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Healthcare Utilization and Provider Workload in Collegiate Student Athletes for Acute, Overuse, Time-

Loss and Non-Time-Loss Injuries

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### 2 Time-Loss and Non-Time-Loss Injuries

### 3 ABSTRACT

4 **Context**: Limited real-world data demonstrate healthcare provided by collegiate sports medicine teams, 5 across a variety of sports and injury categories that could inform appropriate staffing and workload. 6 **Objective:** To describe athletic training (AT) services and physician encounters (PE) for acute and 7 overuse injuries, stratified by gender and time-loss (TL) status. **Design**: Descriptive epidemiology. 8 Setting: Sports medicine facilities at 12 institutions participating in the PAC-12 Health Analytics 9 Program. Patients or Other Participants: Division I collegiate student-athletes. Main Outcome Measures: Injury counts were associated with AT services and PE. Percentages of cases which received 10 either none or  $\geq 1$  AT service and PE were calculated. Descriptive data were provided with confidence 11 12 intervals, with rates calculated per-injury and per-team-season. Results: From 27,575 injuries, 266,910 AT services were provided, with 11,988 PE associated across 31 different sports (M 15; W 16) 13 completing 947 team-seasons (M 416; W 531). Almost half of AT services (47.2%) and PE (48.4%) were 14 dedicated to acute-NTL and overuse TL and NTL injuries. Percentages of cases receiving any AT 15 services varied by injury category of acute TD and -NTL and overuse-TL and -NTL (63.9% to 80.1%), 16 while PE ranged from 33% to 59%. When ranking AT services per-injury and per-team-season, the sports 17 18 with the highest rates were more frequently categorized as low to moderate risk in the Appropriate 19 Medical Coverage of Intercollegiate Athletics, rather than increased risk. Conclusions: Lower or 20 moderate risk sports demonstrated substantial healthcare utilization in AT service rates per-injury and 21 per-team-season. Additionally, those services were frequently directed at overuse and NTL injuries, rather 22 than predominantly acute-TL. Our findings suggest a potential mismatch between provider workload and 23 historic risk categorization calculated by injury risk and treatments per-injury. These data should inform 24 and update considerations for appropriate staffing levels, differential workload assignments, and 25 alignment with clinical best practices.

26 Key Words: Athletic training services, physician encounter, sports injury epidemiology, point-of-care

### Abstract Word Count: 296 (out of 300)

### 28 **INTRODUCTION**

29 Health information technology offers the promise of greater insight into clinician workload, 30 injury burden, and associated healthcare utilization. By leveraging common electronic medical records 31 (EMR) systems across multiple institutions, many clinicians may contribute to a single large dataset, with 32 standard definitions, thereby providing more representative and generalizable findings. Point-of-care data 33 within an EMR represents the treatments and services provided and documented by treating clinicians.<sup>1</sup> In 34 sports medicine settings, point-of-care data illustrate how clinicians spend their time, if student-athletes are able to access services and providers, and if care is provided equitably and in concordance with 35 evidence based guidelines.<sup>1,2</sup> However, there are limited real-world examples of point-of-care data in 36 different athletics settings, demonstrating which sports may require or receive more healthcare than 37 others.<sup>2-6</sup> With increased emphasis on non-traditional seasons, year-round practice and training, and the 38 advent of EMR, point-of-care data related to healthcare utilization has changed dramatically.<sup>5</sup> 39 Categorizations of injuries have also evolved, to include increased emphasis on non-time-loss 40 (NTL) injuries in addition to time-loss (TL), as well as both acute and overuse mechanisms of injury.<sup>6-8</sup> A 41 recent increased emphasis on overuse and NTL injuries<sup>6</sup> may be reflected in point-of-care data. In a study 42 on overuse injuries in high school and collegiate athletes, the authors reported high overuse injury rates 43 per 10,000 athlete-exposures, ranging from 2.85 to 19.59 across a variety of sports.<sup>9</sup> In the collegiate 44 45 athletes, women had higher rates of overuse injuries than men in all sex-comparable sports except soccer, with the highest rates occurring in noncontact running sports.<sup>9</sup> Sports with high injury rates, including 46 47 injuries from overuse mechanisms, may necessitate greater healthcare utilization than previously documented.<sup>9</sup> Another study on overuse and acute injuries in collegiate athletes indicated women had a 48 49 three-times higher rate of overuse injury compared to men, though that study did not find differences when testing across sex-comparable sports.<sup>10</sup> A different 2-year multi-site study reported NTL injury rates 50 were 3.5 times higher than TL for men, and 5.1 times higher for women.<sup>5</sup> NTL injuries necessitated more 51 treatments than TL injuries in that study.<sup>5</sup> The tennis, cross country, track and field, swimming and golf 52

53	teams demonstrated lower TL injury rates compared to other sports, but their NTL injury rates
54	approached those for basketball, soccer, and volleyball. <sup>5</sup> The authors reported that, regardless of
55	"perceived level of risk," similar workload and personnel were needed across teams to provide athletic
56	training services (AT services) when NTL injuries were included in the analysis. <sup>5</sup> Clinician
57	documentation may be impacted by perceptions of injury significance, patient load, and lack of training,
58	formal policies and time. <sup>2,11</sup> Incorporating NTL injuries and overuse mechanisms into sports injury
59	epidemiology may paint a more detailed picture of injury burden and clinician workload, <sup>6</sup> specifically in
60	sports historically labeled as "lower risk" or "technical." <sup>7</sup> Distinguishing healthcare utilization by
61	mechanism of injury and time-loss status may provide a clearer picture of injury and clinician burden in a
62	collegiate environment. <sup>5,6,12,13</sup>
63	The Appropriate Medical Coverage for Intercollegiate Athletics (AMCIA) document presents a
64	Base Health Care Index value by sport using historical injury rate and treatments per-injury data. <sup>14</sup> The
65	risk of catastrophic injury was incorporated, to classify sports by risk level, in an effort to provide
66	guidance for onsite medical coverage. The document may also be used to calculate potential staffing
67	levels, though staffing levels at collegiate institutions are not well documented, nor is AT full-time
68	equivalent (FTE) by team assignment. <sup>5,15,16</sup> "Big data," including multi-site, standardized EMRs may
69	better capture how much healthcare clinicians are currently providing. <sup>1</sup> Assessing healthcare utilization
70	across all teams, including women's and those historically designated lower risk or technical sports will
71	better inform appropriate staffing levels. <sup>5-7,15</sup> Documenting the distribution of services across injury
72	categories, with per-injury and per-team level rates can provide a more accurate and nuanced picture of
73	clinician workload. These data may be used to inform team assignments and distribution of effort for
74	athletic trainers (ATs), team physicians, and other sports medicine personnel.
75	The Pac-12 previously implemented a conference-wide EMR and associated injury registry with
76	standardized definitions. <sup>17,18</sup> Capturing injuries, illnesses, and associated point-of-care data across
77	multiple institutions and teams over several years could provide relevant, real-world data documenting

78 current healthcare utilization for analysis. Specifically, even in a high-resource Division I setting, the

79 question remains whether student-athletes are able to access appropriate care and providers equitably and

80 at the levels wanted or needed.<sup>15,16</sup> Thus, our purpose was to describe AT services and physician

81 encounter (PE) for acute and overuse injuries, stratified by TL status and gender, comparing healthcare

82 utilization to existing risk categorization.

### 83 METHODS

### 84 Study Design

This descriptive epidemiologic study reported healthcare utilization for sports-related injuries where medical attention was sought from an athletic trainer. Injuries were classified as acute or overuse mechanisms, and designated TL or NTL status. Healthcare utilization associated with an injury case included the number of AT services provided and presence of an associated physician encounter (PE). The secondary analysis described here is part of a larger, overarching initiative on injuries in a collegiate conference,<sup>17</sup> specific to overuse and NTL injuries.<sup>19,20</sup>

### 91 Participants

The project was reviewed and approved by both the local Institutional Review Board and by the 92 Pac-12 Student-Athlete Health and Well-Being Initiative (SAHWBI), which oversaw research activities 93 for the Health Analytics Program (HAP) injury registry.<sup>17,18</sup> As part of the HAP and SAHWBI, student-94 athletes provided authorization to their home institution to allow their injury data to be used for 95 research.<sup>17,18</sup> Conference member institutions enrolled in a staggered fashion over the course of the study. 96 During the first two years, IT institutions provided injury data for student-athletes who provided 97 98 authorization from all sponsored teams (July 2018-June 2019 and July 2019-June 2020). Twelve institutions were represented in the 3<sup>rd</sup> vear (July 2020-June 2021) and 4<sup>th</sup> vear (July 2021-June 2022).<sup>17,18</sup> 99 100 Due to COVID, NCAA activities were suspended from March to June of 2020, thus team practices and 101 competitions did not occur during that period.

### 102 **Procedures**

Injuries and associated healthcare utilization were documented by treating clinicians in Presagia
Sports (Montreal, Quebec, Canada). Those data were integrated into the HAP, and stored via Amazon

105	Web Services (AWS, Seattle, WA, USA). A campus administrator housed within the athletic department
106	at the institution provided oversight for data entry accuracy, compliance, and quality checks. <sup>17</sup> A
107	Common Data Elements document and definitions were provided. <sup>17,18</sup> Injury data were de-identified and
108	migrated to a repository. Only student-athletes' who authorized injury cases to be used were migrated. <sup>17,18</sup>
109	All migrated cases had met an end-point or conclusion of the clinical management of the injury/illness as
110	determined by athletic trainers providing care. <sup>17,18</sup> The authors had no access to identifiable data or
111	participants. The research portal was queried each July from 2019 to 2022, and de-identified data were
112	provided to the research team. A unique identification number unrelated to either the student-athlete or
113	the injury incident was used to de-identify the student-athlete. Institutional information was removed,
114	with only gender and sport associated with each injury case. Only sports with at least 2 sponsoring
115	conference institutions were included. All other single teams were excluded to assure de-identification.
116	Institutions adopted quality assurance and control measures, which were repeated at the injury registry
117	level. <sup>17,18</sup> Two members of the research team reviewed each injury record prior to inclusion. Excluded
118	entries were those with blanks in injury mechanism (acute or overuse), TL/NTL status, or injury type.
119	Due to the set-up of the registry and authorization by student-athletes, rates are reported as per-
120	injury and per-team-season. <sup>3,6,7</sup> Approximately 90% of student-athletes authorized their injuries to be used
121	for research. <sup>17</sup> Athlete-exposures were not captured for individuals and linked to the injury registry.
122	Rather, team sponsorship by institution, along with roster size for each year, were abstracted from
123	publicly available institutional websites, and validated with the Equity in Athletics Disclosure Act
124	website. <sup>19-21</sup>

### 125 **Definitions**

Acute injuries were defined as those with symptoms presenting within 24 hours after the initial onset of injury with a specific precipitating event. Overuse injuries had an extended period of time for symptom onset, with no clear precipitating event. This aligns with the established "mechanism of gradual onset...with underlying pathogenesis of repetitive microtrauma" definition.<sup>8</sup> TL injuries were defined as 130 those restricting participation for at least 24 hours, while NTL were categorized as restricting

131 participation less than 24 hours.<sup>4</sup>

AT services included any type of evaluation, manual therapy, modality, therapeutic exercise, testing or skill session, and were recorded as counts for each case.<sup>3,4</sup> The presence or absence of any associated physician level encounter was also recorded.<sup>17</sup> The AMCIA document lists and stratifies sports by injury risk (lower, moderate, increased). Sports represented in this study were categorized to their AMCIA injury risk level.<sup>14</sup>

137 Statistical Analyses

Injury occurrence was reported for the data collection period by gender and sport, stratified by 138 mechanism of injury and TL status.<sup>6,19,20</sup> Associated healthcare utilization reported the number of AT 139 services provided, along with the mean AT services provided per-injury with 95% confidence 140 intervals.<sup>4,22,23</sup> The occurrence of an associated PE was also reported. AT services per-injury and per-team 141 season were calculated, as were the percentage of injury cases that received any AT service ( $\geq 1$ ) or PE. 142 AT services per-injury and per-team season were rank ordered, and concordance of the rank ordering to 143 the AMCIA injury risk category was determined.<sup>14</sup> Sports included in this study were matched to their 144 AMCIA risk level (lower, moderate, and increased) and categorized by level. There were 16 increased 145 risk matched sports, 8 moderate risk matched, and 7 increased risk matched. For concordance, if the 146 sports designated as "increased risk" in AMCIA, we assessed if that sport also demonstrated a higher rank 147 order for AT services per-injury and per-team season for this data, applying categorical agreement by 148 149 percentages. The percentage of cases that received any AT service and any PE were also assessed for 150 concordance to injury risk category.

151 **RESULTS** 

152 Athletic Training Services

The number of student-athletes who authorized their injury records to be used for research, along with injury cases included and excluded are reported in Figure 1. Supplemental Table 1 provides the number of team-seasons for each sport and number of injuries with associated AT services, stratified by 156 mechanism and TL status. A total of 266,871 AT services were provided for the 27,575 injuries included 157 in this study. Of those total AT services, acute-TL represented 52.8% (140,928/266,871). The remaining 158 47.2% represented acute-NTL at 17.9% (47,687/266,871), overuse-TL at 16.0% (42,708/266,871), and 159 overuse-NTL at 13.3% (35,548/266,871). NTL injuries in our sample, whether acute or overuse mechanism, represent 31.2% of AT services provided in this sample. Only injuries for which medical care 160 161 was sought were included in this study, and overall 71.1% (19,618/27,575) of all injuries subsequently 162 received some type of subsequent AT service, with sports varying from 41.6% to 85.5% (Figure 2). 163 Men's sports with the highest AT services per-injury across acute-TI\_and -NTL and overuse-TL and -NTL categories were tennis, baseball, soccer and football (Figure 3). Across the different 164 165 mechanisms and TL status, volleyball, track and field, and cross country also appeared in the top 3 sports (Supplemental Table 1). Women's sports with the highest AT services per injury across all mechanisms 166 167 and TL status were gymnastics, soccer, volleyball and basketball (Figure 3). Across different mechanisms and TL-status, women's swimming also appeared in the top 3 sports (Supplemental Table 1). 168 For AT services provided per-team-season, football was ranked first for men's teams (Figure 4). 169 The next ranked men's teams were soccet, baseball, basketball, volleyball, or track and field, depending 170 on the injury mechanism and TL status category (Supplemental Table 2). For women, the top three sports 171 included were either basketball, soccer, gymnastics, softball, track and field or rowing, depending on the 172 173 category (Supplemental Table 2

174 **Physician Encounters** 

Table 1 provides PE by mechanism and TL status. From 11,988 PE, 6,191 were associated with acute-TL injuries (51.6%). Men's injuries accounted for 61.1% of PE (7,321/11,988) (Table 1). Football demonstrated the highest PE per-team-season (Table 1). The next highest ranked men's teams were men's wrestling, soccer, volleyball and basketball. Women's highest PE per-team-season were rowing, track and field, gymnastics, and soccer (Table 1). Only 43.5% (11,988/27,575) of all injuries had an associated PE, varying from 32.9% to 56.7% across sports (Figure 5).

181 Appropriate Medical Coverage for Intercollegiate Athletics Concordance

When categorizing sports using the AMCIA injury risk groupings,<sup>14</sup> AT services per-injury 182 ranged from 1.9 to 16.3 (Figure 3). Ranges included 2.6 to 11.5 (lower risk sports), 5.7 to 14.7 (moderate 183 184 risk) and 1.9 to 16.3 (increased risk) for AT services per-injury (Figure 3). When injury categories were 185 combined and sports were ranked by AT services-per-injury, the 7 highest ranked in this study were as 186 follows (AMCIA risk level indicated in parentheses): women's gymnastics (increased risk), women's 187 soccer (moderate risk), women's volleyball (moderate risk), and women's basketball (moderate risk), 188 followed by men's tennis (lower risk), women's track and field (lower risk), and women's swimming 189 (lower risk) (Figure 3). For AT services per-team season, increased risk sports ranged from 15.0 to 190 1855.1, while moderate were 90.2 to 494.2 and lower risk at 7.2 to 333.0 (Figure 4). Combining injury categories and ranking sports by AT services per-team-season (AMCLA risk level indicated in 191 parentheses), the 7 highest ranked in this study were football (increased risk), women's soccer (moderate 192 193 risk), women's gymnastics (increased risk), and women's basketball (moderate risk), men's soccer (moderate risk), and women's track and field (lower risk) and women's volleyball (moderate risk) (Figure 194 195 4). When concordance by injury risk categorization and rank AT services per-injury was assessed, 1 196 out of 7 sports (14%) matched for increased risk (women's gymnastics), 2 out of 8 (25%) for moderate 197 risk (men's soccer and women's lacrosse), and 8 out of 16 (50%) for lower risk (men's and women's 198

swimming) (Figure 3). Concordance for injury risk categorization and rank AT services per-team-season

cross country, men's and women's rowing, men's and women's golf, men's water polo, and men's

demonstrated 2 out of 7 (29%) matched for increased risk, 2 out of 8 (25%) for moderate risk, and 11 out

- 202 of 16 (69%) for lower risk (Figure 4). Concordance for percent of injuries receiving any AT service
- ranged from 14 to 63% (Figure 2), while concordance for percent of injuries receiving PE ranged from 14
- to 50%, depending on AMCIA risk categorization level (Figure 5).

### 205 **DISCUSSION**

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206 Our most important finding was that approximately 53% of AT services and PE were directed at 207 acute-TL injuries, while the remaining 47% addressed acute-NTL and overuse-TL and -NTL injuries. When assessing AT services per-injury and per-team season, sports classified as lower or moderate risk still demonstrated substantial healthcare utilization. With this discrepancy, a potential mismatch may occur between provider workload and historic risk categorization calculated by injury risk and treatments

211 per-injury.

### 212 Collegiate Student-Athlete Healthcare Utilization

213 ATs in this study targeted just over half of their services toward acute-TL injuries (52.8%), 214 meaning almost half of their services treated acute-NTL and overuse-TL or -NTL injuries (47.2%). 215 Currently, evaluation of relative risk of injury for sports medicine staffing recommendations does not adequately address NTL injuries, nor are healthcare services provided considered, which would impact 216 clinician workloads.<sup>5</sup> AT services provided in this study for NTL (acute or overuse) were lower at 31.2% 217 than previous reports across Division I, II, and III at 57.9%.<sup>5</sup> Men in this study received 52.7% of all 218 treatments compared to 63.6% reported previously.<sup>5</sup> Our results highlight the need for more data, across 219 different Division levels and teams, to accurately depict healthcare utilization to estimate clinician 220 workload. In the 20 years since the last study, AT services provided for women and for overuse and NTL 221 injuries may have increased, or may be within a larger range than previously reported.<sup>5</sup> Future healthcare 222 utilization studies should include both acute and overuse mechanisms with TL status in order to 223 appropriately depict clinician workload for ATs and team physicians. Healthcare utilization and 224 225 associated clinician workload may vary by setting and over time as the sports medicine profession evolves. Accurate documentation of workload is needed to achieve appropriate staffing and resource 226 227 allocation.

### 228 Frequency of Healthcare Utilization and Athletic Training Staffing

Our results for mean AT services-per injury for men and women (Figure 3) overlapped with previous reports but were generally lower.<sup>5</sup> When teams were rank ordered in descending order of AT services-per-injury (Figure 3), several teams appeared in the highest ranks across previous results and our results, with some inconsistencies.<sup>5</sup> Alternatively, reporting healthcare utilization by team-season represents a different view of clinician workload, across sport assignments (Figure 4). Clinicians and administrators may use these results to demonstrate differences in demand for AT services, and thus
 clinician workload, across a range of sports. Healthcare utilization may encompass a broader range than
 previously reported<sup>5</sup> and should be refined to help inform staffing in a variety of settings.

237 When comparing treatments-per-injury across the same teams for NTL injuries, our range was 2.6 to 14.7 (Supplemental Table 1), while a previous study reported 6.9 to 22.4.<sup>5</sup> AT services per-injury data 238 239 reported here were skewed and demonstrated large 95% Confidence Intervals. Differences in sports 240 included, exposures, documentation, and team roster size may account for the inconsistency and 241 underscore the need for healthcare information technology, supported by EMRs, to accurately document 242 healthcare consumed by student-athletes. When men's sports were ranked for AT services-per-injury, our results were quite consistent with a previous report,<sup>5</sup> highlighting football, baseball, and soccer, followed 243 by tennis and track and field as having high frequency of healthcare utilization (Figure 3). Only men's 244 basketball was not consistent.<sup>5</sup> When women's sports were ranked for AT services-per-injury, our results 245 were less consistent with the previous report<sup>5</sup> with only volleyball, basketball, and soccer consistently 246 highly ranked. We differed in that women's swimming and gymnastics were highly ranked, as opposed to 247 softball,<sup>5</sup> and women's tennis and water polo appeared in our ranks. In women's sports specifically, 248 increases in training demand and improved access to ATs may have evolved in the last 20 years since the 249 previous report and changed healthcare utilization. Technical or repetitive sports, such as those 250 highlighted in our results, may have greater demand for healthcare related to overuse injury mechanisms 251 or NTL injuries. Focused clinical efforts on overuse and NTL injuries may require additional sports 252 253 medicine or sports performance staffing to support those initiatives.

Assessing healthcare utilization per-team-season allows for understanding of clinician workload across sport assignments, not accounting for roster size and injury rate, which may vary substantially by team. Football far eclipsed other sports for AT services provided per-team-season (Figure 4). However, in both men's and women's teams, mid- to small-roster teams were consistently ranked highly for AT services per-team-season, rather than only large roster sports. Even small teams, typically with fewer than 20 athletes, are likely seeking and receiving substantial AT services over the course of a year (Figure 4). Smaller teams may have greater access to an AT, potentially benefitting from a smaller clinician:patient ratio, and may receive more AT services per injury. Alternately, the small- to mid-size roster teams may represent repetitive or technical sports, which may have higher treatment demands for overuse and NTL injuries.<sup>7</sup> It's unclear if clinicians are providing additional care because of the nature of the injury, if patients are seeking it, or if volume of care is due to staffing levels, and there is an unmet healthcare utilization need in larger roster sports.

266 Lastly, our results indicated 28.9% of injuries had no documented AT services associated with 267 them (Figure 2). It's unclear if this value is attributable to lack of documentation or that clinicians deemed treatments or services unnecessary or unimportant. It may indicate there is an unmet need for healthcare, 268 or that adequate documentation isn't supported or enforced. Alternately, student-athletes may be 269 comfortable reporting minor injuries that do not require any treatment. This lack of documented 270 treatments, coupled with differences in the means and rank ordering across AT services per-injury 271 compared to per-team-season, indicate a likely complex relationship among sport and associated clinician 272 workload. Factors including roster size, types of injuries occurring, number and types of treatments 273 provided, and patient to clinician ratios should be considered when depicting workload accurately. 274 Comprehensive EMRs, with appropriate documentation, would provide utilization data in different 275 metrics to ensure adequate staffing to meet healthcare demand. 276

277 Concordance of Healthcare Utilization and Risk Injury Categorization

Our results indicate that, when focusing on AT services provided per-team-season and per-injury, there appears to be a potential mismatch between AMCIA assigned risk-level and amount of healthcare utilization, or provider workload, in this sample. While football consistently ranked first and often at a much higher level than other sports, women's teams demonstrated consistently higher rates of AT services per-injury and per-team season, even in gender matched sports. Sports classified as lower or moderate risk, while likely at lower risk of catastrophic injury, may require substantial provider workload to treat injuries. 285 Appropriate staffing of sports medicine providers is a current challenge, particularly in collegiate settings.<sup>15,16</sup> Powell and Dompier<sup>5</sup> noted different workforce levels (or staffing) across Division I, II, and 286 287 III levels in their study that likely influenced the amount of care provided for TL versus NTL injuries. 288 Division I was noted to have the highest 1,625 AT treatments per FTE AT position, and also a substantially greater number of ATs employed compared to other settings.<sup>5</sup> They indicated, at the time of 289 290 publication 20 years ago, demand from student-athletes for AT services was likely present, but it was unclear if it could be met with existing staffing levels in different settings.<sup>5</sup> A recent survey completed by 291 292 the Intercollegiate Council for Sports Medicine, College/University Compensation Task Force of more than 1,000 collegiate ATs across Division I, II, II, National Association of Intercollegiate Athletics and 2-293 year institutions indicated over half of respondents were providing care for more than 100 student-294 athletes.<sup>16</sup> Anecdotally, respondents to the task force's inquiry indicated concerns they could not meet the 295 demand for care for student-athletes in terms of preventative care, one-on-one rehabilitation or corrective 296 exercises.<sup>16</sup> Our data may demonstrate that real-world healthcare utilization does not consistently align 297 with risk of catastrophic or severe TL injury. When total AT services per-injury and per-team-season 298 were ranked by team and compared to the AMCIA risk category assigned, we found agreement in 50-299 69% of the lower risk category. Thus, half to two-thirds of lower risk sports were receiving fewer AT 300 services per-injury, or per-team-season. Concordance decreased to 25% agreement in the moderate risk 301 category and 14% to 29% in the increased risk category for AT services per-injury and per-team-season. 302 303 Student-athletes in increased risk sports were not consuming the most AT services in this sample. Rather, 304 it was moderate to lower risk sports. While considering catastrophic or severe TL injury risk for 305 categorization, contemporary healthcare utilization demands may not be reflected in the AMCIA. 306 Team Physician Encounters and Staffing

There are almost no existing data and limited recommendations for physician-level care and staffing in collegiate student-athletes with which to compare our data.<sup>24-27</sup> A previous study indicated physician visits per-team annually ranged from 1 to 16 at an NCAA DI-Football Championship Subdivision (FCS) institution with 600 student-athletes across 28 men's and women's teams.<sup>25</sup> At a musculoskeletal complaints, per-capita visits ranged from 0.4 to 11.0.<sup>25</sup> Our data broadly matches and
extends this range reported (Table 1). Another FCS institution indicated over 1,332 physician evaluations
annually, including initial and follow-up visits.<sup>26</sup> The authors' rank ordering of athlete evaluations by

weekday team physician clinic for student-athletes seeking care for musculoskeletal and non-

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sport in descending order was football, women's soccer, men's lacrosse, men's crew, women's basketball,

and men's hockey. This order does not align with ours (football, men's basketball, women's track and

field, women's soccer, men's baseball, women's basketball). This may be due to sports included.<sup>26</sup> It is

318 important to note these publications are over 10 years old, were from FCS rather than Football Bowl

319 Subdivision (FBS) institutions, and may not reflect current staffing, non-traditional seasons and year-

round training. Our data indicate that most injuries evaluated by an AT received some type of AT service,

321 but only one-third to one-half of injuries were evaluated by a physician (Figure 5).

Our results extend the current literature by indicating PE appear to be directed equally at acute-322 TL injuries, and at overuse and NTL injuries. Team physicians may be assigned to multiple sports, but it 323 is unclear what metrics inform that assignment. Football far eclipsed other sports for total PE and PE per-324 team-season. But when remaining teams were ranked by number of PE and PE per-team-season, there 325 was no discernible pattern for the order by roster size, risk level categorization, or gender. Instead, there 326 327 appears to be a mix of large and mid- to small-roster sports, injury risk categorization, and teams by gender. Overall, fewer than half (43.5%) of all injuries were seen by a physician. These data indicate team 328 physicians are seeing some, but not all student-athletes, even with TL injuries. ATs may be managing 329 330 cases without associated physician-level visits. It is unclear if these PE results are due to coordinated care 331 decisions, the nature of the injuries, documentation limitations, or access to and availability of physician 332 appointments. Referral by the AT, demand by the student-athlete, availability of on-site versus in-clinic 333 visits, and scheduling may be influencing these results.

High patient loads and clinician to patient ratios are relevant for both ATs and team physicians, and may impact standard of care provided, long-term injury outcomes, and workforce retention.<sup>15,16,25,28</sup> The number of clinicians per-athlete was associated with injury risk, and schools with greater clinicians 337 per-athlete demonstrated decreased injury incidence of almost 10%, with about 3% lower re-injury incidence.<sup>28</sup> Interestingly, TL days were greater in schools with greater clinicians per-athlete, potentially 338 indicating providers were restricting participation when provider: patient ratios were lower.<sup>28</sup> In a 2015 339 survey of collegiate FBS teams, approximately 34% of respondents met AMCIA recommendations for 340 341 FTE ATs. The remaining 66% were estimated to need 1 to 3 more FTE AT positions to meet guidelines, though a uniform definition of FTE for collegiate ATs was needed.<sup>29</sup> Staffing levels at collegiate 342 institutions are not well documented, nor is AT FTE by team assignment.<sup>5,15,16</sup> Healthcare utilization data 343 344 can help inform provider workload across assignments as a factor in determining appropriate staffing levels. Ensuring alignment between healthcare utilization demands and provider FTE may contribute to 345 better patient outcomes, alignment with best practices care, and workforce retention. 346 347 Limitations There are a number of limitations in this study. These data are limited to Division I, BCS 348 institutions and are likely not representative of Division II or III.<sup>5</sup> Though ATs underwent training in the 349 health record process, documentation of injuries and AT services may be incomplete or inconsistent. It is 350

likely mean AT services documented wete highly skewed, as evidenced by the large confidence intervals. Literature reports documentation capture rate as variable depending on setting and sport, particularly for overuse injuries.<sup>12,30,31</sup> Participation in NCAA sports was stopped for COVID-19 in spring of 2020, and teams and institutions returned with varying timetables. Athlete-exposures were not documented in this study, nor were the types of AT services provided. Differences in metrics, as well as limited or older existing reports, make comparisons difficult. This study could not report healthcare utilization by clinician FTE, which may influence interpretation of findings.

358 <u>Summary and Clinical Implications</u>

AT and physician care are commonly directed at overuse and NTL injuries in DI collegiate settings. Student-athletes in sports classified as lower and moderate risk are receiving substantial healthcare, specifically associated with NTL injuries and those from overuse mechanisms. Data were highly skewed, indicating likely variability in care provided and documentation. These data have the 363 potential to inform and update considerations for appropriate staffing levels, provider workload across

364 assignments, and alignment with best practices care.

- 365
- 366
- 367 **REFERENCES**



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### **Figure Captions**

Figure 1. Flow diagram for selection of study participants

a. Identified by presence in the data set after providing authorization for use of data for research and that injury was resolved.

b. Non-sport related was designated by the treating athletic trainer and defined as an injury/illness not occurring due to participation in an NCAA sanctioned event, training, or practice, or a change in the physical demand imposed by such an event, training, or practice. Note this non-sport related injury/illness could include COVID.

c. Filtered cases for years of inclusion (July 2018-June 2022).

d. Complete cases defined as having demographic information (gender, sport), onset (acute vs overuse), time-loss status (time-loss vs non-time-loss) and injury type listed. Student athletes may have had more than 1 injury case included in the data set.



Figure 2. Percentage of cases receiving any athletic training service with risk level concordance Bar graph color represents Appropriate Medical Coverage of Intercollegiate Athletics categorized risk level for each sport.<sup>14</sup> Orange are "increased risk," gray are "moderate risk," and black are "lower risk." Dotted lines represent the number of sports at each AMCIA level of injury risk, with concordance percentage agreement.

BB baseball, BKB basketball, BVB beach volleyball, CC cross country, FB football, FH field hockey, GYM gymnastics, LAX lacrosse, ROW rowing, SB softball, SKI skiing, SOC soccer, SWIM swimming, TF track and field, TN tennis, VB volleyball, WR wrestling, WP water polo.



Bar graph color represents Appropriate Medical Coverage of Intercollegiate Athletics categorized risk level for each sport.<sup>14</sup> Orange are "increased risk," gray are "moderate risk," and black are "lower risk." Dotted lines represent the number of sports in this study at each AMCIA level of injury risk, with concordance percentage agreement.

BB baseball, BKB basketball, BVB beach volleyball, CC cross country, FB football, FH field hockey, GYM gymnastics, LAX lacrosse, ROW rowing, SB softball, SKI skiing, SOC soccer, SWIM swimming, TF track and field, TN tennis, VB volleyball, WR wrestling, WP water polo.

Figure 4. Athletic training services per-team-season stratified with risk level concordance Bar graph color represents Appropriate Medical Coverage of Intercollegiate Athletics categorized risk level for each sport.<sup>14</sup> Orange are "increased risk," gray are "moderate risk," and black are "lower risk." Dotted lines represent the number of sports in this study at each AMCIA level of injury risk, with concordance percentage agreement.

BB baseball, BKB basketball, BVB beach volleyball, CC cross country, FB football, FH field hockey, GYM gymnastics, LAX lacrosse, ROW rowing, SB softball, SKI skiing, SOC soccer, SWIM swimming, TF track and field, TN tennis, VB volleyball, WR wrestling, WP water polo.

**Figure 5**. Percentage of cases receiving any associated physician encounter with risk level concordance Bar graph color represents Appropriate Medical Coverage of Intercollegiate Athletics categorized risk level for each sport.<sup>14</sup> Orange are "increased risk," gray are "moderate risk," and black are "lower risk." Dotted lines represent the number of sports at each AMCIA level of injury risk, with concordance percentage agreement.

BB baseball, BKB basketball, BVB beach volleyball, CC cross country, FB football, FH field hockey, GYM gymnastics, LAX lacrosse, ROW rowing, SB softball, SKI skiing, SOC soccer, SWIM swimming, TF track and field, TN tennis, VB volleyball, WR wrestling, WP water polo.



## Figure 1. Flow diagram for selection of study participants



6,345 cases excluded based on missing onset and/or time-loss



## Percent of Injuries Receiving Athletic Training Services with Risk Level Concordance

0.0%

10.0%



8	5.5%	
84.4	4%	
82.5%		
82.3%	Top Ranked 7 Spor	ts
81.3%	Representing "Incr	eased
78.5%	Risk" Level. Conco	rdance
77.1%	14% (1/7).	
76.8%		
76.4%		
76.4%		
76.4%		
74.0%	Next Ranked 8 Spo	orts
6	Representing "Mo	derate
6	Risk" Level. Conco	rdance
	63% (5/8).	
	Next Ranked 16 Sp	orts
	Representing "Low	er
	Risk" Level. Concor	dance
	56% (9/16).	
80.0%	90.0% 1	00.0%

W-GYM	
W-SOC	
W-VB	
W-BKB	
M-TN	
W-TF	
W-SWIM	
M-BB	
W-SB	
W-WP	
M-SOC	
M-FB	
W-TN	
M-TF	
W-LAX	
M-VB	
M-XC	
w-xc	
W-BVB	
W-ROW	
W-FH	
M-GYM	
M-BKB	
W-GOLF	
M-WP	
M-SWIM	
W-SKI	
M-ROW	3
M-WR	3.0
M-GOLF	26
M-SKI	1.9
0	.0 2.0
	W-GYM W-SOC W-VB W-BKB M-TN W-TF W-SWIM M-BB W-SB W-WP M-SOC M-FB W-NP M-FB W-TN M-TF W-LAX M-VB M-TF W-LAX M-VB M-TF W-LAX M-FB M-TF M-SVIM M-SVIM M-BKB W-ROW W-FH M-GYM M-BKB W-ROW W-FH M-SKI M-SKI M-SKI M-SKI

# Athletic Training Services Per-Injury with Risk Level Concordance



### Athletic Training Services Per-Injury

	16.3		
14.7	Top Ranked 7 Representing Risk" Level. Co 14% (1/7).	Sports "Increased oncordance	
	Next Ranked a Representing Risk" Level. Co 25% (2/8).	8 Sports "Moderate oncordance	
	Next Ranked	16 Sports "Lower Risk"	
16	Level. Concor (8/16).	dance 50% 18.0	20.0

## Athletic Training Services Per-Team-Season with Risk Level Concordance



0.0

200.0

418.0 367.5 3.0	494.2			
400.0	60	0.0	800	0.0
			Athlat	ic Training



Athletic Training Services Per-Team-Season

1855.1

Top Ranked 7 Sports Representing "Increased Risk" Level. Concordance 29% (2/7).

Next Ranked 8 Sports Representing "Moderate Risk" Level. Concordance 25% (2/8).

Next Ranked 16 Sports Representing "Lower Risk" Level. Concordance 69% (11/16).

1800.0

2000.0

## Percent of Injuries Receiving Physician Encounter with Risk Level Concordance

	M-GOLF	
	W-ROW	4
	M-VB	ģ
	M-ROW	
	M-TN	
	M-BKB	
	W-SWIM	
	M-GYM	
	M-FB	
	W-GYM	
	W-TF	
	W-VB	ģ
	W-WP	
	w-cc	
÷	W-LAX	ł
ğ	M-SOC	 1
s	W-TN	
	W-SB	
	M-BB	
	W-SKI	
	W-BVB	
	M-WR	
	M-SKI	
	M-TF	
	M-CC	
	w-soc	
	M-SWIM	
	M-WP	
	W-FH	
	W-BKB	
	W-GOLF	



Percentage of Injuries Receiving Physician Encounter

Top Ranked 7 Sports Representing "Increased Risk" Level. Concordance 14% (1/7).

Next Ranked 8 Sports Representing "Moderate Risk" Level. Concordance 25% (2/8).

Next Ranked 16 Sports Representing "Lower Risk" Level. Concordance 50% (8/16).

			Acute	Acute	Overuse	Overuse	Total	Total PE per-
Team	Sport	Team-Seasons	TL	NTL	TL	NTL		team-season
Mens	BASEBALL	42	350	75	88	31	544	13.0
	BASKETBALL	46	263	341	52	34	690	15.0
	CROSS COUNTRY	34	31	11	52	18	112	3.3
	FOOTBALL	46	2288	1347	186	217	4038	87.8
	GOLF	46	20	21	16	15	72	1.6
	GYMNASTICS	8	53	17	25	15	110	13.8
	ROWING	32	62	20	48	23	153	4.8
	SKIING	8	11	7	6	1	25	3.1
	SOCCER	20	218	45	33	25	321	16.1
	SWIMMING	22	42	33	6	8	89	4.0
	TENNIS	34	84	35	45	16	180	5.3
	TRACK AND FIELD	38	179	41	124	54	398	10.5
	VOLLEYBALL	12	81	69	13	19	182	15.2
	WATER POLO	16	80	11	18	1	110	6.9
	WRESTLING	12	213	65	• • 9	10	297	24.8
Mens	Total	416	3975	2138	721	487	7321	17.6
Womens	BASKETBALL	46	252	183	54	44	533	11.6
	BEACH VOLLEYBALL	34	62	36	25	30	153	4.5
	CROSS COUNTRY	46	50	14	103	39	206	4.5
	FIELD HOCKEY	8	11	28	8	4	51	6.4
	GOLF	42	5	18	10	12	46	1.1
	GYMNASTICS	30	197	62	76	72	407	13.6
	LACROSSE	24	135	41	39	34	249	10.4
	ROWING	28	232	49	157	69	507	18.1
	SKIING	8	21	2	3	5	31	3.9
	SOCCER	46	372	110	60	35	577	12.5
	SOFTBALL	34	187	68	42	73	370	10.9
	SWIMMING	31	73	59	22	24	178	5.7
	TENNIS	42	96	55	36	15	202	4.8
	TRACK AND FIELD	46	228	78	217	109	632	13.7
	VOLLEYBALL	46	230	76	57	66	429	9.3
	WATER POLO	20	64	8	22	2	96	4.8
Womens	Total	531	2216	887	931	633	4667	8.8
Grand Total		947	6191	3025	1652	1120	11988	12.7

Table 1. Physician encounters for acute and overuse mechanisms, stratified by time-loss status

TL time-loss, NTL non-time-loss; PE physician encounter

			Acute-TL				Acute-NTI	L			Overuse-1	rl 🛛			Overuse-N	TL			Total			
					Mean AT				Mean AT				Mean AT				Mean AT				Mean AT	
					services				services				services				services				services	
		Team		No. AT	per-			No. AT	per-			No. AT	per-		1	No. AT	per-			No. AT	per-	
Team	Sport	Seasons	n injuries	Services	injury	95%CI-L, U	n injuries	Services	injury	95%CI-L, U	n injuries	Services	injury	95%CI-L, U	n injuries	Services	injury	95%CI-L, U	n injuries	Services	injury	95%CI-L, U
Mens	BASEBALL	42	640	7062	11.0	9.6, 12.4	212	1015	4.8	3.6, 5.9	156	2425	15.5	12.3, 18.8	93	1181	12.7	8.5, 16.9	1101	11683	10.6	9.6, 11.7
	BASKETBALL	46	654	4929	7.5	6.1, 9	840	2416	2.9	2.5, 3.3	90	1049	11.7	8.8, 14.5	121	655	5.4	2.5, 8.3	1705	9049	5.3	4.6, 6
	CROSS COUNTRY	34	73	740	10.1	5.6, 14.7	51	306	6.0	4.2, 7.8	114	1177	10.3	8.1, 12.5	61	478	7.8	4.7, 11	299	2701	9.0	7.5, 10.6
	FOOTBALL	46	4696	58468	12.5	11.9, 13.1	3231	16463	5.1	4.7, 5.5	367	6233	17.0	14.5, 19.4	515	4158	8.1	6.8, 9.3	8809	85322	9.7	9.3, 10.1
	GOLF	46	34	95	2.8	1.5, 4.1	42	107	2.5	1.1, 4	21	63	3.0	1.2, 4.8	30	64	2.1	0.6, 3.7	127	329	2.6	1.9, 3.3
	GYMNASTICS	8	104	585	5.6	4.1, 7.1	47	201	4.3	3, 5.5	38	279	7.3	4.3, 10.4	48	226	4.7	3.1, 6.3	237	1291	5.4	4.5, 6.3
	ROWING	32	106	434	4.1	2.6, 5.6	70	132	1.9	1.2, 2.6	65	301	4.6	3,2, 6	64	169	2.6	1.9, 3.4	305	1036	3.4	2.8, 4
	SKIING	8	30	61	2.0	0.9, 3.2	16	14	0.9	-0.2, 1.9	10	23	2.3	0.1, 4.5	7	22	3.1	-2.2, 8.5	63	120	1.9	1.1, 2.7
	SOCCER	20	406	4390	10.8	8.8, 12.9	234	1024	4.4	3.1, 5.6	52	1110	21.3	12.6, 30.1	58	826	14.2	9.4, 19.1	750	7350	9.8	8.4, 11.2
	SWIMMING	22	91	301	3.3	2, 4.6	116	289	2.5	1.5, 3.5	11	174	15,8	-0.7, 32.3	25	253	10.1	5.1, 15.1	243	1017	4.2	3.1, 5.3
	TENNIS	34	160	1649	10.3	8.4, 12.2	90	428	4.8	3.2, 6.3	62	1309	21.1	14, 28.2	47	755	16.1	8.7, 23.5	359	4141	11.5	9.7, 13.4
	TRACK AND FIELD	38	450	4580	10.2	8.8, 11.6	183	1108	6.1	4.4, 7.7	226	2598	11.5	9.3, 13.7	163	1311	8.0	6.4, 9.7	1022	9597	9.4	8.5, 10.3
	VOLLEYBALL	12	158	1819	11.5	9, 14.1	135	667	4.9	3.5, 6.4	24	453	18,9	6.1, 31.7	44	347	7.9	5.1, 10.6	361	3286	9.1	7.5, 10.7
	WATER POLO	16	131	554	4.2	2.8, 5.7	117	443	3.8	2.8, 4.8	23	357	15.5	6.6, 24.5	40	233	5.8	4.1, 7.6	311	1587	5.1	4.1, 6.1
	WRESTLING	12	395	1480	3.7	3.1, 4.4	297	514	1.7	1.2, 2.2	16	148	9.3	0.9, 17.6	38	70	1.8	1.1, 2.6	746	2212	3.0	2.5, 3.4
Mens	TOTAL	416	8128	87147	10.7	10.3, 11.1	5681	25127	4.4	4.2, 4.7	1275	17699	13.9	12.7, 15	1354	10748	7.9	7.2, 8.7	16438	140721	8.6	8.3, 8.8
Womens	BASKETBALL	46	515	8090	15.7	12.5, 18.9	874	5371	6.1	4.7, 7.5	85	2647	31.1	18.6, 43.7	148	3121	21.1	13.4, 28.8	1622	19229	11.9	10.2, 13.5
	BEACH VOLLEYBALL	34	119	935	7.9	5, 10.7	118	511	4.3	3.2, 5.4	40	550	13.8	7.3, 20.2	107	1072	10.0	6.7, 13.3	384	3068	8.0	6.5, 9.5
	CROSS COUNTRY	46	101	640	6.3	4.3, 8.3	76	331	4.4	2.9, 5.8	180	1833	10.2	8, 12.3	114	1003	8.8	5.8, 11.8	471	3807	8.1	6.9, 9.3
	FIELD HOCKEY	8	25	126	5.0	1.2, 8.9	86	394	4.6	2.5, 6.7	17	134	7.9	-0.2, 16	27	227	8.4	5.5, 11.3	155	881	5.7	4.1, 7.3
	GOLF	42	16	68	4.3	-1.5, 10	75	159	2.1	1, 3.2	14	169	12.1	-3.3, 27.4	35	332	9.5	1.9, 17	140	728	5.2	2.7, 7.7
	GYMNASTICS	30	351	6659	19.0	15.5, 22.4	200	2298	11.5	8.7, 14.3	142	3170	22.3	16.8, 27.8	206	2536	12.3	9.8, 14.9	899	14663	16.3	14.5, 18.1
	LACROSSE	24	242	2304	9.5	7.2, 11.9	172	968	5.6	3.6, 7.7	63	840	13.3	8.6, 18	101	1183	11.7	6.9, 16.5	578	5295	9.2	7.6, 10.7
	ROWING	28	382	2773	7.3	5.8, 8.7	122	339	2.8	2.1, 3.5	242	2002	8.3	6.4, 10.2	176	902	5.1	4, 6.3	922	6016	6.5	5.7, 7.3
	SKIING	8	42	205	4.9	1.6, 8.1	14	15	1.1	-0.2, 2.3	14	65	4.6	-1.1, 10.4	7	2	0.3	-0.4, 1	77	287	3.7	1.7, 5.8
	SOCCER	46	782	13758	17.6	14.8, 20.4	522	4216	8.1	6.6, 9.6	94	1985	21.1	15.5, 26.7	146	2772	19.0	14, 24	1544	22731	14.7	13.1, 16.3
	SOFTBALL	34	417	3733	9.0	7.6, 10.3	222	1188	5.4	4.2, 6.5	93	1730	18.6	13.6, 23.6	182	2862	15.7	12.8, 18.7	914	9513	10.4	9.3, 11.5
	SWIMMING	31	133	885	6.7	4.6, 8.7	143	967	6.8	4.6, 9	36	1172	32.6	15.8, 49.3	71	1117	15.7	9.5, 22	383	4141	10.8	8.5, 13.1
	TENNIS	42	201	1889	9.4	7, 11.8	159	1230	7.7	5.3, 10.2	59	947	16.1	9.5, 22.6	56	393	7.0	4.2, 9.8	475	4459	9.4	7.8, 11
	TRACK AND FIELD	46	444	4898	11.0	9.5, 12.5	292	1921	6.6	5.5, 7.6	329	4435	13.5	11.6, 15.4	337	4057	12.0	10.5, 13.6	1402	15311	10.9	10.1, 11.7
	VOLLEYBALL	46	385	6089	15.8	12.6, 19	285	2421	8.5	6.4, 10.6	83	2447	29.5	16.7, 42.3	203	2870	14.1	10.5, 17.8	956	13827	14.5	12.5, 16.4
	WATER POLO	20	103	729	7.1	3.5, 10.7	49	231	4.7	0, 9.4	31	883	28.5	13.7, 43.3	32	351	11.0	7.3, 14.7	215	2194	10.2	7.1, 13.3
Womens	TOTAL	531	4258	53781	12.6	11.8, 13.5	3409	22560	6.6	6.1, 7.2	1948	25009	16.4	15.1, 17.8	1948	24800	12.7	11.7, 13.8	11137	126150	11.3	10.9, 11.8
Grand																						
Total	ALL	947	12386	140928	11.4	11, 11.8	9090	47687	5.2	5, 5.5	2797	42708	15.3	14.3, 16.2	3302	35548	10.8	10.1, 11.5	27575	266871	9.7	9.4, 9.9

### Supplemental Table 1. Athletic Training Services Per-Injury

No. number, AT athletic training, TL time-loss, NTL non-time-loss, 95%CI-L 95% confidence interval lower, 95%CI-H 95% confidence interval upper

			Acute	Acute	Overuse	Overuse	Total
		Team-Seasons	TL	NTL	TL	NTL	
Mens	BASEBALL	42	168.1	24.2	57.7	28.1	278.2
	BASKETBALL	46	107.2	52.5	22.8	14.2	196.7
	CROSS COUNTRY	34	21.8	9.0	34.6	14.1	79.4
	FOOTBALL	46	1271.0	357.9	135.5	90.4	1854.8
	GOLF	46	2.1	2.3	1.4	1.4	7.2
	GYMNASTICS	8	73.1	25.1	34.9	28.3	161.4
	ROWING	32	13.6	4.1	9.4	5.3	32.4
	SKIING	8	7.6	1.8	2.9	2.8	15.0
	SOCCER	20	219.5	51.2	55.5	41.3	367.5
	SWIMDIVE	22	13.7	13.1	7.9	11.5	46.2
	TENNIS	34	48.5	12.6	38.5	22.2	121.8
	TRACK AND FIELD	38	120.5	29.2	68.4	34.5	252.6
	VOLLEYBALL	12	151.6	55.6	37.8	28.9	273.8
	WATER POLO	16	34.6	27.7	22.3	14.6	99.2
	WRESTLING	12	123.3	42.8	12.3	5.8	184.3
Mens	TOTAL	416	209.5	60.4	42.5	25.8	338.3
Womens	BASKETBALL	46	175.9	116.8	57.5	67.8	418.0
	BEACH VOLLEYBALL	34	27.5	15.0	16.2	31.5	90.2
	CROSS COUNTRY	46	13.9	7.2	39.8	21.8	82.8
	FIELD HOCKEY	8	15.8	49.3	16.8	28.4	110.1
	GOLF	42	1.6	3.8	4.0	7.9	17.3
	GYMNASTICS	30	222.0	76.6	105.7	84.5	488.8
	LACROSSE	24	96.0	40.3	35.0	49.3	220.6
	ROWING	28	99.0	12.1	71.5	32.2	214.9
	SKIING	8	25.6	1.9	8.1	0.3	35.9
	SOCCER	46	299.1	91.7	43.2	60.3	494.2
	SOFTBALL	34	109.8	34.9	50.9	84.2	279.8
	SWIMDIVE	31	28.5	31.2	37.8	36.0	133.6
	TENNIS	42	45.0	29.3	22.5	9.4	106.2
	TRACK AND FIELD	46	106.5	41.8	96.4	88.2	332.8
	VOLLEYBALL	46	132.4	52.6	53.2	62.4	300.6
	WATER POLO	20	36.5	11.6	44.2	17.6	109.7
Womens	TOTAL	531	101.3	42.5	47.1	46.7	237.6
All	Total	947	148.8	50.4	45.1	37.5	281.8

Supplemental Table 2. Athletic Training Services Per-Team-Season

TL time-loss, NTL non-time-loss