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Barriers and Facilitators Faced by Athletic Trainers Implementing National Athletic Trainers' Association Inter-Association Task Force Preseason Heat-Acclimatization Guidelines in US High School Football Players

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Context: The aim of the National Athletic Trainers' Association Inter-Association Task Force (NATA-IATF) preseason heat-acclimatization guidelines was to acclimatize high school athletes to the environment during the first 2 weeks of the preseason and reduce the risk of exertional heat illness.

Objective: To identify barriers and facilitators that high school athletic trainers (ATs) encountered when implementing the NATA-IATF guidelines.

Design: Qualitative study.

Setting: Individual phone interviews with all participants.

Patients or Other Participants: Thirty-three ATs (16 men, 17 women; age = 36.0 ± 12.0 years, athletic training experience = 12.9 ± 10.5 years) representing 19 states (4 with state mandates) were interviewed before data saturation was achieved. Participants were purposefully sampled from a larger investigation based on stratification of US Census region and preidentified high school compliance with the NATA-IATF guidelines.

Main Outcome Measure(s): A cross-sectional, semistructured phone interview (6 steps) was conducted with each participant and then transcribed verbatim. A 7-person research team (5 coders, 2 auditors) coded the data into themes and categories, focusing on consensus of data placement to reduce bias and ensure accuracy.

Results: Facilitators and barriers that influenced successful guideline implementation were (1) perceived stakeholder access, (2) perceived stakeholder role, (3) capability and capacity, (4) school culture, (5) logistical support, (6) resources, (7) physical environment, and (8) consistency of the guidelines. Overall, participants discussed facilitators and barriers within each category based on their experiences and circumstances.

Conclusions: Athletic trainers faced numerous concerns regarding compliance with the NATA-IATF preseason heat-acclimatization guidelines. Multiple levels of influence should be targeted to improve implementation. These include intrapersonal factors by giving ATs the education and self-efficacy to support advocacy for implementation, interpersonal components by establishing strong collaborative networks for change, community and environmental factors by optimizing school culture and community resources for implementation, and policy aspects by establishing consistent guidelines across all bodies.

Key Words: exertional heat illness, implementation, best practices

Key Points

- Barriers to successful implementation of the National Athletic Trainers' Association Inter-Association Task Force preseason heat-acclimatization guidelines existed.
- A multifactor approach that targets all sport stakeholders should be used to improve implementation.
- Establishing relationships with all sport stakeholders may support implementation efforts.

Approximately 9000 patients with exertional heat illness (EHI) are treated annually in high school (HS) sports in the United States,[1] most of whom are football athletes during the preseason.[1–4] Heat acclimatization is one recommended approach for preventing EHI.[5–8] In 2009, preseason heat-acclimatization guidelines to help HS athletes reduce their risk of EHI were developed by the National Athletic Trainers' Association (NATA) Inter-Association Task Force (NATA-IATF).[5] The guidelines recommended gradual acclimatization to the hot

environment during the first 2 weeks of the preseason and provided specific recommendations for football, including the length of practice and rest breaks, limitations on double-practice days, a requirement that an athletic trainer (AT) be present, and limitations on physical contact and equipment worn.

Using HS injury-surveillance data, recent researchers[9] suggested that state-level mandates of the NATA-IATF guidelines by HS athletic associations were associated with 55% lower EHI rates. However, in a survey of the 2017 preseason, investigators[10] found that ATs reported compliance with an average of 12 ± 3 of the 17 guidelines by HS football programs; only 3.9% reported compliance with all guidelines. Programs in states with mandated NATA-IATF guidelines (Arizona, Connecticut, Iowa, Mississippi, New Jersey, North Carolina, Rhode Island, and Utah) had higher levels of compliance with the guidelines (allowed activity during the first 5 days, length of practices, length of rest breaks, AT presence, equipment alterations, limited contact).[10,11]

Previous work[12,13–15] illustrated that policies may be deterred by incomplete implementation. In particular, as policies are instituted, their effects on the intended outcomes of interest may decrease over time or may not reach the entire targeted audience.[16,17] One way to mitigate the lack of reach in policy implementation is to integrate theory-based approaches and frameworks. The Translating Research Into Injury Prevention Practice (TRIPP) framework highlighted the need for a multistage approach, including being fully aware of the stakeholder relationships involved in injury-prevention efforts.[13] Although the TRIPP model is relatively new, the influence of multilevel intervention is further emphasized by the socioecological model (SEM). The SEM is a theory-driven model that addresses the relationships among influential stakeholder domains.[18] It describes the roles of (1) the intrapersonal in interpersonal relationships; (2) intrapersonal and interpersonal relationships within the community; and (3) intrapersonal, interpersonal, and community relationships within the larger society. As a result, formative research to identify factors that help and hinder proper implementation of the NATA-IATF guidelines will help us to develop comprehensive and sustainable implementation practices that reach all levels of stakeholder influence and injury-prevention efforts.

Therefore, we aimed to identify barriers and facilitators that HS ATs encountered when implementing the NATA-IATF guidelines concerning HS football. We hypothesized that ATs would identify institutional, sport-based, and individual-level factors that facilitated and impeded their ability to implement NATA-IATF guidelines in the HS football preseason. The findings will assist the NATA, state athletic associations, and individual schools in identifying strategies to assist ATs in proper implementation of the NATA-IATF guidelines.

METHODS

A consensual qualitative research (CQR) tradition guided us in constructing this study.[19,20] Consensual qualitative research has been used in athletic training as well as other health professions and is based on phenomenology and grounded theory. This approach is ideal for examining novel topics that have not been commonly explored, as it helps the investigators to form ideas and theories as to why problems may or may not exist. As such, it was an appropriate choice for examining the context in which NATA-IATF guidelines were (or were not) implemented. We used semistructured phone interviews to identify various factors affecting proper implementation of the NATA-IATF guidelines. The study was approved by the University of North Carolina at Chapel Hill Institutional Review Board.

Study Population and Sample Recruitment

The population of interest was NATA-affiliated ATs working with US HS football programs in the 2017 preseason. We recruited our sample from a previous study sample (N = 1023) in which participants completed questionnaires regarding their HS football program's implementation of the NATA-IATF guidelines[10] and indicated their willingness to be contacted for additional research (n = 524). To be eligible to complete the questionnaire, ATs had to (1) have a valid email address, (2) be NATA affiliated, (3) have opted in on the NATA membership list for surveys, and (4) be either directly employed by a school district or work in the HS football setting via outreach for a clinic, hospital, or physician practice.

The 524 ATs who indicated willingness to be contacted for additional research were then stratified based on their questionnaire responses by sex, location (based on the 4 US Census regions[21]), and compliance with the NATA-IATF guidelines (designated as low versus high based on a median split of the number of the 17 guidelines with which the AT's HS program complied).[10] The lists of ATs per stratum were randomized, and the ATs were contacted in order of appearance.

We attempted up to 3 email contacts to recruit an AT to participate in the interviews before moving to the next AT on the list. From these 16 cross-sections of sex, location, and compliance level, we aimed to recruit 2 to 4 ATs from each stratum, with the goal of completing approximately 30 to 40 telephone interviews. Overall, we completed interviews with 33 ATs (16 men, 17 women) and ATs from HSs with a high (n = 17) or low (n = 16) level of compliance with the NATA-IATF guidelines (Table 1). Although this is a relatively large sample in qualitative research, we felt that a stratified sample including all genders, regions of practice, and compliance levels was the best way to improve the generalizability of our findings to the larger population of ATs. Therefore, we recruited as few individuals as possible per stratum to reach *saturation*, or the point at which the research team was receiving redundant as opposed to novel information.[22]

Data Collection

A member of the study team (A.J.M.) served as the interviewer. This interviewer had a baccalaureate degree in exercise and sport science and was provided with training in qualitative research methods from an internationally recognized research institute consisting of an intensive summer qualitative research-training program. The interviewer's lack of experience in athletic training was important in minimizing the bias that could have arisen if

Table 1. Distribution of Athletic Trainers by Sex, Location, and Reported High School Compliance With NATA-IATF Guidelines

Athletic Trainers	High School's Level of Compliance With NATA-IATF Guidelines[a]	Census Region				Total
		Midwest	Northeast	South	West	
Male	High	3	2	1	2	8
	Low	1	1	3	3	8
Female	High	2	0	4	3	9
	Low	2	3	1	2	8
Total		8	6	9	10	33

Abbreviation: NATA-IATF, National Athletic Trainers' Association Inter-Association Task Force.

[a] Designated as low versus high based on a median split of the number of the 17 total guidelines with which the athletic trainer's high school complied.

the interviewer was an AT. However, our interviewer was provided with a primer on athletic training terminology and encouraged to ask participating ATs for clarifications and disclose his non-AT status if he felt it necessary.

At the beginning of each phone interview, the ATs orally consented to participating in the study and being audio recorded. The interviewer followed a semistructured interview protocol (Table 2) that allowed for clarification questions throughout the interview**.** Participants were first asked to discuss their general experiences as ATs in the HS football setting. Then they were asked to consider their general experiences with exertional heat illnesses in HS sports.

Next, their experiences implementing the NATA-IATF guidelines in the HS football preseason football setting were addressed. To aid discussion, the content of the NATA-IATF guidelines was grouped into 6 categories.[10] For each category, the ATs discussed the factors that helped or hindered implementation, as well as any additional factors they felt would have helped implementation. The interviewer was encouraged to ask follow-up questions when appropriate to elucidate further information.

The interview protocol was developed and refined with the aid of discipline experts. The preliminary interview protocol was sent to 3 experts in sport safety research. Each expert was asked to review the protocol for clarity and content. Then the expert met with the research team to offer feedback. We also pilot tested the interview protocol with a convenience sample of 3 ATs who had provided care to HS athletes. The pilot participants were asked to highlight any questions lacking clarity and to expand on any areas they felt were not appropriately covered by the interview protocol. After the expert review and pilot testing, the research team met to review and implement the feedback, which was minor. Audio recordings of the interviews were reviewed and transcribed by a third-party company specializing in academic interview transcriptions. To protect confidentiality, participants' identifying information was edited out of all materials.

Table 2. Semistructured Phone Interview With Athletic Trainers

Step	Approach
1	Consent process
2	Athletic trainer general experience in high school football setting
3	Athletic trainer general experience with exertional heat illness
4	Athletic trainer experience implementing the NATA-IATF guidelines in the high school football preseason football setting
	Describe situations/experiences, particularly factors that[a]
	Helped implementation
	Hindered implementation
	Would have helped implementation
4a	First 5 days
4b	Length of practice
4c	Length of rest breaks
4d	Athletic trainer presence
4e	Equipment alterations
4f	Contact drills
5	Additional follow-up
6	Closing thoughts

Abbreviation: NATA-IATF, National Athletic Trainers' Association Inter-Association Task Force.

[a] Refers specifically to items 4a to 4f.

Analysis

Our analysis used the CQR tradition, which originates from a grounded theory and phenomenologic approach. The CQR tradition consists of 4 progressive stages.[19,20] In stage 1, initial code domains or key words are identified. In stage 2, core ideas such as categories are extracted from each domain. In stage 3, multiple interviews are cross-analyzed to finalize categories and themes. In stage 4, the frequency of data presenting in each category and theme is established.

For this process, we relied on the multiperson research team's ability to reach consensus. The research team consisted of 7 members who had different levels of experience with both athletic training and qualitative research in order to reduce potential researcher bias and strengthen the credibility of the findings. Five members of the team served as coders and the other 2 members served as an internal and external auditor to ensure that all perspectives were incorporated appropriately. Once all interviews were transcribed, interviews were returned to participants for member checking.[19,20] During this time, participants were not allowed to make changes to their transcripts but were asked to clarify their responses if they felt it necessary. Member checking is one way to ensure the credibility of qualitative data.

Five interviews were selected by the interviewer for their diversity in discussion points. The research team individually coded them for stages 1 and 2 and then convened to discuss the individually developed themes and categories, with the ultimate goal of coming to a consensus and creating a codebook. The team coded the remaining interviews individually according to the consensus codebook. Throughout this process, the team reconvened as necessary to discuss coding decisions until consensus was reached. This process of *triangulation* is a common method of establishing scientific rigor in qualitative data analysis.

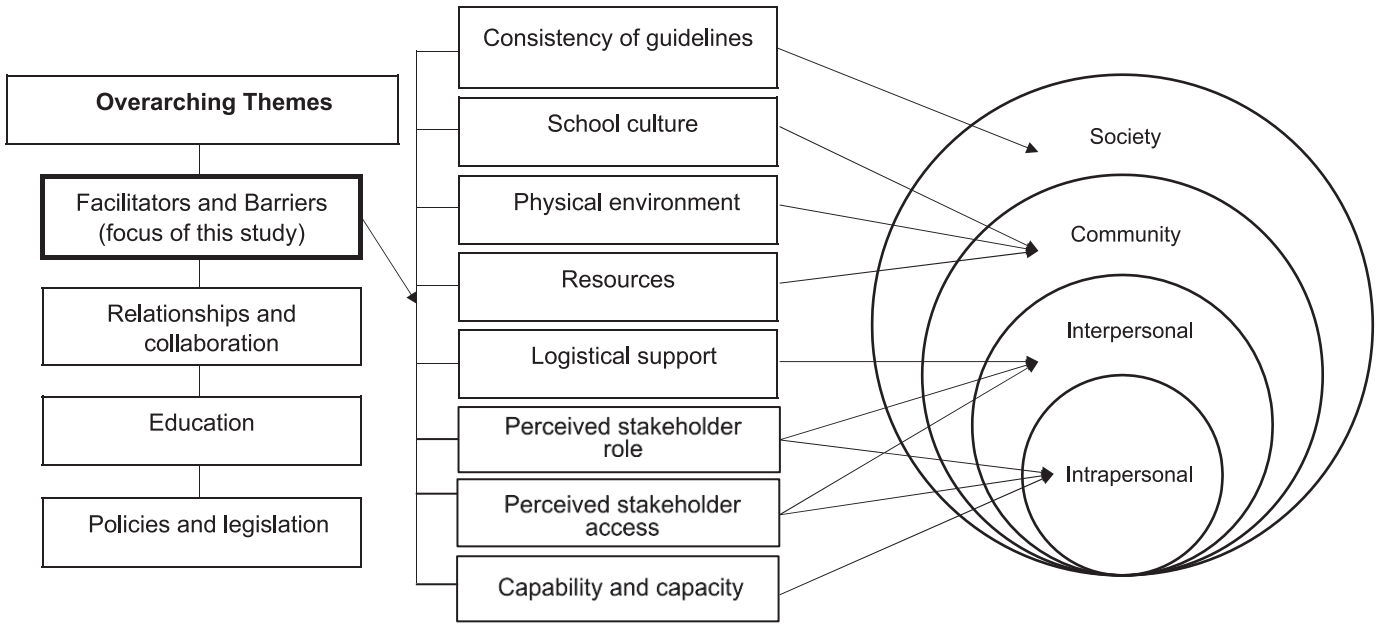

Figure. Overarching themes and socioecological model mapping.

The themes and frequencies were divided into 4 categories: (1) general (pertained to more than 30 participant cases), (2) typical (pertained to more than 17 participant cases), (3) variant (pertained to fewer than 17 participant cases), or (4) rare (pertained to fewer than 5 participant cases).[19] In this study, all themes and categories were represented in at least half of all participant cases and were therefore classified as general or typical as appropriate.

RESULTS

We identified 4 primary themes that affected implementation of the NATA-IATF guidelines by ATs: (1) facilitators and barriers, (2) relationships and collaboration, (3) education, and (4) policies and legislation (Figure). Because of the volume and scope of the identified themes, we prioritized the information regarding facilitators of and barriers to proper implementation of NATA-IATF guidelines in this article. The theme of facilitators and barriers was further broken down into 8 categories: (1) perceived stakeholder access, (2) perceived stakeholder role, (3) capability and capacity, (4) school culture, (5) logistical support, (6) resources, (7) physical environment, and (8) consistency of the guidelines.

Perceived stakeholder access referred to the presence and availability of individuals such as ATs. The *perceived stakeholder role* expanded the definition of a stakeholder to include the roles of all sport stakeholders (ATs, coaches, administrators, etc). *Capability and capacity* described the ability of sport stakeholders (primarily ATs) to perform their identified roles. *School culture* was the sociocultural environment in which the school functioned (as opposed to geographic location); school culture included items such as the mindset and expectations of sport stakeholders (including athletes and parents). *Logistical support* addressed the presence and use of key resources to support implementation. *Resources* were tangible items that helped or hindered implementation. *Physical environment* referred specifically to the geographic location and weather-related concerns that affected an individual participant or school. Lastly, *consistency of the guidelines* described the similarities and differences in different levels of information, such as state-level athletic associations and national-level best practices. Overall, participants spoke of the facilitators and barriers in each category depending on their experiences and circumstances, although barriers were noted more frequently.

In general, respondents discussed having multiple staff members and access to strong collaborative networks as facilitators of perceived stakeholder access (established relationships with stakeholders), perceived stakeholder role, capability and capacity, and logistical support. For individuals who were new to athletic training or at schools in which ATs had not previously been employed, school culture and capability and capacity were cited as significant barriers. Geographic positioning of the ATs also influenced their experience of facilitators of and barriers to implementation. Athletic trainers who self-identified as being in rural environments identified barriers related to the physical environment, resources, and school culture.

The programs of approximately half the sample ($n = 17$) were deemed at a high level of compliance based on their responses in the previous investigation.[10] Low versus high compliance in this study was determined by a median split of the number of the 17 total guidelines with which the AT's school complied. *Low compliance* included the median and below, whereas *high compliance* consisted of values above the median. Although both high-compliance and low-compliance participants discussed the same factors, the former observed more factors as facilitators and the latter described more factors as barriers. Further support for how each category was discussed as a facilitator or barrier as well as a breakdown of findings by compliance level is provided in Tables 3 and 4. Additionally, each category is presented in detail in the following sections.

Table 3. Facilitators and Barriers to Guideline Implementation Outlined by School's Level of Compliance

Compliance Level	Subsample Demographics[a]		Facilitators	Barriers
	Characteristic	Value		
High (n = 17)	Age, y	37.0 ± 12.0	Multiple staff for being in multiple places at once	Restricted hours and overtime
	Highest degree held, No. (%)			Unqualified coaches at lower levels
	Bachelor's	4 (23.5)	Establishing collaborative roles	Conflicting role obligations for AT
	Master's	11 (64.7)	Education and role playing with stakeholders to prepare	School demographics and old-school mentality
	Other	2 (11.8)	Coach accountability throughout community to keep children safe	Effect on nonfootball teams
	Years of experience	13.6 ± 10.0	Ability to move practices, adjust schedules, or both	Financial background of athletes
	Years at current school	8.7 ± 8.0	Communication tools and physical resources	Unpredictable or unexpected weather
			Experience in the physical environment	Poor education of stakeholders
			Consistency between best practices and state guidelines	
Low (n = 16)	Age, y	36.0 ± 13.0	Multiple staff for being in multiple places at once	Restricted hours and overtime
	Highest degree held, No. (%)			Complacency that tasks are someone else's responsibility
	Bachelor's	2 (12.5)	Establishing collaborative roles	Understaffing of ATs
	Master's	12 (75.0)	Authoritative capabilities	School demographics and old-school mentality
	Other	2 (12.5)	Established presence in school and community	Tracking late additions to team for acclimatization
	Years of experience	12.1 ± 1 0.9	Coach mindset and state mandates for no or limited weekend practices	Limited access to physical resources (water, air conditioning, etc)
	Years at current school	6.4 ± 6.7	Established relationships in the absence of physical resources	New physical environment and perception of climate by stakeholders
			Experience in the physical environment	State guidelines inconsistent with best practices

[a] Mean ± SD unless otherwise indicated.
Abbreviation: AT, athletic trainer.

Perceived Stakeholder Access

In the category of perceived stakeholder access, participants generally highlighted access to ATs as both facilitators and barriers, depending on the circumstances. Specifically, respondents discussed being available before, during, and after football practices as a facilitator of NATA-IATF guideline implementation. However, this presence at football practices often came at the expense of other sports coverage, turning it into a barrier overall to their role as an AT. One AT described trying to ensure that coaches knew of her presence regardless:

> I've talked to athletic trainers in other states and they're just like, how do you do that? That's not fair to the other teams. But again, they know where to find me. All the coaches have my number. If the kids need to be taped and stuff, they know, hey, I got to have enough time to get down to the [football] practice field to get her to tape it before I have to be at my field... It's just in the fall, I'm with football.—*Female, 6 years of experience, high compliance, South Region*

Participants also discussed schools' not employing ATs as a barrier. One person commented, "They don't have an athletic trainer; how do those coaches ever get access to those guidelines?" Another AT discussed the lack of access to ATs in the community overall:

> The hindrance becomes once again that, you know, it's schools that don't have an athletic trainer, you know, so I can tell you in our conference alone that...I think that out of maybe 15 schools that's us, maybe 2, have a full-time athletic trainer. The rest of them are ones that only are there for games and they show up once a week just to take a look at kids.—*Male, 30 years of experience, high compliance, Northeast Region*

Perceived Stakeholder Role

In addition to perceived stakeholder access, participants described the general importance of the perceived stakeholder role. Specifically, they felt that a team of individuals to help implement the NATA-IATF guidelines was critical to optimize success. Role delineation and cohesion of team members were noted as facilitators of team success. However, in contrast, a lack of support from team members and administration was identified as a barrier.

First, several respondents noted that 1 facilitator of implementing the NATA-IATF guidelines was relying on other stakeholders, particularly coaches, to ensure that athletes complied with and completed the acclimatization process, particularly in the event of late additions to the football team. One AT said,

> Luckily, we make our coaches responsible for tracking that, and so I don't even have to track it, which is

Table 4. Supporting Quotations by Category Continued on Next Page

Category	Frequency, Cited by No. Participants (N = 33)	Facilitator Quotations	Barrier Quotations
Perceived stakeholder access	Typical (29)	"The school policy is that there's an athletic trainer available for all home contests. So because we have multiple fields, we are not on the sidelines for every game that occurs, but if there's a football game, we are at the football game." "I mean if you don't have access to an athletic trainer, it doesn't matter—it doesn't always matter what guidelines you have because there's nobody to help hold you accountable or to deal with situations that come up either way, so I think if you don't have somebody there that can help recognize any, then it's a disservice to everybody."	"One thing that hindered was the fact that football goes so much later than every other sport. They're the only ones on campus so the cut for me is I'm an 8-hour employee, 40 hours per week. I'm basically, and because football is the highest risk statistically, I have to be here for the football practices, which means I can't be here for every other sport."
Perceived stakeholder role	General (32)	"I have a role and the coach has a role. And we're still in the same page. And if we're not, then that's where I'll recruit the athletic director."	"They're relying on the athletic trainer to make sure that you're there kind of telling them these things, but it's good for everyone to know."
Capability and capacity	General (33)	"It's been really vital that I have people around me that are educated and trained in how to manage heat illness, so we do really—we try to make sure that the adults that are working with kids you know, how to do basic first aid with regard to heat and environmental conditions, so I guess help in training, having the time to train those people or help in having training tools, perhaps even time to practice with them like kind of in a mock situation and let them really see what it looks like and feels like and that way, there is not as much of a panic when they start to know the symptoms of the students that are severe."	"I'm a teacher as well so you know, during the school day, I have teacher responsibilities, and so—I actually did 2 full-time job descriptions." "I'm over 2 school districts and in a clinic, so sometimes I'll have practice and I won't be there, so it's kind of hard to make sure that they follow the rules when you're not around."
School culture	General (33)	"I feel like head coaches don't last if they're not receptive. They get kicked pretty hard to the curb. Me and the parents would kind of make that happen."	"It's one of those things where it was a smaller town and the football coach is a very prominent figure within the community and they want to win, and so you practice longer and harder so that they can win."
Logistical support	General (31)	"And then my coach wants his weekend, so he takes Saturday off as well to have that for themselves." "I put that on the, uh, who... if the kid's primarily offense or defense, I put it on the...the offensive coordinator or the defensive coordinator. And I work with that particular coach."	"I think our coaches are very reluctant to have a practice with only like 2 or 3 coaches just from a shear [mindset] that's not effective coaching and not safe to have 2 coaches out there for 70 kids. So that's one of the issues we kind of had. Practices are dictated by our external coaches' schedules."
Resources	Typical (29)	"Our football teams practice usually the same time on 2 fields that are separated by like a baseball field. So on those games, say I'm the only one there, I'm still there before practice and I'm still afterwards and I'm still present at practice. But I'll talk to the coaches in advance saying, "Look, I'm the only one here. What time are you doing full contact?" And then I'll ask the other coach what time they're doing full contact so I can make sure that I'm at the field that is doing more contact than the other."	"When they don't have money, when a lot of people in this county are...1 out of 4 children in our county are underfed. And it's a stat."
Physical environment	Typical (26)	"I learned most of that, you know, trial-by-fire style, so working cross-country events is when I saw the most in California, because we already adapted a lot of different protocols, so the heat [did] not allow...practice over certain temperature and so on, but the majority of what I learned was hands on with doctors and other certifieds [athletic trainers] at a cross-country meet."	"I mean there was a time where back about 2 years ago where the first like 4 days or something like that, it was actually very cold out and we actually never acclimated within the first 5 days, so I wonder if there should be like a threshold, like at some point or like...you know, because we went from mid-60s the first 4 days and then boom badabang we're in the upper 90s, so we actually had...I think we had 1 day of shifting and then you're out of the guideline. And I say, I do recall that being kind of an issue. Like, it didn't really help with it all, like the acclimatization didn't work that year."

Table 4. Continued From Previous Page

Category	Frequency, Cited by No. Participants (N = 33)	Facilitator Quotations	Barrier Quotations
Consistency of guidelines	Typical (26)	"I think the biggest thing is trying to keep things all pretty much kind of the same. It's like our state's regulations are, coincides pretty closely with NATA recommendations. There's other organizations and they have different recommendations as well. But as athletic trainers, I think the consistency definitely helps because we need to know what needs to be done and what's the best way to handle situations or how to, how can we, there's going to be these people around the country that has smaller staff, smaller schools, bigger schools."	"I kind of wish that I did [use NATA-IATF guidelines] a little more. I think part of the reason why I don't is because we're dictated by what the state association says."

Abbreviations: NATA, National Athletic Trainers' Association; NATA-IATF, National Athletic Trainers' Association Inter-Association Task Force.

wonderful. That's one of the responsibilities I pawned off to them. You know when they're there and when they're not, that's not my job, you do it. Luckily for us, that's fine and works out really well, and again, has been the standard in [blinded] for several years now, so everyone is pretty used to that.—*Female, 7 years of experience, low compliance, Midwest Region*

Second, the ATs also specifically relied on or wanted to rely on administrators to assist them with accountability to and enforcement of the NATA-IATF guidelines. This was a frequent point of contention, as one participant described:

I think it would be helpful to me if that was—there was a leadership role that also [had] that in their job description, so communications director or an administrator, athletic director, also being in charge of that given the other duties that I'm assigned.—*Female, 15 years of experience, high compliance, West Region*

Another stated the positive influence of administrators:

That order will come down from the district by our administrator in charge of athletics at the district level, so he will send out an email like, "On these days, we don't do a 2-a-days."—*Male, 19 years of experience, low compliance, Midwest Region*

Lastly, participants characterized their own roles of educator, advocate, and caregiver. Regarding education, they discussed relying on coaches to implement the guidelines and recognize the signs and symptoms of heat illness when the AT was unable to be physically present. As 1 participant commented:

. . .having coaches strictly follow the acclimatization deadlines and making sure that they aren't putting kids in a vulnerable position to start with. And then making sure that the entire athletic staff, including coaches and the athletic director and other people who are on site, to be able to be educated and knowledgeable of obviously the kinds of symptoms.—*Female, 4 years of experience, low compliance, Midwest Region*

Capability and Capacity

In relation to stakeholder access and role, ATs generally described a breaking point when they could only do so much because they were pulled in many different directions simultaneously. Even though they felt capable of performing all necessary duties, they were hindered by their capacity for workload distribution. Most often, capability and capacity were discussed as significant barriers to successful implementation of the NATA-IATF guidelines.

First, respondents spoke of the effect of being the only full-time AT with little assistance. They described the need to rely on coaching staff and athletes to help support their multiple roles as ATs. One mentioned:

I was always, like I said, [in] 3 places at once, so it was putting a lot of trust in the coaching staff and a lot of trust in the student-athletes to say look, if there's something wrong, you gotta come find me or have coach call me, and I'll come down immediately.—*Female, 11 years of experience, low compliance, Northeast Region*

Second, ATs reported wanting to do more than they were able to do because of these limitations. As stated by 1 person, this became particularly difficult when job delineations allowed the AT to work only 40 hours per week, which required the AT to prioritize football over other sports. Although this was a facilitator of implementation of the NATA-IATF guidelines in football, it was also a significant barrier to fulfilling the entirety of their role at their school.

Football [is] the only team that goes late in the day. They're the only ones on campus so the cut for me is I'm an 8-hour employee, 40 hours per week. I'm basically, and because football is the highest risk statistically, I have to be here for the football practices, which means I can't be here for every other sport.—*Male, 1 year of experience, low compliance, Midwest Region*

Last, respondents described the inability to control athletes and coaches outside of the school setting. Although ATs felt capable of implementing the NATA-IATF guidelines, they did not feel capable of controlling the individuals around them. This barrier was heightened by

the lack of accountability to and enforcement provided by the administration, particularly within the school setting. A participant explained the overall lack of authority:

> I don't know that I would have a lot to say [about not following guidelines], I mean I can obviously put in my 2 cents as far as health and wellbeing of the athletes go, but unless there's some sort of penalty or some sort of the high school guideline that specifically states that, where the coach could potentially get in trouble for practicing longer, there's not going to be a lot that I can do.—*Female, 4 years of experience, low compliance, Midwest Region*

At the same time, this lack of authority extended beyond the school. For example, athletes might be following the NATA-IATF guidelines appropriately at school, yet they could go home and engage in other activities that halted their progress.

School Culture

Participants also discussed the relationship of cultural implications, such as the student and parent demographic as well as the coach mindset, with the ability to implement the NATA-IATF guidelines. Most of these circumstances were labeled as barriers. However, several ATs also observed that a positive school culture facilitated implementation efforts.

First, participants residing in rural communities noted that students and their families worked as farmers and in other outdoor jobs. This led to many football student-athletes working in the field while not being involved in sports and being outdoors for unregulated periods of time. One respondent commented,

> Just small-town atmosphere. You know, parents are out for work at certain hours, a lot of them have to go back and milk the cows, and they all go fishing or something like that, you know so…yeah, I'd say just the farm atmosphere kind of drives it.—*Male, 3 years of experience, high compliance, Midwest Region*

Second, participants also noted how the "old-school" mentality affected implementation of the NATA-IATF guidelines.

> …something that hindered that in the past is just that idea of tradition and this is how we've been doing it for X amount of years in the past, so why do we kind of have the change. I had 1 coach that had been coaching for a long time and kind of had that old-school mentality.—*Female, 5 years of experience, low compliance, Midwest Region*

> That's always definitely the hardest sell to the coaches is no double practices, especially because we're still in that phase where they all did it and they're all much tougher than our kids are, and these days kids are soft and kind of the old-school mentality of they'll be fine, we all did it. You know what, they probably will, but it's written in the guideline and that will be the hardest one to sell is no double practices.—*Female, 7 years of experience, low compliance, Midwest Region*

This old-school mentality was also present with respect to other aspects of safety, as ATs recalled coaches saying, "taking off helmets makes you weak" and "injuries make you weak."

Last, respondents described general hesitation by the school community as a factor that affected their ability to implement the guidelines. Even if they were able to comply with the guidelines, perceptions of exertional heat illness often affected their ability to provide best-practice care. One of the most common negative perceptions that affected the ability to implement best-practice policies, such as heat acclimatization, dealt with obtaining rectal temperature. Although not directly related to heat acclimatization, obtaining rectal temperature became a point of contention for school officials, regardless of the policy in question. As such, it was difficult for ATs to separate their experiences with this larger cultural barrier from the NATA-IATF guidelines:

> I mean, my school [athletic director] and my district [athletic director] has said, you know, you won't be doing that. I said I never wanted to in the first place. So, I mean, that's just one of those things that is not practical.—*Male, 30 years of experience, high compliance, Midwest Region*

However, several participants spoke positively about the culture of no longer performing 2-a-day practices:

> The last time I had double days was 2013 maybe? That came from the coaches' end because they realized the kids were pretty much worthless when you have a night practice, a morning practice, and then the next night. So, either the next night was going to be awful, or the morning practice was going to be awful.—*Female, 10 years of experience, high compliance, West Region*

Despite several participants discussing the positive effect of eliminating 2-a-day practices, one person addressed more intensive practice structures, particularly when coaches prioritized varsity games over those at lower levels (eg, junior varsity):

> So we may only…actually, probably only tackle 2 days a week as a varsity team. Now, the JV [junior varsity] kids unfortunately tackle Friday, Monday, Tuesday, Wednesday…How come the varsity guys get a day off. The JV kids don't. They're the ones who always get hurt…I don't think they [coaches] think about them [JV]. I don't think they think about it. Varsity guys, that's the one that matters, that's, you know, that's the one that gets you the playoffs.—*Female, 11 years of experience, low compliance, Northeast Region*

Logistical Support

As with school culture, the ATs cited many aspects of the school environment that could help or hinder their efforts to implement the NATA-IATF guidelines. Many individuals

had both positive and negative experiences related to logistical support. Specifically, role delineation (or the lack thereof) could influence logistical planning and implementation.

First, participants recognized the importance of having coach support to maintain oversight and progress toward guideline implementation. One respondent experienced difficulty in gaining support due to her coach's misunderstanding of their roles:

> [The coach said] kind of like, "Oh, well, that's your job." I'm like, "I know it's my job to educate them [the athletes], but it's your job to make sure that they all get there." And he doesn't seem to really see that. He just sees that as like since it's my job to educate them, it's my job to track them all down, and it's my job to organize all of it. It's like I don't have time. I can't do all of it. I could use a little help here, and he just doesn't seem to get that, so that's a problem for me. But it's a battle that's still being waged and every year we get a little bit better, but there's always something.—*Female, 19 years of experience, low compliance, Northeast Region*

Another AT described the benefit of always having multiple people, such as the coaches, ensuring that aspects of the guidelines were met:

> The coaches have been doing it [tracking student acclimatization], but I've been kind of double checking everything too, making sure that everybody is set up and ready to go and not having any issues.—*Female, 12 years of experience, high compliance, West Region*

Second, participants struggled with the availability of alternative venues in the event of bad weather and with the timing of practices. In certain instances, other sports needed to use the school's cafeteria or gymnasium, thus requiring schedule changes:

> Most of our athletes are in the cafeteria for their break [between 2-a-days]. If another team needs the cafeteria, then they kind of just. . .maybe [are] more enticed to start practice or something sooner or do the next round sooner or at least do some indoor activity without really giving them much of a break. Just to try and manage all those kids at once can be kind of difficult unless you have your designated space for them that's guaranteed.—*Male, 3 years of experience, high compliance, Midwest Region*

Several people discussed moving practices from afternoon to either early morning or early evening because of heat-related concerns. One participant stated,

> Nine years ago, our school district came down and said that all teams could have only 2 hours of practice and the time [was] to be from 7:00 to 9:00 in the morning.—*Male, 25 years of experience, low compliance, South Region*

In contrast, an AT was aware of the inability to reschedule practice due to logistical concerns about athletes being unable to attend:

> We're dependent on the Metro, so you're limited as to how early you could start practice because Metro doesn't run, and the kids couldn't get there and that kind of thing. You're not gonna get a kid up at 3 o'clock to catch a 4 o'clock bus to be at a 5 o'clock practice. It's not happening in the mornings.—*Female, 27 years of experience, high compliance, South Region*

Lastly, respondents noted the influence of sport seasons on guideline implementation:

> . . .for the last 100 years, [blinded] high school football played 9 games, the 10th week of the season is A, the first week of the playoffs for the teams that would make it, and B, it's a consolation game for teams that don't make it. They're trying to change that to play a true state championship, so they've extended the preseason, so 3 years to 4 years ago, the preseason started on or about August 25th, this year it's now August 8th.—*Male, 30 years of experience, high compliance, Northeast Region*

Resources

Several physical and tangible resources influenced, or would influence, the success of guideline implementation. These resources were related to the prevention and care of patients with EHI, as well as postworkout recovery.

The first category was prevention resources, including communication tools. One participant explained,

> There are some systems out there that's a really good communication tool between coaches, administrators, student-athletes, parents, and their athletic trainer, but it doesn't have anything like that built into it. It would be interesting if somebody developed a kind of subtool within a tool like that, but it could be used where every—all the parties involved in that athlete's health would know where they were at in the acclimatization process.—*Female, 15 years of experience, high compliance, West Region*

The second category pertained to providing adequate care to a patient during a suspected EHI event. This included having ice tubs, water and ice access on the field, and access to shade. One participant said, "Just having water access was a struggle." Another detailed,

> So some of the resources that we did make available is we have tubs of cold water towels, we had—we forced the athletic directors on both sides or the parent boosters or whoever it was to get cooling systems like the big swamp cooler and things like that, just—and maybe outlets available, we had water on top of water and access to ice, and they made it within close reach so that we could just go and pull that and bring it on their sideline.—*Female, 2 years of experience, low compliance, West Region*

The third category was postworkout recovery resources, such as having an indoor facility with air conditioning and access to nutrition. Concern focused on having these

resources adequately available to prevent future EHI events. An AT mentioned,

> There are situations because we have schools in our district that our kids do not have access to food. They go hungry. And in those cases, the coaches are alerted to that and we go out and buy peanut butter and bread and eat peanut butter and jelly sandwiches. One of the high schools I'm working at, we set up all summer long lunch and breakfast for athletes. They can come in and get breakfast and lunch for free. Because their parents don't have the resources to provide that to them, if they have parents.—*Male, 30 years of experience, low compliance, West Region*

Physical Environment

As part of the physical environment, participants generally described geographic location as the biggest facilitator and barrier to guideline implementation. Whether heat illness was perceived as a concern depended on whether the climate was warm or cold. One individual conveyed,

> Luckily, we didn't actually have any really hot days up in [blinded] for the fall camp last year, so it wasn't a super big factor as far as like practice times and, but I didn't really implement any guidelines. The coaches already have their practice schedule up and everything, and so they were the ones who kind of dictated that schedule.—*Female, 4 years of experience, low compliance, Midwest Region*

Another respondent described being proactive with practice times because of the warm climate:

> I've lived in [blinded] for close to a decade. So this environment is entirely different. There are specific times of the year that we may have to be very proactive, obviously fall camp is a time being one of them, but anything from July through October, you have to be very careful. So just paying attention to the weather overall is very important in how we conduct outside activities. We practice at night almost all the time so it's not even the radiation effect, it's just that…the sweat on your head cannot evaporate.—*Female, 10 years of experience, high compliance, West Region*

Consistency of Guidelines

Last, participants typically discussed the need for consistent guidelines between their standards of care (NATA-IATF guidelines) and the state associations. Of note, ATs typically preferred the NATA-IATF guidelines because of their relationship with their professional association as well as the clarity and conciseness of the guidelines themselves. As 1 person indicated,

> I think it's challenging when you have conflicting guidelines in terms of what your state policies are versus what's that practice, versus NATA. So obviously we have to follow what our state mandates, but those don't always clearly align with what the NATA is recommending, so when they differ, how do you navigate that to provide your best conditions for your athlete, when they don't line up, because really, I feel like the NATA usually puts things out more quickly than our state association follow[s], and it's harder to get coaches to buy into things when it's not something they're required to do.—*Female, 5 years of experience, low compliance, Midwest Region*

Respondents also addressed the need for guidelines to match local emergency medical services [EMS] systems recommendations to ensure continuity of optimal patient care:

> I think it [NATA-IATF] bridged quite well with the EMS crew. I know for our heat…like we had a heat illness episode during a cross-country meet and we were kind of shocked by the gap in knowledge that the EMS crew had, and I wouldn't say we kind of had a fight with it but, you know, I referenced one of the NATA documents and weighed it against what they had.—*Male, 3 years of experience, high compliance, Midwest Region*

DISCUSSION

In sports medicine research, applying public health frameworks allows researchers to connect their findings to the community at large. The TRIPP framework stated that the practice of injury prevention relies on a multistage approach to injury-prevention research.[13] Although this approach has previously informed injury-prevention research,[23–26] little is known about the later stages that aim to evaluate the implementation of injury-prevention practices. Outcome evaluation and process evaluation work in tandem to determine the overall effect of an injury-prevention intervention, including effectiveness, acceptance, and feasibility.[27]

This study was part of a larger examination of the TRIPP framework in the context of exertional heat illness prevention, particularly with respect to the NATA-IATF guidelines. We found that most often, the facilitators of and barriers to implementing the NATA-IATF guidelines were locally framed. These factors had both positive and negative influences, depending on the situation; however, most participants discussed them with a negative connotation. In addition, many similarities were evident in the factors described by high-compliance and low-compliance participants (Table 3), although the former group tended to discuss them in a more positive light. Because of the fluidity of local needs, ATs need to establish collaborative relationships and learn about their communities to optimize success, particularly when beginning a new position. Athletic trainers should take the initiative to interact with coaches, parents, and school administrators as well as to integrate themselves within their communities. For some ATs, that may mean attending nonathletic school events or community functions or joining community partnerships such as churches. For others, it may be occur through an informal but consistent presence in the community, such as

making a point of simply being at the school and educating themselves about the community as a whole.

The first set of categories we identified reflected the ability of the AT to adopt, implement, and manage the NATA-IATF guidelines due to access, role, and capability and capacity. In relation to AT access, public schools had greater access to full-time, part-time, and per diem AT services than private-sector schools.[28] Athletic trainer access affected the patient-AT relationship for the better by improving educational efforts and injury identification when providing care.[29,30] In this study, all respondents' schools had at least some level of access to ATs, even if that access was inadequate. Our participants noted access to ATs was a strong facilitator of implementation in terms of the physical presence of an individual with whom other sport stakeholders could interact. However, simply being present was not enough. Health care delivery can be significantly improved by having established team member roles.[31–33] Our respondents echoed similar sentiments with respect to their ability to implement the NATA-IATF guidelines by relying on athletes and coaches to play active roles. Despite this, for stakeholders to have active and successful roles in EHI prevention, the school and its administrators must also be supportive. Some of these supporting roles may include accountability and enforcement of the guidelines from an authoritative standpoint, as well as providing resources to ATs for adequate injury prevention and patient care. Therefore, ATs should work closely with their administrators to determine and agree on the ways in which their schools will enforce the guidelines, such as with financial or other incentives to support change. Additionally, school districts can come together to develop resources regarding EHI prevention and management to create a comprehensive and streamlined approach to patient care.

The next set of categories was related to school support, including cultural implications, logistical support and resources, and the physical environment in which the school is located. Although a newer concept in sports medicine, this topic has been widely discussed in the promotion of other health care behaviors, such as physical activity and nutritional interventions.[34–36] If the school has a culture that is unsupportive of health-promotion initiatives, ATs may struggle to implement guidelines without mandated support. Recent literature[10] endorsed the positive effect on compliance of a guideline mandate at the state level, particularly regarding compliance with most, if not all, guidelines. Oftentimes, this mandated support may be in the form of state athletic association requirements and state laws; a lack of either can indicate the absence of support. The mandated-support approach has been taken with several sports medicine concerns, including concussion. State concussion laws now mandate the guidelines that many schools must follow. However, these guidelines often differ from state to state.[37] Furthermore, even though mandated guidelines are helpful, they are not always the most feasible approach because of the communities in which they are implemented and inconsistencies with best practices.[37–39] Regardless of whether a mandate exists, it is imperative that the athletic administration play a leading role in supporting and driving guideline implementation, as these are barriers outside of an AT's control.

If such mandated support is instituted for EHI prevention, it must be consistent with best-practice documents such as the NATA-IATF guidelines. Participants noted having to abide by state athletic association policies that did not align with or even contradicted components of the NATA-IATF guidelines. In addition, state athletic association policies are typically less stringent and therefore fail to provide ATs with the weight to reinforce the NATA-IATF guidelines when they encounter reluctance from other sport stakeholders. Respondents suggested mechanisms of accountability and enforcement to require stakeholders to comply. However, mandates from state associations that comply with best-practice guidelines ultimately provide the best possible scenarios for making and implementing care decisions that benefit the student-athlete.

LIMITATIONS

We called on a convenience sample of ATs who had previously completed a survey regarding NATA-IATF guideline implementation, yet we randomly sampled and stratified individuals in the identified pool to represent all geographic regions and levels of compliance with guideline implementation. Additionally, respondents may have self-selected to participate in the interviews because of strong positive or negative feelings regarding the NATA-IATF guidelines. Therefore, further research is needed to understand the facilitators and barriers, as well as other factors, that affect all ATs, no matter where their schools are on the spectrum of guideline implementation.

CONCLUSIONS

In terms of the TRIPP framework, an injury-prevention intervention can only be as successful as each of its individual components. Hence, if feasibility, acceptability, or both are questioned, ultimately, the designed intervention will struggle to succeed. By examining these variables, we were able to understand the factors ATs faced when trying to comply with the NATA-IATF guidelines, but we can also help ATs learn from each other by showing how others successfully implemented the guidelines. Additionally, our work supported use of the SEM, which requires intervention at multiple levels of society to ensure success. The SEM has been endorsed previously[40] for concussion management with respect to building networks of support. Specifically related to EHI, the data supported targeting intrapersonal factors by supplying ATs with the education and self-efficacy to support implementation, interpersonal components by establishing strong collaborative networks for change, community and environmental factors by optimizing school culture and community resources for implementation, and policy aspects by establishing consistent guidelines across all bodies. At the same time, it is essential to continue longitudinal examinations of the effects of and compliance with the NATA-IATF guidelines, using such findings with previous results[9,10] as baseline measures that can be compared across time.

Athletic trainers should work to integrate themselves in their communities and schools to establish stronger relationships with athletes, parents, coaches, and administrators. Although strengthening relationships is not necessarily an easy task, it is essential to success. Therefore, ATs should interact to learn from one another's experiences,

communicate with their respective stakeholders, and take the initiative regarding implementation tactics in their schools. Targeted examples include bringing research, legal support, or both to administrators to prove the need for a particular policy; collaborating with administrators to create accountability and enforcement mechanisms directed at coaches; and educating athletes, parents, and coaches about the AT's role in sport safety in general, as well as in each community.

REFERENCES

1. Centers for Disease Control and Prevention. Heat illness among high school athletes—United States, 2005–2009. *MMWR Morb Mortal Wkly Rep*. 2010;59(32):1009–1013.
2. Kerr ZY, Casa DJ, Marshall SW, Comstock RD. Epidemiology of exertional heat illness among U.S. high school athletes. *Am J Prev Med*. 2013;44(1):8–14. doi:10.1016/j.amepre.2012.09.058
3. Nelson NG, Collins CL, Comstock RD, McKenzie LB. Exertional heat-related injuries treated in emergency departments in the U.S., 1997–2006. *Am J Prev Med*. 2011;40(1):54–60. doi:10.1016/j.amepre.2010.09.031
4. Yeargin SW, Kerr ZY, Casa DJ, et al. Epidemiology of exertional heat illnesses in youth, high school, and college football. *Med Sci Sports Exerc*. 2016;48(8):1523–1529. doi:10.1249/MSS.0000000000000934
5. Casa DJ, Csillan D; Inter-Association Task Force for Preseason Secondary School Athletics Participants. Preseason heat-acclimatization guidelines for secondary school athletics. *J Athl Train*. 2009;44(3):332–333. doi:10.4085/1062-6050-44.3.332
6. Racinais S, Alonso JM, Coutts AJ, et al. Consensus recommendations on training and competing in the heat. *Scand J Med Sci Sports*. 2015;25(suppl 1):6–19. doi:10.1111/sms.12467
7. Daanen HAM, Racinais S, Périard JD. Heat acclimation decay and re-induction: a systematic review and meta-analysis. *Sports Med*. 2018;48(2):409–430. doi:10.1007/s40279-017-0808-x
8. Bergeron MF, Bahr R, Bärtsch P, et al. International Olympic Committee consensus statement on thermoregulatory and altitude challenges for high-level athletes. *Br J Sports Med*. 2012;46(11):770–779. doi:10.1136/bjsports-2012-091296
9. Kerr ZY, Register-Mihalik JK, Pryor RR, et al. The association between mandated preseason heat acclimatization guidelines and exertional heat illness during preseason high school American football practices. *Environ Health Perspect*. 2019;127(4):047003. doi:10.1289/EHP4163
10. Kerr ZY, Register-Mihalik JK, Pryor RR, Hosokawa Y, Scarneo-Miller SE, Casa DJ. Compliance with the National Athletic Trainers' Association Inter-Association Task Force preseason heat-acclimatization guidelines in high school football. *J Athl Train*. 2019;54(7):749–757. doi:10.4085/1062-6050-373-18
11. Adams WM, Scarneo SE, Casa DJ. State-level implementation of health and safety policies to prevent sudden death and catastrophic injuries within secondary school athletics: response. *Orthop J Sports Med*. 2018;6(2):2325967117752129. doi:10.1177/2325967117752129
12. van Mechelen W, Hlobil H, Kemper HC. Incidence, severity, aetiology and prevention of sports injuries: a review of concepts. *Sports Med*. 1992;14(2):82–99. doi:10.2165/00007256-199214020-00002
13. Finch C. A new framework for research leading to sports injury prevention. *J Sci Med Sport*. 2006;9(1–2):3–10. doi:10.1016/j.jsams.2006.02.009
14. Rapport F, Clay-Williams R, Churruca K, Shih P, Hogden A, Braithwaite J. The struggle of translating science into action: foundational concepts of implementation science. *J Eval Clin Pract*. 2018;24(1):117–126. doi:10.1111/jep.12741
15. Wiltsey Stirman S, Kimberly J, Cook N, Calloway A, Castro F, Charns M. The sustainability of new programs and innovations: a review of the empirical literature and recommendations for future research. *Implement Sci*. 2012;7:17. doi:10.1186/1748-5908-7-17
16. Durlak JA, DuPre EP. Implementation matters: a review of research on the influence of implementation on program outcomes and the factors affecting implementation. *Am J Community Psychol*. 2008;41(3–4):327–350. doi:10.1007/s10464-008-9165-0
17. Shelton RC, Lee M. Sustaining evidence-based interventions and policies: recent innovations and future directions in implementation science. *Am J Public Health*. 2019;109(S2):S132–S134. doi:10.2105/AJPH.2018.304913
18. Bronfenbrenner U. Toward an experimental ecology of human development. *Am Psychol*. 1977;32(7):513–531. doi:10.1037/0003-066X.32.7.513
19. Hill CE, Knox S, Thompson BJ, Williams EN, Hess SA, Ladany N. Consensual qualitative research: an update. *J Couns Psychol*. 2005;52(2):196–205. doi:10.1037/0022-0167.52.2.196
20. Hill CE, Thompson BJ, Williams EN. A guide to conducting consensual qualitative research. *Couns Psychol*. 1997;25(4):517–572. doi:10.1177/0011000097254001
21. Census regions of the United States. US Census Web site. http://www.census.gov/const/regionmap.pdf. Published 2009. Accessed December 4, 2016.
22. Walker JL. The use of saturation in qualitative research. *Can J Cardiovasc Nurs*. 2012;22(2):37–46.
23. Verhagen EALM, van Mechelen W. Sport for all, injury prevention for all. *Br J Sports Med*. 2010;44(3):158. doi:10.1136/bjsm.2009.066316
24. Verhagen EALM, van Stralen MM, van Mechelen W. Behaviour, the key factor for sports injury prevention. *Sports Med*. 2010;40(11):899–906. doi:10.2165/11536890-000000000-00000
25. Orr B, Brown C, Hemsing J, et al. Female soccer knee injury: observed knowledge gaps in injury prevention among players/parents/coaches and current evidence (the KNOW study). *Scand J Med Sci Sports*. 2013;23(3):271–280. doi:10.1111/j.1600-0838.2011.01381.x
26. Lloyd D, Cook J, Gabbe B, et al. Translating the scientific evidence for preventing lower limb injuries into training guidelines: the role of mechanistic versus clinical versus epidemiological studies. *J Sci Med Sport*. 2011;14 (suppl 1):E6–E7. doi:10.1016/j.jsams.2011.11.016
27. Moore GF, Audrey S, Barker M, et al. Process evaluation of complex interventions: Medical Research Council guidance. *BMJ*. 2015;350:h1258. doi:10.1136/bmj.h1258
28. Pike AM, Pryor RR, Vandermark LW, Mazerolle SM, Casa DJ. Athletic trainer services in public and private secondary schools. *J Athl Train*. 2017;52(1):5–11. doi:10.4085/1062-6050-51.11.15
29. Wallace J, Covassin T, Nogle S, Gould D, Kovan J. Knowledge of concussion and reporting behaviors in high school athletes with or without access to an athletic trainer. *J Athl Train*. 2017;52(3):228–235. doi:10.4085/1062-6050-52.1.07
30. Kerr ZY, Lynall RC, Mauntel TC, Dompier TP. High school football injury rates and services by athletic trainer employment status. *J Athl Train*. 2016;51(1):70–73. doi:10.4085/1062-6050-51.3.02
31. Zenzano T, Allan JD, Bigley MB, et al. The roles of healthcare professionals in implementing clinical prevention and population health. *Am J Prev Med*. 2011;40(2):261–267. doi:10.1016/j.amepre.2010.10.023
32. Adams WM, Mazerolle SM, Casa DJ, Huggins RA, Burton L. The secondary school football coach's relationship with the athletic trainer and perspectives on exertional heat stroke. *J Athl Train*. 2014;49(4):469–477. doi:10.4085/1062-6050-49.3.01
33. Welch Bacon CE, Erickson CD, Kay MC, Weber ML, Valovich McLeod TC. School nurses' perceptions and experiences with an

interprofessional concussion management team in the secondary school setting. *J Interprof Care*. 2017;31(6):725–733. doi:10.1080/13561820.2017.1345873
34. Deschesnes M, Martin C, Jomphe Hill A. Comprehensive approaches to school health promotion: how to achieve broader implementation? *Health Promot Int*. 2003;18(4):387–396. doi:10.1093/heapro/dag410
35. Storey KE, Montemurro G, Flynn J, et al. Essential conditions for the implementation of comprehensive school health to achieve changes in school culture and improvements in health behaviours of students. *BMC Public Health*. 2016;16(1):1133. doi:10.1186/s12889-016-3787-1
36. Webster CA, Beets M, Weaver RG, Vazou S, Russ L. Rethinking recommendations for implementing comprehensive school physical activity programs: a partnership model. *Quest*. 2015;67(2):185–202. doi:10.1080/00336297.2015.1017588
37. Kim S, Connaughton DP, Spengler J, Lee JH. Legislative efforts to reduce concussions in youth sports: an analysis of state concussion statutes. *J Leg Asp Sport*. 2017;27(2):162–186. doi:10.1123/jlas.2016-0007
38. Faure CE, Moffit DM, Schiess K. Concussion law compliance: the allocation of time, resources, and money in a rural, Western state. *Am Secondary Educ*. 2015;44(1):4–27.
39. Flaherty MR, Raybould T, Jamal-Allial A, et al. Impact of a state law on physician practice in sports-related concussions. *J Pediatr*. 2016;178:268–274. doi:10.1016/j.jpeds.2016.08.025
40. Gioia GA, Glang AE, Hooper SR, Brown BE. Building statewide infrastructure for the academic support of students with mild traumatic brain injury. *J Head Trauma Rehabil*. 2016;31(6):397–406. doi:10.1097/HTR.0000000000000205

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