

Athletic Trainers' Observations of Social Determinants of Health in the Collegiate Setting: A Card Study

Kelsey J. Picha, PhD, ATC*‡; Cailee E. Welch Bacon, PhD, ATC‡§, Cassidy Evans Windsor, DAT, Joy Lewis, DO, PhD§, Alison R. Snyder Valier, PhD, ATC, FNATA‡§¶

*Department of Interdisciplinary Health Sciences, A.T. Still University, Mesa, AZ

‡ Department of Athletic Training, A.T. Still University, Mesa, AZ

§ School of Osteopathic Medicine in Arizona, A.T. Still University, Mesa, AZ

¶ Department of Research Support, A.T. Still University, Mesa, AZ

Corresponding Author: Kelsey J. Picha, PhD, ATC

Address: A.T. Still University
5850 E. Still Circle
Mesa, AZ 85206

Phone: (480) 245-6250

Email: kpicha@atsu.edu

Twitter: [@KelseyPicha](https://twitter.com/KelseyPicha)

Cailee E. Welch Bacon, PhD, ATC

Address: A.T. Still University
5850 E. Still Circle
Mesa, AZ 85206

Phone: (602) 633-5235

Email: cwelch@atsu.edu

Twitter: [@CaileeEWelch](https://twitter.com/CaileeEWelch)

Cassidy Evans Windsor, DAT, LAT, ATC

Address: Roswell High School
11595 King Road
Roswell, GA 30075

Phone: (470) 663-4275

Email: cassidy.windsor@sourceatlanta.com

Joy H. Lewis, DO, PhD

Address: A.T. Still University
5850 E. Still Circle
Mesa, AZ 85206

Phone: 307-200-7009

Email: jhlewis@atsu.edu

Alison R. Snyder Valier, PhD, AT, FNATA

Address: A.T. Still University
5850 E. Still Circle
Mesa, AZ 85206

Phone: (480) 219-6034

Email: arsnyder@atsu.edu

Twitter: [@ValierFam](https://twitter.com/ValierFam)

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Online First

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5 **ABSTRACT**

6 **Context:** Addressing social determinants of health (SDH) in all populations improves patient
7 outcomes, leading to better patient-centered care. Despite known influences of SDH, little is
8 known about the ability of athletic trainers (ATs) to observe SDH in practice.

9 **Objective:** To explore ATs' observations of SDH and describe actions taken at the point-of-care
10 in college/university settings.

11 **Design:** Descriptive via an observational card study.

12 **Setting:** Athletic training facilities.

13 **Participants:** ATs (23 participants across 20 institutions) employed in the college/university
14 setting.

15 **Data Collection and Analysis:** ATs used a modified observation card to document observations
16 of SDH during patient encounters in the college/university setting. Cards contained instructions
17 for completion and a table with 4 columns: (1) a list of 19 predetermined SDH, (2) checkbox for
18 observed SDH, (3) checkbox for perceived negative influence of observed SDH on patient
19 health, and (4) open box to write in what actions, if any, were taken to address the observed
20 SDH.

21 **Results:** Overall, 424 cards were collected. Of 725 observed SDH, access to social media
22 (153/725, 21.1%), academic stressors (131/725, 18.1%), and behavioral health issues (71/725,
23 9.8%) were the most commonly observed. Nearly 39% (281/725) had a perceived negative

24 influence. Of those, academic stressors (49/281, 17.4%), behavioral health issues (46/281,
25 16.4%), and transportation issues (32/281, 11.4%) were most common. For the 23.0% (166/725)
26 of SDH acted on, ATs used counseling and education (73/166), provided additional resources
27 (60/166), referred to others (29/166), or communicated with others (4/166).

28 **Conclusions:** Because ATs are positioned to accurately assess SDH, they can promote better
29 patient-centered care and improve patient outcomes. Our results suggested many SDH observed
30 by ATs in the college/university setting had a negative influence on patient health. Better support
31 for patients with behavioral health issues and academic stressors is important because these SDH
32 were commonly perceived to negatively influence health and well-being.

33 **Abstract Word Count:** 300/300

34
35 **Key Words:** athletic healthcare, patient outcomes, social factors, academic stressors, behavioral
36 health

37 38 **Key Points**

- 39 • Social determinants of health are observed by athletic trainers in the college/university
40 setting and are often perceived to negatively influence patient health.
- 41 • Because behavioral health was commonly perceived to negatively influence patient
42 health, athletic trainers should be aware of best practice guidelines for mental health
43 emergency action plans and policies and procedures.
- 44 • Referral and education were common actions taken by athletic trainers to address the
45 negative influence of social determinants of health, which emphasized their ability to
46 mitigate these at the point-of-care.

47 The athletic training profession is advancing efforts toward recognizing and studying the
48 circumstances in which patients live, learn, work, play, and grow and determining how those
49 conditions influence health and well-being.¹⁻⁴ These conditions, known as social determinants of
50 health (SDH), have been reported to influence health more than the care provided through
51 traditional healthcare services, in both positive and negative ways.^{5, 6} Further, SDH have been
52 categorized by the CDC into 5 domains that are interconnected: economic stability, education
53 access and quality, healthcare access and quality, neighborhood and built environment, and
54 social and community context.⁷ Although the influences of SDH can be both positive and
55 negative, much of the research focuses on the negative influence due to the lasting effects on
56 health, as well as the contribution to widening of health disparities. For example, individuals
57 who do not earn an income above the poverty line (economic stability) may be unable to afford
58 housing in a safe neighborhood (neighborhood and built environment), and those living in
59 neighborhoods with more social disorder may have higher rates of anxiety and depression.⁸
60 Often the result of the unequal allocation of power and resources,⁹ these factors can negatively
61 influence mental, physical, and social well-being and may prevent optimal individual and
62 population health.^{6, 7} Therefore, SDH should be recognized by clinicians as an integral part of
63 healthcare.

64 Recognition and assessment of SDH may lead to interventions that mitigate negative
65 effects in populations at various societal levels, improving patient-centered care and leading to
66 better patient outcomes.^{7, 9, 10} Public health efforts and interventions have the ability to reduce the
67 negative influences of SDH on individual and population health. At the patient level, when
68 physicians in the United Kingdom referred their patients with known anxiety, stress, or
69 depression to social services, the patients' symptoms improved.¹¹ Similarly, when children in the

70 United States were screened for their basic needs and providers referred families to community
71 resources for support, positive outcomes included childcare for the children, fuel to meet
72 transportation needs, and a reduction in homelessness.¹² At the community level, a faith-based
73 organization in the Dominican Republic provided youth baseball athletes attending a sports
74 academy with an education in addition to the opportunity to play sports.¹³ Partners of this
75 organization indicated a positive influence of the academies noting that they promoted equity
76 and education and kept the youth off the street.¹³ These examples highlight the potential for
77 implementation of interventions as long as there is recognition of the negative influence of SDH
78 on a population. To date, research on SDH has primarily focused on nonathletic populations, yet
79 there are calls to investigate the athletic population for better support and understanding of these
80 athletes.^{4, 14}

81 Despite the health benefits of sport participation, individuals participating in sport are
82 still susceptible to the influence of SDH, and clinicians in athletic healthcare are just now
83 recognizing their impact.¹⁵⁻¹⁸ Although athletes participate in various settings, a central setting
84 for athletic healthcare is the college/university. Participation in college/university athletics often
85 places an athlete in regular communication with athletic trainers (ATs). ATs have reported
86 managing patient cases where a variety of SDH were negatively influencing their patients' well-
87 being.¹⁹ Because of their unique position in the athletic healthcare system and because they are
88 often the only healthcare provider an athlete interacts with regularly,¹⁵ ATs are in an optimal
89 position to assess SDH. In college/university settings, ATs are likely the first provider an athlete
90 seeks care from. Additionally, ATs in this setting have many opportunities to create meaningful
91 patient encounters, build trusting relationships, and initiate difficult conversations.
92 Unfortunately, there is limited evidence describing the SDH that affect college athletes and the

93 strategies used to reduce their negative influence. More intentional observation and
94 documentation of SDH may highlight trends, which may result in the ability to address
95 significant issues affecting college athletes. When ATs recognize SDH and identify trends in
96 their own practice, they will be better positioned to support their patients, provide guidance
97 toward the appropriate resources, and facilitate referrals.²⁰ Therefore, the purpose of the current
98 study was to explore ATs' observations of SDH and describe actions taken at the point-of-care in
99 college/university settings.

100

101 **METHODS**

102 **Design**

103 The current study used a descriptive design. observational prevalence card study design.
104 Card studies are designed to collect large samples of data over a short period at the point-of-care
105 without altering or changing the care provided or the interaction between the clinician and
106 patient.^{21,22} Prevalence card studies collect clinician observations about the prevalence of a
107 certain phenomenon in clinical practice.²¹ This study design allowed the research team to gain
108 insight about the SDH observed by ATs at the college level during patient encounters. The study
109 was approved by the sponsoring University's institutional review board.

110 **Participants**

111 We recruited ATs employed in the college/university setting through criterion-based
112 convenience sampling. An individual was considered eligible to participate if they were certified
113 by the Board of Certification and currently providing athletic training services in a
114 college/university setting. A convenience sample of 45 ATs were contacted by a member of the
115 research team by e-mail to determine their interest in the study. Additionally, ATs were recruited

116 through social media sites, including Twitter and Facebook. If an AT saw a social media posting
117 and was interested in participating, they were asked to contact the principal investigator using the
118 e-mail address provided on the post. Twenty-three ATs who met the inclusion criteria expressed
119 interest in participating in the study.

120 **Instrumentation**

121 To achieve the study aims, the research team used an observation card to collect data
122 about SDH during meaningful patient encounters. For the current study, a meaningful patient
123 encounter was defined as “an interaction that occurs through verbal communication and/or
124 physical examination.”²³ An example of a meaningful encounter is when a patient receives
125 passive stretching by the AT after practice and the AT engages in conversation about how the
126 patient felt throughout practice. Wrapping an ice bag on the athlete without any clinically
127 relevant discussion is not considered a meaningful patient encounter.

128 To create the SDH observation card, 3 members of the research team (AAA, BBB, CCC)
129 requested permission to modify a previously validated SDH card developed to capture SDH
130 observations of primary care providers.²² The main modifications adjusted the wording on the
131 card, so it was relevant and appropriate for ATs. Once all modifications were made, the SDH
132 card was re-reviewed by a content expert (DDD) and 2 experienced ATs to ensure modifications
133 were appropriate and the card maintained readability and comprehensibility. The content expert
134 has expertise in SDH and experience conducting observational research using a card study
135 design. Based on feedback from the content expert and ATs, no additional modifications were
136 made.

137 The final SDH card (Figure) was 9 inch × 6 inch and included basic instructions for
138 completion of the card on the front side and a table to record SDH observations on the back.

139 Each card consisted of a table with 4 columns: (1) a list of predetermined SDH, (2) checkbox for
140 observed SDH, (3) checkbox for perceived negative influence of observed SDH on patient
141 health, and (4) open box to write in what actions, if any, were taken to address the observed
142 SDH. Based on the 5 domains of SDH, 19 SDH were listed in the first column with an option to
143 add another SDH if a factor other than those listed was observed. At the bottom of the card, there
144 were 2 additional checkbox options that stated “I am unsure if this patient is affected by any of
145 the listed social factors,” and “I did not observe any of the listed social factors.” Participants
146 could check either or both boxes. Cards were designed to be completed in less than 30 seconds.
147 Table 1 outlines the domain (economic stability, education access and quality, healthcare access
148 and quality, neighborhood and built environment, and social and community context) of each
149 specific SDH.

150 To establish the feasibility and validity of the study methods, we conducted a pilot study
151 with 17 different ATs than those in the final analysis employed in the college/university or
152 secondary school setting. Over a 2-week period, the 17 athletic trainers returned 122 cards and
153 reported an average of 1.5 SDH per card (range 0-8). Based on review of the data collected
154 during the pilot study, we noted that the SDH listed as “job/academic stressors” did not allow for
155 differentiation between a job and an academic stressor. Therefore, we split this factor into 2
156 separate factors for data collection.

157 **Procedures**

158 Once eligible ATs agreed to participate in the study, they were asked to complete a brief
159 demographic questionnaire. Before data collection, each participating AT was sent a packet
160 through postal mail that included instructions, 30 blank SDH cards, a definition sheet for all

161 SDH listed on the cards, and a prepaid, preaddressed envelope to return all materials to study
162 investigators.

163 A week before data collection, each participating AT completed online training hosted in
164 the Qualtrics platform (Qualtrics LLC, Provo, UT). The training provided an overview of SDH
165 and their importance in healthcare. It also reviewed the study procedures and participant
166 expectations. The online training took approximately 20-30 minutes to complete. The principal
167 investigator followed up with each participant after the training to answer any remaining
168 questions before the data collection period.

169 Data collection for the study began in August 2021 and ended in May 2022. We stratified
170 data collection efforts, so only 2 of the 23 ATs were completing SDH cards at any time to ensure
171 observations were being made during each month of the academic year. To guarantee ATs would
172 observe the most representative sample of their patient panels, we asked each AT to indicate the
173 most appropriate months for them to conduct the observations, and we strategically scheduled
174 them to collect data within that timeframe. During the assigned collection period, each AT
175 collected data over a 2-week period or until they completed the 30 cards provided, whichever
176 came first. After each meaningful patient encounter, the AT completed the SDH card. Once the
177 ATs finished data collection, they returned their completed cards in the provided envelope
178 through postal mail to the principal investigator. After completion of the study, each AT was
179 provided a study honorarium for their participation.

180 **Data Analysis**

181 Once completed SDH cards were received, a member of the research team manually
182 entered the data into Microsoft Excel (Microsoft Corp., Redmond, WA). Quantitative and
183 qualitative analyses were conducted on the collected data. Descriptive statistics were used to

184 characterize quantitative data, including demographic characteristics of ATs, frequency of cards
185 completed, frequency of SDH observed, and frequency of SDH the ATs' perceived to have a
186 negative influence. Qualitative analyses were used to characterize the reported actions taken by
187 ATs. To investigate which SDH were observed by participating ATs, we used a deductive
188 thematic analysis²⁴; the 9 SDH outlined by the National Academies of Sciences, Engineering,
189 and Medicine⁹ served as the predetermined themes that guided data analysis. To analyze these
190 open-ended responses when ATs indicated and described an action taken to mitigate the
191 negatively perceived SDH, qualitative data analyses were conducted using a deductive thematic
192 analysis,²⁴ and the multiple phases were guided by a modified consensual qualitative research
193 (CQR) approach.^{25, 26} This approach was selected to guide data analysis for the open-ended
194 response data, so the research team could explore the actions taken by ATs when SDH were
195 observed and perceived to have a negative influence on the patient's health. The rigorous
196 multiphase approach of CQR requires multiple analysts to minimize researcher bias and achieve
197 consensus during each phase.^{25, 26} We used a 3-person data analysis team to complete the
198 multiphase analysis process, 2 researchers were new to the CQR methodology and were trained
199 by the third team member,²⁶ who had extensive experience with the method. Additionally, an
200 internal auditor was used to review all final data analysis and confirm accuracy and
201 representativeness of the study findings.^{25, 26} During the first phase, the identified SDH was
202 blinded, and only the responses for the actions taken were analyzed. Each member of the data
203 analysis team reviewed the first 50 rows and developed an initial codebook of emergent
204 categories. Next, the data analysis team met to discuss the categories and developed a consensus
205 codebook. During the second phase, each member coded 50 new responses using the initial
206 codebook. The team then met again to discuss the codes and confirm the codebook. During the

207 third phase, all open-ended responses were coded and reviewed by each team member until
208 consensus was achieved. Finally, the coded responses were categorized by the SDH listed, and
209 descriptive statistics were calculated to establish the frequency of each category. The internal
210 auditor reviewed all study findings once data analysis was completed to ensure researcher bias
211 was minimized and the participant responses were accurately represented.

212 **RESULTS**

213 Overall, 424 observation cards were collected from 23 ATs (age = 28.1 ± 3.7 years) from
214 20 different colleges/universities (Table 2). Each AT collected a mean of 18.4 ± 9.2 observation
215 cards. In 78% (331/424) of patient encounters, SDH were observed, whereas in 22.0% (93/424)
216 of patient encounters, no SDH were observed, and in 4.0% (17/424) of patient encounters, ATs
217 recorded being “unsure” whether an SDH was observed. There were 725 SDH observed across
218 all cards, and 38.8% (281/725) were perceived to have a negative influence on the patient’s
219 health (Table 3). The top 3 SDH observed were access to social media and emerging
220 technologies (153/725, 21.1%), academic stressors (131/725, 18.1%), and behavioral health
221 issues (71/725, 9.8%). The 3 SDH observed the least were educational limitation (1/725, 1.4%),
222 poverty/near poverty (3/725, 4.1%), and homeless/poor or unstable living conditions (5/725,
223 6.9%). Neighborhood safety was not observed by ATs.

224 The top 3 reported SDH that were perceived to have a negative influence on patient
225 health were academic stressors (49/281, 17.4%), behavioral health issues (46/281, 16.4%), and
226 transportation issues (32/281, 11.4%) (Table 3). Although not observed as often as other SDH,
227 when insufficient/lack of health insurance (15/18, 83.3%), food insecurity (8/11, 72.7%), and
228 poor social support (24/39, 61.5%) were observed, ATs also perceived these SDH to negatively
229 influence patient health.

230 Of the 725 SDH observed, ATs reported acting on 25.0% (181/725) of them. Of those
231 181, 15 reported actions were deemed unclear; the handwriting of the response was illegible or
232 undecipherable by the data analysis team without making assumptions about the action taken.
233 Therefore, 166 responses about the actions taken were included in our qualitative analyses (Table
234 3). Four categories emerged for the actions taken by ATs to address SDH: counseling and
235 education (73/166), providing additional resources (60/166), referral to others (29/166), and
236 communication with others (4/166). The most common SDH where actions were taken were
237 behavioral health, lack of health literacy, and transportation issues.

238 **DISCUSSION**

239 In the current study, we described ATs' observations of SDH and investigated actions
240 taken at the point-of-care in college/university settings. Although interest in SDH and their
241 influence on health is increasing, research exploring the influence of SDH in athletic healthcare
242 and the role of ATs in mitigating these SDH is limited.^{1, 27-30} Our results suggested many SDH
243 observed by ATs in the college/university setting had a negative perceived influence on patient
244 health. These results support foundational findings that ATs in the college/university setting
245 observe SDH in their daily practice which often require intervention.

246 The most commonly observed SDH by ATs in the college/university setting was social
247 media use. Access to and use of social media has been on the rise with the majority of users in
248 the age range of 18-29 years.³¹ Like all SDH, social media can have a positive or negative
249 influence on health and well-being.^{32, 33} For these college/university athletes, social media and
250 emerging technologies were not often perceived by the ATs to negatively influence health,
251 possibly because the patients had access to education, healthcare, and sport. However, previous
252 studies suggest that prolonged use of social media is related to increases in sedentary behavior,

253 anxiety, depression, and stress.^{32,34, 35} In college freshman students, a strong positive correlation
254 between sleep quality and social media use has been previously identified, indicating worse sleep
255 quality with increased use of social media.³⁶ Although our ATs did not document these potential
256 negative effects, awareness of the potential negative effects of social media and emerging
257 technologies may help with early detection of issues so they can be addressed sooner.

258 In the current study, academic stressors and behavioral health were the 2 SDH that were
259 most observed and most perceived to negatively influence patient health. These findings were
260 not surprising since previous studies have reported that a common cause of mental distress in
261 collegiate athletes is academics.^{37,38} To address this issues, the National Collegiate Athletic
262 Association created a mental health and athlete wellness task force to develop a Mental Health
263 Best Practices consensus document³⁹ that could guide coaches and healthcare providers on best
264 practices for navigating mental health issues in college athletes. The document outlines the
265 importance of mental health screening in preparticipation physicals and the need for emergency
266 action plans for mental health emergencies; it also identifies the appropriate clinical staff to
267 manage such situations. Although an AT may be the first to recognize an athlete's behavioral
268 health condition, the document recommends that a licensed mental health provider handle the
269 behavioral health conditions. This recommendation highlights the importance of creating teams
270 of medical professionals to support the care of athletes.^{39, 40} Taken together, results of the current
271 study and recommendations from the consensus document suggest that ATs in the
272 college/university setting should be prepared with EAPs, policies, and procedures to handle
273 behavioral health conditions and emergencies.^{39, 40}

274 Despite ATs in this study not reporting social medial and emerging technologies as
275 negatively influencing patient health, social media's contribution to behavioral health conditions

276 cannot be ignored. Athletic trainers in this study may not have been in a position to attribute
277 behavioral health conditions observed to use of social media, yet research has indicated that
278 young adults use of social media may undermine their well-being.⁴¹ Additionally, addiction to
279 online social networking is being studied and in some work considered an addiction disorder.⁴²
280 These types of studies have used several scales and questionnaires in combination to determine
281 social media effects on behavioral health. Athletic trainers with concerns about social media
282 addiction or its relationship to patient behavioral health issues may want to administer one of the
283 following or in combination: Addictive Behavior Questionnaire, Online Social Support Scale,
284 Rosenberg Self-Esteem Scale, the Beck Depression Inventory, or Patient Health Questionnaire-9
285 depression screen.⁴² Before implementing screenings or questionnaires such as these, ATs need
286 to consider what the results may yield and have the appropriate plans in place.

287 Although less commonly observed than academic stressors and behavioral health, we also
288 identified insufficient/lack of health insurance (83.3%), food insecurity (72.7%), and poor social
289 support (61.5%) had high percentages of perceived negative influence on patients. When
290 compared with the total number of observations, insufficient/lack of health insurance had the
291 highest perceived negative influence on overall health than all other observed SDH (15/18,
292 83.3%). Having access to health insurance has been preliminarily linked to higher use of
293 healthcare services, and it is essential in the United States to have access to quality care.⁴³ In
294 2017, the American College Health Association reported that 82.8% of college students had
295 some form of health insurance; 2.4% did not, and 0.8% were not sure.⁴⁴ The limited observation
296 of health insurance issues in this study may be because many institutions require health insurance
297 to participate in sports. The college setting is unique because some institutions also cover all
298 additional costs of healthcare for student athletes. However, the financial amount that a college

299 setting covers for external services varies between institutions.⁴⁵ Even though a
300 college/university may cover all healthcare costs for student athletes, ATs need to be aware of
301 the costs of healthcare, so they can reduce potential costs for patients through their clinical
302 decisions, especially for those who have insufficient insurance. The negative influence of this
303 SDH is particularly important since ATs are often the only healthcare provider in a community
304 and may manage untreated health conditions because of lack of insurance or quality healthcare.¹⁵

305 The prevalence of food insecurity among college students in the United States ranges
306 from 20%-50%,⁴⁶⁻⁴⁸ which is higher than the general population.⁴⁹ That percentage may seem
307 high for our reported observations, but athletes are a subset of the college population that may
308 require further study. Further, although student athletes are often provided with meals or snacks
309 during the seasons depending on the institution, ATs may not be observing food insecurities
310 because this resource is in place to feed student athletes. Regardless, our findings indicated when
311 food insecurity was observed it was perceived as a serious problem. In a review article,
312 Freudenberg et al⁴⁷ provided examples of how college campuses can and have responded to food
313 insecurity, which could be used in athletic programs. For example, in collaboration with the
314 college/university and an athletic program/department, ATs could create food pantries, set aside
315 funds for emergency situations, or prepare meal vouchers for student athletes.⁴⁷ Having
316 information readily available would be beneficial when this SDH is observed, so athletes in need
317 can access community food banks or enroll in the Supplemental Nutritional Assistance Program.

318 The role of social support in individual health and well-being is crucial. In general, social
319 support refers to a person's social network, social norms, values, and cultural background.⁵⁰
320 Consequences of poor social support or isolation include high blood pressure, a weaker immune
321 system, heart disease, obesity, and mental health conditions.⁵¹ In the current study, ATs

322 recognized the negative influence of social support in their patient populations. In athletic
323 healthcare, ATs provide vital support to their patients during the recovery and rehabilitation
324 process and may be an additional source of support when it is perceived to be missing. Previous
325 studies in the college setting have indicated that social support provided by ATs reduces patient
326 anxiety and depressive symptoms after injury.^{2,27} Athletic trainers have also reported managing
327 patient cases where social support negatively influenced patient health, and they strongly agreed
328 with its importance in athletic healthcare.¹⁹ The current study adds to the existing literature that
329 acknowledges ATs' ability to observe and intervene when social support is negatively
330 influencing patient health.

331 Although important in the global context of society, ATs in our study did not often
332 observe educational limitations, poverty, and homelessness. This result was unsurprising because
333 all the patients observed by the ATs were enrolled in college and, as a part of the college
334 experience, may have had housing. Therefore, ATs may not consider education itself an issue
335 since their patients are actively enrolled in college. Additionally, many college/university
336 athletes live in dorms or are provided with housing expenses. Unless specific questions are asked
337 about living in poverty or homelessness, some athletes may not divulge such information. Our
338 ATs also did not observe the SDH of neighborhood safety. An explanation for this result may be
339 that this SDH is not naturally discussed in athletic healthcare or does not generally apply to those
340 living in dorms. Perhaps in the university setting, education and housing concerns are addressed
341 by the university instead of the student. In general, these SDH are not easily observed without
342 additional questioning, a screening tool, or an established relationship. Athletic trainers may
343 want to directly inquire about how safe an athlete feels in their neighborhoods or what their
344 housing situation is if not living in a dorm.

345 Because SDH are often intertwined, the SDH that were not observed in our study may
346 have presented as other SDH that were observed. Even though these SDH were limited or not
347 observed in the study, ATs should not assume that the student athlete has not experienced these
348 SDH before attending university or that they are not currently experiencing them. Instead, ATs
349 should assess SDH through regular use of patient-reported outcome measures, or already
350 established screening tools, which may lead to deeper conversations and understanding,
351 potentially highlighting some of the more difficult SDH to observe. Ultimately, improved
352 observation, assessment, and intervention of SDH that negatively influence patient health may
353 lead to better health equity in athletic healthcare.

354 Participating ATs in the current study were not only observing the influence of SDH in
355 their patients, but they were also trying to mitigate some of the perceived negative influences. As
356 illustrated in the current study, ATs are well versed in providing education to their patients and
357 being an advocate for their patients. The main actions used by our ATs to address the negative
358 influences of SDH were counseling and education, additional resources, referral to others, and
359 communicating with others. Although ATs are taking action to mitigate the negative influence of
360 SDH, action was only reported in about 25% of cases where a SDH was perceived to be
361 negatively influencing health. As health care providers, ATs awareness and observation of SDH
362 is not enough to improve patient outcomes and they should continue to provided support to
363 patient experiencing a negative impact of SDH when appropriate or possible. These findings
364 indicate a need for additional resources to mitigate the negative influences of SDH. Specifically,
365 academic stressors, behavioral health issues, health literacy, and transportation were commonly
366 perceived to have a negative influence on patient health and were the SDH that ATs reported

367 acting on the most. Future studies should expand these findings to determine which resources
368 ATs are missing to provide better care and direction for athletes in need.

369 Athletic trainers continue to be advocates for their patients through observation and
370 actions to address SDH negatively influencing health. Further, continued observation, with the
371 addition of assessing SDH, will help ATs align with the Institute of Medicine's 6 aims for
372 improving healthcare quality when making clinical decisions.⁵² Making a conscious effort to
373 clinically practice in a manner that prioritizes these criteria can help address SDH found through
374 assessment and intervention.⁵²

375 **Limitations**

376 One limitation of the current study was its observational design. We chose this design for
377 our card study because it captures what is occurring in the environment and gathers information
378 about the current state of practice. However, it does not allow for shifts in clinical practice or the
379 opportunity to confirm observations with others. Another limitation is that some SDH may be
380 less observable than others. Since study participants were specifically instructed to not alter their
381 clinical practice or ask questions they normally would not, it is possible that some SDH were not
382 observed even though they were impacting the patient's life. Additionally, this study did not
383 inquire about the positive influences of SDH. Despite the limitations of this study design, large
384 amounts of data can be collected quickly at many sites without too much additional work for the
385 clinician, providing a foundation for future SDH research.²¹ Future research should confirm the
386 observations of SDH made by ATs with patients' experiences.

387 **CONCLUSIONS**

388 Overall, the results of the current study suggested ATs employed in the college/university
389 setting are observing and perceiving the negative influences of SDH in their clinical practice.

390 Athletic trainers are also acting to mitigate the negative influence of SDH through counseling
391 and education, additional resources, referral to others, and communication with others.
392 Importantly, ATs in this setting seem prepared to address behavioral health issues and academic
393 stressors, which were the most commonly observed SDH in the current study and were most
394 often perceived to negatively influence SDH. Ways to address these issues may include having
395 mental health Emergency Action Plans, policies, and procedures in place and providing
396 resources and access to individuals who can help student athletes struggling with mental health.
397 Although the current study supports the ability of ATs to observe and act on perceived negative
398 influences of SDH in their clinical practice, future research should focus on patient confirmation
399 of ATs' observations and the best methods of SDH assessment in this population so that
400 appropriate interventions can be developed.

401

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Figure. Example of the Social Determinants of Health Data Collection Card

Front of Card

Social Determinants of Health Card Instructions

Place an “x” on the grid for all that apply to this patient encounter.

Columns

A. **Observe:** Observe your patient for social factors. Check the box only if you observe the corresponding social factor.

If you observed a social factor, complete columns B and C for that social factor.

B. **Negative Impact:** Evaluate the impact of the social factor on the patient’s health. Check the box only if you believe the social factor has a negative impact on the patient’s health.

C. **Action Taken:** If you took action to address the observed social factor, enter a brief statement regarding the action taken (eg. education, counseling, referral, resources).

Back of Card

	A	B	C
Social Factors	Observed Social Factors	Negative Impact on the Patient’s Health?	Action Taken
Access to social media/emerging technologies			
Behavioral health issues			
Cultural beliefs/values			
Educational limitations			
Family care demands			
Individual/family life circumstances			
Poor social support			
Language barrier			
Lack of health literacy			
Poverty/near poverty			
Insufficient/lack of health insurance			
Food insecurity			
Homeless/poor or unstable living conditions			
Transportation issues			
Migrant/immigration status			
Neighborhood safety			
Substance use/abuse			
Academic stressors			
Job stressors			
Other			

I am unsure if this patient is affected by any of the listed social factors

I did not observe any of the listed social factors

Table 1. Social Determinants of Health Categories and Examples

Category	Example	Outcome	Social Determinant of Health Collected
Economic Stability	Having an income above the poverty line	More opportunities for safe housing, healthy food, and private health insurance.	<ul style="list-style-type: none"> • Job stressors • Poverty/near poverty
Education Access and Quality	Access to good schools of all age levels	Increases the likelihood of obtaining higher paying jobs, access to scholarships, and better economic stability.	<ul style="list-style-type: none"> • Academic stressors • Educational limitations • Language barrier
Healthcare Access and Quality	Access to health insurance, medications, preventative screening, and overall access to healthcare	Proactive and preventative approaches to care can be taken, compared to reactive, decreasing the rate of disease and cost of care.	<ul style="list-style-type: none"> • Insufficient/lack of health insurance • Lack of health literacy
Neighborhood and Built Environment	Violence within a neighborhood, unsafe air or water (or lack of access to), structural integrity, pest control	When basic needs are met rates of illness, injury, and disease decrease.	<ul style="list-style-type: none"> • Neighborhood safety • Transportation issues • Homeless/poor or unstable living conditions • Food insecurity
Social and Community Context	Relationships from home, work, and within the community	Strong social support systems allow individuals to thrive, improving health and quality of life	<ul style="list-style-type: none"> • Poor social support • Individual/family life circumstances • Family care demands • Cultural beliefs/values • Behavioral health issues • Access to social media/emerging technologies • Substance use/abuse • Migrant/immigration status

Table 2. Demographic Characteristics of Participating College/University Athletic Trainers (N = 23)

Characteristic	No. (%)
Sex	
Male	5 (21.7)
Female	18 (78.3)
Race	
White	17 (73.9)
Black or African American	2 (8.7)
Other	1 (4.3)
Unreported	3 (13.0)
Highest degree attained	
Bachelor's	3 (13.0)
Master's	12 (52.2)
Clinical doctorate	2 (8.7)
Academic doctorate	2 (8.7)
Unreported	4 (17.4)
Years as a certified AT	
0-4	9 (39.1)
5-10	5 (21.7)
11-15	3 (13.0)
16-20	1 (4.3)
Unreported	5 (21.7)

Abbreviation: AT, athletic trainer.

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Table 3. Athletic Trainers' Observations of Social Determinants of Health and the Actions Taken When Social Determinants of Health Were Perceived to Have a Negative Impact on Health

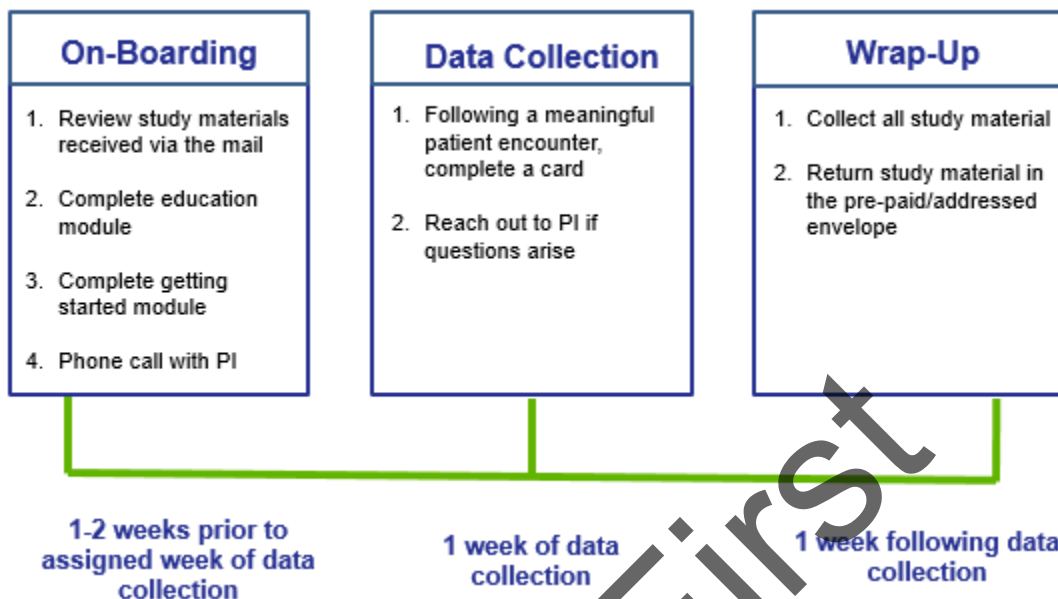
Social Determinant of Health	Observations		Action Taken				
	Observed in a Patient	Perceived as a Negative Impact on Patient Health	Counseling and Education	Provide Additional Resources	Referral to Others	Communication with Others	Total
Access to social medial/emerging technologies	153	13	5	2	1	0	8
Academic stressors	131	49	5	8	3	0	16
Behavioral health issues	71	46	17	4	13	0	34
Transportation issues	56	32	0	20	0	0	20
Lack of health literacy	50	27	21	2	0	1	24
Individual/family life circumstances	46	24	2	2	5	0	9
Poor social support	39	24	8	1	0	0	9
Job stressors	37	11	4	2	0	0	6
Language barrier	23	4	0	2	0	1	3
Cultural beliefs/values	23	2	0	0	0	0	0

Social Determinant of Health	Observations		Action Taken				
	Observed in a Patient	Perceived as a Negative Impact on Patient Health	Counseling and Education	Provide Additional Resources	Referral to Others	Communication with Others	Total
Family care demands	22	7	0	4	2	0	6
Insufficient/lack of health insurance	18	15	1	6	3	0	10
Migrant/immigration status	14	2	0	0	0	0	0
Substance use/abuse	13	7	4	1	1	0	6
Food insecurity	11	8	3	2	1	2	8
Other	9	6	2	0	0	0	2
Homeless/poor or unstable living conditions	5	3	1	3	0	0	4
Poverty/near poverty	3	1	0	1	0	0	1
Educational limitations	1	0	0	0	0	0	0
Neighborhood safety	0	0	0	0	0	0	0
Total	725	281	73	60	29	4	166

Data are reported as frequency.

Social Determinants of Health Card Study Instructions

Thank you for agreeing to take part in this study! Below provides instruction and guidance as you work through your responsibilities.



Step 1: On-boarding

- Complete education and getting started modules.
 - Access these through the link the PI emailed you
- Familiarize yourself with study materials
 - This instruction sheet
 - 1 Definitions sheet
 - 30 Social determinants of health cards
 - 1 pre-paid return envelope
- Phone call with PI to answer any questions or concerns

Step 2: Data Collection

- Record observations on cards following patient interaction
 - 1 card per patient, please no repeats!
 - Must be meaningful encounter (prevention, evaluations, treatment, rehabilitation)

Step 3: Wrap-up

- Mail all study materials back to PI
 - 30 Social determinants of health cards
 - Completed
 - Blank
 - Definitions sheet

*Upon return of study materials, your compensation will be processed and sent.

Contact the PI at any time if you have questions or concerns!

Social Determinants of Health Card Study Instructions

Definitions Sheet

Social Factors	Factors you feel are present and affect the person's overall health or well-being. Base answers on patient interaction. Do not refer to the patient.
Access to social media/emerging technologies	Interactions with news, Instagram, Facebook, Twitter, or other technology.
Behavioral health issues	Emotions, behaviors and/or biology relating to a person's mental well-being, their ability to function in everyday life and their concept of self (eg. anxiety, depression, attention disorders).
Cultural beliefs/values	Attitudes, behavior, and values that characterize the functioning of a group or organization.
Educational limitations	Access or lack of access to learning opportunities and literacy development. Can also include difficulty reading, listening, asking questions or applying information.
Family care demands	Responsibility of supporting themselves and others financially or responsibility of caring for others such as siblings or elderly parents.
Individual/family life circumstances	The dynamics of the family which may include parents (or the individual) being separated or divorced, blended families, illness or death.
Poor social support	Lacks assistance from other people and lacks a supportive social network, this could be from family, friends, teammates, or coaches.
Language barrier	Primary language not English; inability to communicate freely and openly with provider.
Lack of health literacy	Observed difficulty processing and understanding medical information and processes. Can include difficulty reading, listening, asking questions or applying information.
Poverty/near poverty	Income is below poverty line, not enough to meet basic needs or just enough to meet basic needs, but nothing extra.
Insufficient/lack of health insurance	Either no health insurance or has insurance which is not sufficient to cover medical expenses or doesn't cover medications. Prohibits seeking care or follow-up.
Food insecurity	Does not have reliable access to sufficient quality of affordable, nutritious food. Does not know where next meal is coming from. Might live in area with limited access to nutritious food.

Social Determinants of Health Card Study Instructions

Homeless/poor or unstable living conditions	Does not have permanent housing, may live on the streets, in a shelter, mission, abandoned building, vehicle or any unstable non-permanent situation.
Transportation issues	Hard to get to appointments due to lack of transportation. Does not own vehicle or family does not own vehicle, can't afford public transportation, lives far from public transportation or services are unreliable.
Migrant/immigration status	Person is a migrant who relocates frequently due to work availability. Not born in US, now living here legally or illegally. Can have difficulty obtaining public assistance if 'illegal'. May be child with legal status whose parents do not have legal status.
Neighborhood safety	Not feel safe going outside in neighborhood, threat of crime/violence. Under stress from environment. Children can't play outside, can't exercise, hard to get to appointments.
Substance use/abuse	Use or excessive use of alcohol, drugs, or steroids.
Academic stressors	Schedule demands, course rigors, grade or achievement concerns.
Job stressors	Schedule demands, job rigors, achievement concerns.
Other: _____	Any other social determinant of health not listed on this card.

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