{365} = 2.1$, $P = .100$).

DISCUSSION

Our sample of ATs observed health concerns that extended beyond the traditional scope of care that many had been trained to perform. Addressing these health problems creates new challenges for the field of athletic training. Although the term *social determinants of health* may not be new, knowing how to screen for, prevent, and manage the factors that influence them is still quite new to many ATs. Roughly 80% of health outcomes are determined by factors beyond medical care; therefore, allied health care providers need to be aware of how various health determinants contribute positively or negatively to the overall health of student-athletes and can be used to inform the best allocation of time in addressing health matters.[14] The presence of ATs in secondary schools may be a protective factor for the populations they serve and could lead to a reduction in health disparities that are

Table 5. Athletic Trainer–Reported Perceived Barriers to Health

Barrier	Rating, Mean ± SD (No.)				*P* Value[a]	Adjusted *P* Value From Pairwise Comparisons[b]
	Total	Urban	Suburban	Rural		
Accessibility of transportation	4.5 ± 2.9 (496)	5.2 ± 3.2 (128)	4.1 ± 2.7 (204)	4.4 ± 2.8 (164)	**.002**[c]	U ves S = **.001**[c] U vs R = **.048**[c] S vs R = .849
Distance to health care services	3.1 ± 2.8 (448)	3.1 ± 2.9 (109)	2.6 ± 2.7 (189)	3.9 ± 2.8 (150)	<**.001**[c]	U vs S = .345 U vs R = .097 S vs R = <**.001**[c]
Insurance	5.6 ± 3.1 (511)	6.1 ± 2.9 (133)	5.4 ± 3.2 (211)	5.6 ± 3.0 (167)	.103[c]	NA
Poverty	5.1 ± 3.1 (496)	6.1 ± 3.0 (129)	4.5 ± 3.1 (204)	5.2 ± 3.0 (163)	<**.001**[c]	U vs S = <**.001**[c] U vs R = **.034**[c] S vs R = .100
Community safety	3.2 ± 2.8 (441)	4.1 ± 3.0 (121)	2.9 ± 2.9 (184)	2.7 ± 2.5 (135)	<**.001**[c]	U vs S = <**.001**[c] U vs R = <**.001**[c] S vs R = 1.000
Housing insecurity	3.6 ± 2.8 (465)	4.4 ± 2.9 (123)	3.3 ± 2.8 (192)	3.4 ± 2.6 (150)	<**.001**[c]	U vs S = **.001**[c] U vs R = **.005**[c] S vs R = 1.000
Food insecurity and poor nutrition	4.5 ± 2.8 (495)	5.3 ± 3.0 (128)	4.2 ± 2.8 (207)	4.2 ± 2.6 (160)	**.002**[c]	U vs S = **.005**[c] U vs R = **.006**[c] S vs R = 1.000

Abbreviations: NA, pairwise comparisons were not applicable; R, rural; S, suburban; U, urban.

[a] 1 = *low significance*, 10 = *high significance*.

[b] *P* value comparing all 3 geographic regions.

[c] Bonferroni-adjusted *P* values from pairwise comparisons.

[d] Bold values are significant at the .05 level.

often related to social determinants of health, such as access to care, substance use, and mental health–related concerns. Our results suggested that ATs were currently observing many of these concerns related to mental health conditions, substance use, and housing and food insecurities, which were often linked with social circumstances, individual health behaviors, and the physical environment.

Mental Health and Substance Use

Participants reported on the perceived prevalence of mental health disorders that they were experiencing in the populations of students they served. They believed an average of 32% of the student-athletes they interacted with experienced a mental health problem within the past year. This finding was markedly higher than shown in a national study[15] that indicated 13.3% of students aged 12–17 years described at least 1 major depressive episode in the past year. Despite this higher estimate in our research, the ATs in both our sample and the preliminary focus groups stated that student-athletes were discussing their mental health difficulties with them and often preferred not to speak with school professionals because they felt they could trust the AT more based on the established relationship. We are not suggesting that ATs should provide mental health care to patients, yet it is interesting that about 13% of nonspecialty mental health care was delivered in the school systems.[13] Some ATs commented that they had become members of the school's mental health assistance programs, established open-door policies, and partnered with mental health professionals to create care pathways for athletes who needed advanced mental health care. Managing mental health can present other challenges for the AT as well. In some instances, individuals with mental health disorders may also be more likely to face substance use disorders and vice versa based on data demonstrating that adolescents with substance use disorders were also more likely to have co-occurring mental health disorders.[16–19] This can present an additional challenge for ATs in responding to these complex situations and making the appropriate referrals.

Respondents perceived a high prevalence of student-athletes who had used tobacco and marijuana in the past year. Nationally about 9.7% of students aged 12–17 years acknowledged tobacco use in the past year, with the majority (20.3%) living in rural communities. Tobacco use in rural communities in both our work and a national study[15] highlighted the high prevalence of use in this age group. Our ATs reported a higher prevalence of tobacco and substance use compared with national survey data. This discrepancy may have resulted from inaccurate perceptions of usage or student-athletes being a higher-use population. The student-athlete population may benefit from heightened surveillance and interprofessional health education to prevent substance use disorders in adolescents. To identify and refer individuals with mental health and substance use disorders, many secondary schools are adopting an SBIRT model (Surveillance, Brief Intervention, Referral to Treatment).[20]

The SBIRT Method

The SBIRT model is an evidence-based practice that is used to identify, reduce, and prevent problematic use and abuse of and dependence on alcohol and illicit drugs.[20] Brief interventions with college-aged students and adolescents have been effective in reducing substance use dependence, consumption, and harmful behaviors.[21] Most SBIRT interventions are done at the community level, but some secondary schools have incorporated these interventions into school health programs to improve accessibility for adolescents. This increases the opportunity for school health professionals, including ATs, to identify high-risk

adolescents early, conduct a brief intervention regarding the type of referral and resources they might need, and help the student obtain appropriate care. However, for SBIRT to be effective, the program must engender student trust, have appropriately trained professionals in the areas of risk reduction and motivational interviewing, and be seen as valuable to all stakeholders. Schools that use SBIRT interventions should include the AT when providing training on risk surveillance and conducting brief interventions with students. Athletic trainers often have trusted relationships with their student-athletes because of the unique nature of their role in providing care and support, so they are more likely to know about the problems and challenges that students experience as a result of both social and individual circumstances.

Housing and Food Insecurities

Housing and food insecurities were identified by many ATs as barriers to maintaining proper health. *Housing instability* is defined as having difficulty paying for rent, spending more than 50% of household income on housing, moving frequently, living in overcrowded conditions, or doubling up with friends and relatives.[22] Additionally, nearly 39 million persons experience some sort of *food insecurity*, which is defined as having limited or uncertain availability of nutritionally adequate and safe foods or the inability to acquire foods in socially acceptable ways.[22] In 2016, the National Center for Homeless Education[23] found that homelessness among public school students was on the rise and affected about 3% of the population, or about 1.36 million students. Often, housing and food insecurities are associated with poorer health outcomes, poor or limited access to a usual source of health care, low level of compliance with medication, and a rise in emergency department use. Our participants shared that they interacted with many student-athletes who were homeless, lived with friends or relatives, were in foster care, or had parents facing deportation. Several stated that they had started athletic training food pantries where student-athletes could purchase healthy snack items at a reduced cost. The ATs had also organized food collections before school breaks to send student-athletes home with healthy meals while school was out of session. They were using their own funds to feed student-athletes who were noticeably hungry and did not have access to food and were working with school administrators to identify local community services that provided free food to those in need. The AT-reported housing and food insecurities for student-athletes in this study could create many challenges in preventing injury, illness, and worse health outcomes. Although the accuracy of the estimates was hard to assess, developing early screening and surveillance to identify these student-athletes could help ATs locate resources and services early on to prevent poor health outcomes for these individuals.

Limitations and Future Research

Our research had several limitations that warrant future exploration. The ATs were not asked to report the prevalence of alcohol use among high school athletes. National survey data have shown high use of alcohol among children aged 12–17 years, which may correlate with mental health disorders. The respondents' perceptions of many of these health behaviors may have been based on a small percentage of the student-athlete population or on the number of encounters they had with student-athletes who expressed these concerns. Future investigations to determine the relationship between social engagement among high school student-athletes and the prevalence of substance use may provide additional information about the circumstances and factors that influence health behaviors and the AT's role in reducing illness and injury. Because ATs reported that they were responding to mental health, substance use, and housing and food insecurities in their daily interactions with student-athletes, evaluating the role of the AT in school-based health centers and behavioral health education programs is important. Future exploration and education in the use of population health in athletic training should also be conducted to help inform clinical decision making, prevention programs, and practice patterns for ATs who may be more likely to treat student-athletes from underserved populations.

CONCLUSIONS

Population health theory and practice is grounded in the concept that health care professionals understand the causes, conditions, and factors that determine the health of homogeneous groups of people. Although the AT's primary responsibility may be providing direct medical care to student-athletes, teaching ATs how to screen for and identify the effects that social factors are having on their patients' health should also be considered. When ATs begin to identify the barriers and challenges to better health in the population, they may be more likely to discover that other student-athletes are experiencing similar influences that are putting them at a significant health disadvantage. Developing new training and educational opportunities for ATs to identify population-health–level concerns related to social determinants of health is critical in the current health care landscape. With the emphasis being placed on care coordination, screening and prevention, and social equality in health, secondary school ATs are in a position to inform policy and implement interventions and programs that can positively affect the behaviors and health outcomes of the population they serve at an early stage.

REFERENCES

1. Nash DB, Skoufalos A, Fabius RJ, Oglesby WH. *Population Health: Creating a Culture of Wellness*. 3rd ed. Jones & Bartlett Learning; 2019.
2. Artiga S and Hinton E. Beyond health care: the role of social determinants in promoting health and health equity. Kaiser Family Foundation. Published May 10, 2018. Accessed September 2019. https://www.kff.org/racial-equity-and-health-policy/issue-brief/beyond-health-care-the-role-of-social-determinants-in-promoting-health-and-health-equity/
3. Galea S. *Healthier: Fifty Thoughts on the Foundations of Population Health*. Oxford University Press; 2017.
4. McLeod TCV, Huxel Bliven KC, Lam KC, Bay RC, Snyder Valier AR, Parsons JT. The National Sports Safety in Secondary Schools Benchmark (N4SB) study: defining athletic training practice characteristics. *J Athl Train*. 2013;48(4):483–492. doi:10.4085/1062-6050-48.4.04
5. Robinson B. The value of the secondary school athletic trainer. National Federation of State High School Associations. Published

March 10, 2015. Accessed September 2019. https://www.nfhs.org/articles/the-value-of-the-secondary-school-athletic-trainer/
6. 2017–18 NFHS annual report. National Federation of State High School Associations. Published 2018. https://www.nfhs.org/media/1019857/2017-18_annual_report.pdf
7. Huggins RA, Coleman KA, Attanasio SM, et al. Athletic trainer services in the secondary school setting: the athletic training locations and services project. *J Athl Train*. 2019;54(11):1129–1139. doi:10.4085/1062-6050-12-19
8. The Secretary's Advisory Committee on National Health Promotion and Disease Prevention Objectives for 2020. Phase I report: recommendations for the framework and format of healthy people 2020. US Department of Health and Human Services. Published October 28, 2008. Accessed September 2019. https://www.healthypeople.gov/sites/default/files/PhaseI_0.pdf
9. Eberhardt MS, Pamuk ER. The importance of place of residence: examining health in rural and nonrural areas. *Am J Public Health*. 2004;94(10):1682–1686. doi:10.2105/ajph.94.10.1682
10. Doogan NJ, Roberts ME, Wewers ME, et al. A growing geographic disparity: rural and urban cigarette smoking trends in the United States. *Prev Med*. 2017;104:79–85. doi:10.1016/j.ypmed.2017.03.011
11. Nagasako E, Waterman B, Reidhead M, Lian M, Gehlert S. Measuring subcounty differences in population health using hospital and census-derived data sets: the Missouri ZIP Health Rankings project. *J Public Health Manag Pract*. 2018;24(4):340–349. doi:10.1097/PHH.0000000000000578
12. Marmot M. The health gap: the challenge of an unequal world: the argument. *Int J Epidemiol*. 2017;46(4):1312–1318. doi:10.1093/ije/dyx163
13. Choi E, Sonin J. Determinants of health. GoInvo. Updated April 14, 2020. Accessed April 26, 2019. https://www.goinvo.com/vision/determinants-of-health
14. Magnan S. Social determinants of health 101 for health care: five plus five. NAM Perspectives, National Academy of Medicine. Published October 9, 2017. Accessed September 2019. https://nam.edu/social-determinants-of-health-101-for-health-care-five-plus-five/
15. Key substance abuse and mental health indicators in the United States: results from the 2017 National Survey on Drug Use and Health. Substance Abuse and Mental Health Services Administration & US Department of Health and Human Services. Published September 2018. Accessed September 2019. https://www.samhsa.gov/data/sites/default/files/cbhsq-reports/NSDUHFFR2017/NSDUHFFR2017.pdf
16. Sheidow AJ, McCart M, Zajac K, Davis M. Prevalence and impact of substance use among emerging adults with serious mental health conditions. *Psychiatr Rehabil J*. 2012;35(3):235–243. doi:10.2975/35.3.2012.235.243
17. Bukstein OG, Horner MS. Management of the adolescent with substance use disorders and comorbid psychopathology. *Child Adolesc Psychiatr Clin N Am*. 2010;19(3):609–623. doi:10.1016/j.chc.2010.03.011
18. Sterling S, Weisner C, Hinman A, Parthasarathy S. Access to treatment for adolescents with substance use and co-occurring disorders: challenges and opportunities. *J Am Acad Child Adolesc Psychiatry*. 2010;49(7):637–646. doi:10.1016/j.jaac.2010.03.019
19. Winters KC, Tanner-Smith EE, Bresani E, Meyers K. Current advances in the treatment of adolescent drug use. *Adolesc Health Med Ther*. 2014;5:199–210. doi:10.2147/AHMT.S48053
20. Screening, Brief Intervention, and Referral to Treatment (SBIRT). Substance Abuse and Mental Health Services Administration. Updated June 10, 2021. https://www.samhsa.gov/sbirt
21. Curtis BL, McLellan AT, Gabellini BN. Translating SBIRT to public school settings: an initial test of feasibility. *J Subst Abuse Treat*. 2014;46(1):15–21. doi:10.1016/j.jsat.2013.08.001
22. Kushel MB, Gupta R, Gee L, Haas JS. Housing instability and food insecurity as barriers to health care among low-income Americans. *J Gen Intern Med*. 2006;21(1):71–77. doi:10.1111/j.1525-1497.2005.00278.x
23. Meltzer A, Quintero D, Valant J. Better serving the needs of America's homeless students. Brookings Brown Center Chalkboard. Published October 24, 2019. https://www.brookings.edu/blog/brown-center-chalkboard/2019/10/24/better-serving-the-needs-of-americas-homeless-students/

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