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Policies in Need of a Problem? A Qualitative Study of Medical and Nonmedical Opioid Use among College Student-Athletes in the United States

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Abstract: Concern around nonmedical opioid use (NUPO) among student-athletes in the United States abounds, yet research around NUPO in this population is mixed. While some studies have identified athletic participation and related injury as risk factors for NUPO, the balance of research has found the inverse, or no association. This study represents the first qualitative inquiry into college student-athletes' history of injury, medical and nonmedical opioid exposure, and pain management practices. Drawing on surveys ($n = 280$) and interviews ($n = 30$) with less-elite (i.e., non-NCAA Division I) athletes attending a large state university, our analyses documented little NUPO in this population, despite significant rates of injury and opioid prescription. Interview participants evinced little knowledge, but high fears, around opioid use, while describing potentially harmful levels of over-the-counter drug use. Overall, this study suggests the need for the development of broad, evidence-based curricula concerning pharmacological pain management within this population.

Keywords: opioids; drug use; drug testing; student-athletes; pain management



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1. Introduction

In March 2022, a handful of veteran legislators in the U.S. Congress introduced a bill seeking to address the “scourge of our time”: “opioid misuse” among young people, and specifically, young athletes. The Student Athlete Opioid Prevention Act proposed a new federal grant mechanism for the creation of educational and training programs concerning opioids, aimed at coaches, athletic administrators, and student-athletes themselves. Citing sports participation as a risk factor for opioid experimentation, co-sponsor Josh Gottheimer identified a mandate to “take better care” of young athletes, who faced not only injury, but subsequent exposure to “dangerous and addictive opioids”. A press release accompanying the bill's introduction overflowed with data meant to establish the urgency of the underlying problem (Gottheimer 2022).

Indeed, statistics reflecting the severity of the U.S. opioid epidemic are not difficult to come by. A simple review of overdose mortality data from the past 15 years reveals a chronic, mutating public health crisis that has evaded definitive intervention. After a sharp decline in accidental opioid deaths from 2017 to 2019, overdose fatalities accelerated alongside the COVID-19 pandemic, fueled by both stressful social conditions and the continuous spread of synthetic opioids (namely fentanyl) throughout diverse drug markets (Tanz et al. 2022). Moreover, the most recent data show the increasing toll of overdose deaths within populations previously thought to be more “protected”, those being residents of urban areas, African-Americans, and individuals who primarily use stimulants. Some bright spots are present in the latest numbers. However, in 2020, rates of opioid prescribing fell to their lowest levels since 2006, and the past-year surge in overdose appears to be largely driven by illicitly-manufactured, rather than prescription, opioids (CDC Injury Center 2022a, 2022b). Furthermore, while the percentage of overdose deaths involving individuals under age 24 rose from 2019 to 2020, this proportion has fallen by nearly 50% since 2013 (Kaiser Family Foundation 2022). In fact, national survey data show that

the rates of nonmedical opioid use fell significantly among 12-to-25 year-olds from 2019 to 2020 (U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality 2020).

Interestingly, supporting data did not accompany the primary claim underwriting the proposed legislation, namely that “student athletes are at risk of developing a dependency on opioids and other substances at a young age due to common pain treatment following injuries” (Gottheimer 2022). To be certain, data on rates of overdose and nonmedical opioid use—the consumption of illicit opioids, unprescribed opioids, or prescribed opioids in ways that depart from medical guidance—among young athletes are difficult to source. While the former metric is impossible to calculate using public records, estimates of opioid exposure, nonmedical use, and clinical disorders among athletes exist only in limited scholarly analyses, which are increasingly out of date. The relative absence of data on this population is somewhat surprising, given a surfeit of stories concerning their vulnerability to opioid-related harms, not to mention a flurry of policymaking on their behalf. Since 2016, 39 U.S. states have passed legislation limiting the dosage and/or duration of opioid prescriptions for minors, often implementing standards that depart from those mandated for adult patients (Stone et al. 2022). Largely targeted to opioid dispensing for acute (rather than chronic) pain, such laws specifically seek to restrict the use of prescription opioids for injuries and surgeries, such as those related to athletic participation (National Conference of State Legislators 2019).

While an abundance of caution has perhaps animated policy in this area, legitimate questions remain as to the extent and nature of opioid use among young athletes, including the relationship between medical and nonmedical use. Without further insights into how student-athletes receive opioids or initiate nonmedical use, it is hard to evaluate the impact of existing legislation (on prescribing caps, for example), or define the objectives of new programming, such as that solicited by the impending Student Athlete Opioid Prevention Act. Furthermore, there is ample evidence surrounding the unintended consequences of other well-intentioned opioid prevention policies. For example, some research suggests that policies reducing access to prescription opioids both exacerbated, and displaced, the problem of nonmedical use. Unable to secure opioid medications (or crush/inject newly-formulated pills), many individuals moved on to their illicit counterparts, whose unknown contents imply increased overdose risk (Haynes et al. 2016; Kuo et al. 2018; Powell and Pacula 2021; Rhodes et al. 2019). An incomplete understanding of athletes’ motives for and patterns of opioid use may lead to similarly fraught successes, while a single-minded focus on opioids may obscure other ill-informed pain management practices involving over-the-counter analgesics, or marijuana. Drawing on surveys and interviews with current student-athletes at a large public university, this article seeks to address a near vacuum of qualitative research concerning young athletes’ exposure to opioids. Asking student-athletes about their history of injury, pain management, opioid knowledge and experience, this study finds scant evidence of a relationship between athletic participation and opioid consumption, with few reporting nonmedical use. At the same time, students’ strategies for pain management may warrant further attention, with participants describing common patterns of self-medication that carry both medical and social risks.

2. Opioids and Athletes: Theory, Research, and Rhetoric

Concerns around young athletes’ exposure to opioids dates back to the “early days” of the U.S. opioid epidemic—or at least, the first stirrings of public recognition around increasing rates of overdose and nonmedical opioid use. In 2015, President Barack Obama announced a host of public and private initiatives meant to roll back rising rates of prescription drug “abuse”, including educational campaigns undertaken by the National Collegiate Athletics Association, the National Association of High School Coaches, the National Athletic Trainers’ Association, the National Interscholastic Athletic Administrators Association, and the American College of Sports Medicine (The White House, Office of the Press Secretary 2015). Returning from a national “Turn the Tide Rx” tour, Surgeon

General Vivek Murthy reiterated the administration's attention to plight of young athletes, writing "... in Oklahoma City, a mother and father shared the tragic experience of their son, an all-American athlete, whose fatal disease began with prescriptions he received after sports injuries" (Murthy 2016). Anecdotal evidence, meanwhile, swirled within the popular mediascape, with feature exposés appearing in *Sports Illustrated*, and a primetime Public Service Announcement (PSA) depicting an "All-American" cheerleader abandoning her team, school, family, and dog for heroin (National Council Against Drug Abuse 2016; Wertheim and Rodriguez 2015).

Anxiety surrounding a possible sport-opioid nexus is, of course, understandable. While athletes serve as a cultural metonym for national strength, progress, and glory, the linkage between sports participation and opioid exposure appears intuitive. Sports-related injuries, and surgeries, have increased alongside participation in youth and young adult athletics, with approximately three million children seeking emergency medical care for athletic injuries in 2021 (Bannon et al. 2021). There is significant data, moreover, to suggest that the era of peak opioid prescribing coincided with a dramatic rise in sport-related surgeries among pediatric patients. While the U.S. opioid dispensing rate peaked in 2012, after a decade of steady increases, orthopedic surgeries among individuals 18 and under nearly doubled from 2004 to 2014 (Bannon et al. 2021; CDC Injury Center 2022a; Tepolt et al. 2018). Some procedures, such as anterior cruciate ligament (ACL) and medial ulnar collateral ligament (UCL) reconstruction—linked to running and throwing sports, respectively—increased three- to four-fold among children and young adults over the same period (Mahure et al. 2016; Tepolt et al. 2018). In light of such numbers, a rational observer might postulate an association between athletic and opioid "careers", with injury representing a precipitating event for first medical, then nonmedical, opioid use. Of course, this hypothesis rests upon an assumption that prescribed opioid use commonly escalates into uncontrolled consumption, if not a conflation between physical dependence and opioid use disorder or "addiction" (Minozzi et al. 2013; Muhuri et al. 2013; Noble et al. 2010). It also neglects a wealth of studies demonstrating that young athletes are significantly less likely to consume illicit drugs or develop substance use disorders than their peers outside of sports, as well as emerging research which suggests that exercise and physical activity more generally may protect against neurochemically "reward-seeking" behaviors such as substance use (see, for example, Dunn and Wang 2003; Exner et al. 2021; Fontes-Ribeiro et al. 2011; Kantomaa et al. 2008; Lisha and Sussman 2010; Wechsler et al. 1997; Weinstock et al. 2012).

Luckily, the sports/pain management pathway into nonmedical opioid use has been assessed by over a half-dozen survey-based studies that, on the balance, qualify its salience for young athletes in the U.S. On the one hand, two secondary analyses conducted at the pinnacle of opioid prescribing found evidence of increased medical opioid consumption in sports. A 2013 cross-sectional study of college students found that individuals reporting interscholastic sports participation in high school had a higher odds of lifetime opioid prescription, while longitudinal data collected among high school and middle students from 2009-10 and 2011-12 found similarly elevated rates of medical opioid exposure among male participants (Veliz et al. 2014, 2015). Such findings resonate with the above research revealing rising injuries and surgeries among young athletes—but don't necessarily speak to the issue of nonmedical opioid use in this population. Here the scholarship is murkier, even in studies conducted within similar populations. Veliz et al. (2014) also pointed to increased odds of nonmedical opioid use (taking "too much" medication, and taking medication to "get high") among male organized sports participants in secondary school. Moreover, Ford et al. (2018), looking at past-year NUPO among college students between 2008 and 2011, isolated varsity athletics involvement as a risk factor. Yet several other analyses of NUPO among 8th grade, 10th grade, 12th grade, and university students found no overarching association between athletics exposure and outcome (Veliz et al. 2015, 2017; Veliz et al. 2013). Two additional studies showed an inverse relationship between these variables, with young athletes protected against NUPO and heroin use (Ford 2008; Veliz

et al. 2016). Finally, other analyses focused solely on college student-athletes documented levels of NUPO well-below those reported by broader college-age populations (Moore and Abbe 2021; National Collegiate Athletic Association 2018; U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality 2020).

The implications of this research remain ambiguous, especially in the absence of qualitative data that might illuminate the specific pathways, motives, and sources for non-medical opioid use among young athletes. While few studies have highlighted any athletic involvement as a risk factor for nonmedical opioid use, the above research does point toward subpopulations with greater vulnerability. Specifically, male athletes are identified by two studies as reporting elevated levels of NUPO, compared to both female athletes and all non-athletes (Ford et al. 2018; Veliz et al. 2014). Additionally, several sports involving solely or disproportionately male participants—American football, wrestling, weightlifting, and ice hockey—showed statistical associations with NUPO by young athletes (Veliz et al. 2017; Veliz et al. 2013). Though it is difficult, in these analyses, to disentangle the effects of gender and sport-type, Ford et al. (2018) does suggest their interaction. Beyond revealing past-year injury as a risk for nonmedical opioid use, this study found that injured male athletes had the highest odds of NUPO within a national sample of college students defined by gender, injury history, and varsity sport participation. Moreover, a cross-sectional survey of retired U.S. National Football League (NFL) players documented startling levels of prescription opioid use, medical and nonmedical, among participants, with NUPO particularly prevalent among those reporting a history of 3-plus injuries, a career-ending injury, or undiagnosed concussions (Cottler et al. 2011).

Significant questions remain as to why and how young athletes might obtain and consume opioids in nonmedical ways. With all extant analyses referencing datasets that are now nearly a decade (or more) old, the contemporary prevalence of both medical and nonmedical opioid use in this population is unclear, as are the effects of state-level prescribing policies in restricting access to prescription opioids among minors. Similarly, the impact of educational efforts undertaken by schools, athletic leagues and administrators, and coaches remains to be assessed. Drawing primarily on in-depth interviews with 30 current student-athletes at a large public university, this mixed-methods study seeks to describe the relationship between participants' sport involvement, injury history, and lifetime substance use, including both medical and nonmedical opioid consumption. It additionally captures participants' knowledge and attitudes toward opioid-type drugs, and their willingness to use opioids, and/or other substances, for pain management. While interviews and surveys revealed little opioid use—medical or nonmedical—for sports-related pain, the data did reveal an overwhelming lack of knowledge, yet high fear, around these drugs, even as student-athletes consumed other analgesics in unregulated ways.

3. Methods

This paper reports on data from a mixed-methods study of opioid use, knowledge, attitudes, and beliefs among student-athletes attending 19 "satellite" campuses within the Pennsylvania State University (Penn State). From April 2021 to October 2022, all individuals competing in intercollegiate sports at an eligible campus were invited to participate in a 20-minute survey inquiring about their injury history, medical and nonmedical use of opioids and other substances, and perceptions of opioids and opioid use among their athlete peers. Nonmedical drug use is here defined as: (1) taking prescription drugs just for the feeling or experience they cause; (2) taking prescription drugs more often or at higher doses than prescribed; (3) taking prescription drugs that were not prescribed to the respondent; or (4) taking illicitly-prepared drugs. Basic demographic information (age, gender, race and ethnicity) was also solicited, while specific campus information was not collected in order to preserve respondent anonymity. The survey recruitment proceeded in two phases. From April 2021 to April 2022, the Primary Investigator asked campus athletic administrators to forward an email invitation for the survey to their student-

athletes, with requests being sent once per semester (3 semesters total). Given the difficulty in tracking the breadth of this indirect recruitment method, a more efficient method of student-athlete contact was approved for the final six months of the study, with the study team reaching out to potential participants directly, using publicly-available team rosters and the Pennsylvania State University directory. A \$15 gift card was offered as an incentive for survey participation.

While the survey component of this study informed estimates of opioid prescription and nonmedical use within the study sample, it was also intended as a means of interview recruitment, which forms the primary data informing this paper. At the end of the main instrument, students were directed to a separate survey to enter their contact information for compensation, and indicate their willingness to do a follow-up interview. All survey participants who expressed interest in an interview were contacted by the PI, until thematic saturation was achieved. Interviews captured participants' lifetime athletic history (including sports-related injury), past and present substance use, and opioid exposure, knowledge, and attitudes. The interviewees were also asked to speculate on the existence of a relationship between sports involvement and substance use, including opioid use. Given the geographic distribution of interviewees across the state, all interviews were conducted by the PI on the teleconferencing platform Zoom, with participants invited to leave their cameras off. Interviews ranged from 38 to 93 min, with an average duration of roughly one hour. All interview participants received a \$25 gift card as compensation for their time.

The survey data were cleaned, recoded, and subjected to preliminary analyses that generated the estimates of opioid use prevalence reported below. The interview transcripts produced by Zoom were checked and corrected using the original audio, while any video files were deleted immediately following the interview. While qualitative coding was initially guided by interview questions and topics of interest (for example, injury history, opioid exposure, opioid knowledge), other latent themes were allowed to emerge over three rounds of coding, with analysis specifically attuned to connections among codes, particularly those concerning substance use and sports participation. Ultimately, four major themes, presented in the following section, were identified with relation to interviewees' opioid use, knowledge, and pain management practices. The original study protocol, and April 2022 modification, was approved by the Pennsylvania State University Institutional Review Board.

4. Study Sample

All survey and interview participants participated in intercollegiate athletics at one of the Pennsylvania State University's 19 Commonwealth campuses between the Spring 2021 and Fall 2022 semesters. The Penn State "campuses", as they are known, represent just under half of the university's undergraduate population, and disproportionately enroll in-state students, as well as a larger population of first-generation, "nontraditional" and adult learners, compared to the flagship campus. While all NCAA Division I (D-I) sports operate out of "Penn State Main", the Commonwealth campuses offer a tremendous diversity of athletic opportunities at the NCAA Division III (D-III), National Association of Intercollegiate Athletics (NAIA), United States Collegiate Athletic Association (USCAA), and intermural levels. Collectively, 17 intercollegiate sports are represented across the Commonwealth teams, with most campuses offering at least 6 different options for aspiring student-athletes. Even as many student-athletes are actively recruited at the D-III, NAIA, and USCAA levels, tuition support is much less common, and students may walk-on to many teams at will.

While more attention is naturally paid to student-athletes competing in the top NCAA division, this study is specifically interested in less-elite athletes, who represent the vast majority of intercollegiate college sports participants ([National Collegiate Athletic Association 2022](#)). Moreover, some research suggests that athletes at the lower divisions of college athletics may engage in higher levels of substance use. For example, the most recent (2017) NCAA Study on Substance Use Habits of College Student-Athletes found that Division

III Athletes were significantly more likely to report past-year alcohol, marijuana, cigarette, cocaine, amphetamine, and anabolic steroid use, compared to their D-I peers ([National Collegiate Athletic Association 2018](#)). The published data on rates of “narcotic medication” use were not disaggregated by division. Such disparities may reveal a de facto gradient in drug testing policies by division, a less rigorous training and competition schedule at the lower levels, or simply a more recreational orientation toward sport by D-III athletes (who may only access academic, not athletic scholarships). Moreover, given differences in the size and tuition of D-I and D-III schools, gaps in substance use may also reference institutional characteristics and student demographics ([NCAA n.d.](#)). Whatever variables may animate divisional differences in substance use, such findings are more concerning in light of concurrent gaps in training, academic, and athletic success resources available to student-athletes at different levels ([Navarro et al. 2019](#)). While the directionality of this association is untested, it suggests that the student-athletes who are more likely to engage in substance use enjoy fewer supportive services—or possibly, that inadequate training or health resources may encourage nonmedical substance use.

5. Results

5.1. Participant Demographics, Injury, and Substance Use History

Table 1 describes the demographic features of the survey ($n = 280$) and interview ($n = 30$) samples, as well as variables related to sport affiliation and related injury. A majority of individuals within both samples reported current affiliation with female-only teams (58.9% of survey, and 56.7% of interview respondents), with slightly more than one-third of survey and interview respondents competing on male-only teams (37.5% and 36.7%, respectively.) Participants in both samples overwhelmingly identified their race as “white” (81.3%, 83.3%), with 8.3% and 10% of survey and interview respondents self-identifying as Black, respectively. Only a few respondents in either sample indicated a Hispanic or Latina/o ethnic background (7.5%, 6.7%). While the mean age within both groups hovered around 20 years (19.82, 20.37), most survey respondents identified as “lowerclassmen” (i.e., freshmen or sophomores), while the interview sample skewed slightly toward “upperclassmen” (i.e., juniors and seniors). Sport-related injuries were extremely common in both samples, with 81.1% and 93.3% of survey and interview participants affirming a lifetime history of injury. Roughly half the people within each group (46.8%, 50%) characterized their injuries as “recurrent” (or occurring “in the same location, after a period of recovery”), with 10.7–13.3% reporting a sport-related surgery. Within both samples, the most common categories of injury included muscle strains/ruptures/tears, joint sprains/ligament tears, bone fractures, contusions/bruises, and concussions. Despite similar rates and types of injury, specific sport participation varied slightly among survey and interview respondents. A plurality (18.9%) of survey participants competed in softball, with other popular sports including soccer (17.5%), basketball (16.7%), baseball (14.6%), and volleyball (13.9%). By contrast, volleyball was the sport most frequently reported by interviewees (23.3%), followed by basketball (16.7%), soccer (16.7%), track and field (13.3%), baseball (10%), and swimming and diving (10%). All sports offered across the Commonwealth campuses were represented across the combined samples, including bowling, cross-country, golf, ice hockey, tennis, water polo, and wrestling.

Table 1. Full Sample Demographics.

Team Type	Survey Sample (%)	Interview Sample (%)
Male	37.5	36.7
Female	58.9	56.7
Co-Ed	7.9	13.3
Mean Age (years)	19.82	20.37
Class Standing		
Freshman	18.6	20
Sophomore	34.6	26.7
Junior	24.6	23.3
Senior	22.1	30
Race (Self-identified)		
White	81.3	83.3
Black	8.3	10
Asian	4.7	3.3
Other	5.7	3.4
Hispanic or Latino/a (Self-identified)		
Lifetime Sport-Related Injury	81.1	93.3
Most Common Injuries (Top 5)		
Muscle Strain/Rupture/Tear	46.1	46.4
Join Sprain/Ligament Tear	41.2	50
Bone Fracture	38.2	42.9
Contusion/Bruise	37.7	46.4
Concussion	37.3	21.4
History of Recurrent Sport-Related Injury	46.8	50
Mean Participation Days Lost to Injury	47.7	31.6
Surgery to Repair Sport-Related Injury	13.3	10.7
Current Sports Participation (Top 5)	Softball (18.9), Soccer (17.5), Basketball (16.8), Baseball (14.6), Volleyball (13.9)	Volleyball (23.3), Basketball (16.7), Soccer (16.7), Track & Field (13.3), Baseball (10), Swimming & Diving (10)

Table 2 summarizes rates of past-year substance use reported by both survey and interview respondents, and further provides comparative figures from surveys of NCAA (2017) and NAIA (2020) student-athletes (Moore and Abbe 2021; National Collegiate Athletic Association 2018). It should be noted that the latter two studies captured significantly larger, and representative, samples within their respective associations. Overall, survey respondents showed levels of substance use within the range of those reported by the NCAA and NAIA samples, with a few exceptions. Namely, smokeless tobacco consumption in the past-year was less common in the current survey (2.9%, vs., 13% and 8% of NCAA and NAIA samples), while the smaller sample may have struggled to capture rarer forms of substance use, including cocaine (0.4%), methamphetamine (0%), and heroin (0%). Medical (4.6%) and nonmedical opioid use (0.7), as well as nonmedical stimulant use (1.8%), in the past-year were also reported by fewer participants in the Penn State survey, a finding that may reflect sample size or possible cohort effects (U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration,

Center for Behavioral Health Statistics and Quality 2020). By comparison, rates of reported substance use among interview respondents more closely mirrored, or exceeded, those found in the NCAA and NAIA studies, a result that may indicate selection bias. Although all survey respondents were eligible to participate in follow-up interviews, it is possible that individuals with more experience, and interest, in substance use opted-in to interviews. For example, a much larger proportion of interview participants indicated past-year use of e-cigarettes (33.3%), cannabis (40%), and psychedelic-type drugs (6.7%), while levels of both nonmedical and medical opioid and stimulant use were similar to those within the larger studies shown below. Of course, the qualitative data presented below cannot be used to extrapolate larger trends in substance use prevalence among student-athletes. It may, however, reveal different motives for and experiences with substance use in sport that are relevant to a larger population of athletes or young adults.

Table 2. The rates of Reported Past-Year Substance Use, by Type, and Study/Year (%).

	Survey Sample (2021–2022)	Interview Sample (2021–2022)	NCAA (2017)	NAIA (2020)
Combustible Tobacco	7.8	16.7	11 *	5 *
Smokeless Tobacco	2.9	6.7	13	8
E-Cigarettes/Vapes	16.8	33.3	8	16.2
Alcohol	54.3	76.7	77	49.2
Cannabis	19.3	40	25	21
Cocaine	0.4	3.3	3.8	1.7
Psychedelics	2.5	6.7	1.9/1.7 **	1/3 **
Methamphetamine	0	0	0.2	0.1
Heroin	0	0	0.2	0.1
Nonmedical Opioid	0.7	3.3	3	2
Medical Opioid	4.6	13.3	11	9
Nonmedical Stimulant	1.8	6.7	7.5	3
Prescribed Stimulant	5.4	5.4	6.6	4.5

* These figures represent only past-year cigarette use among NCAA and NAIA athletes. ** These figures represent past-year Ecstasy/Molly and LSD use, respectively, among NCAA and NAIA athletes (Moore and Abbe 2021; National Collegiate Athletic Association 2018).

5.2. Qualitative Themes

Four primary themes relating to interviewees' sports careers, past and present substance use, and opioid exposure, knowledge, and attitudes emerged over three rounds of qualitative coding and analysis. Most participants emerged as "opioid naïve", reporting no lifetime medical or nonmedical exposure to opioids, yet the same individuals expressed a high-level of fear—and a low-level of knowledge—around this category of drug. At the same time, individuals who had received a prescription for opioids (40% of interviewees) described largely unremarkable experiences with these drugs, which were overwhelmingly received after dental surgery. A handful of interviewees did describe lifetime ($n = 2$) or current ($n = 1$) patterns of opioid use that departed from medical guidance. However, such use was not always recognized as "nonmedical", or as carrying potential risks. Finally, the problem of unmanaged pain, and its relief through illicit substance use—or high levels of over-the-counter analgesics—was reported by many participants, who were not always cognizant of associated harms.

5.3. Low Knowledge, High Fear of Opioids among “Naïve” Student-Athletes

As referenced above, a slight majority of the interview sample identified as “opioid naïve”, having never received a prescription for an opioid-type drug, or used such drugs in nonmedical ways. For this reason, it is perhaps unsurprising that such participants evidenced little knowledge around this category of substance, struggling to identify specific opioid drugs or medications, or describe their effects. After questions relating to their sports career, injury history, and prior substance use, all participants were prompted about any lifetime use of opioids in medical or nonmedical ways. Individuals reporting no previous exposure were then asked “what they knew” about opioids, whether prescription or illicit, with further probes as to different types or names of specific opioids, and any knowledge of their bodily or psychoactive effects. Several participants confessed complete ignorance around this topic, often apologetically, while mischaracterizing the common effects, or uses, of opioids in their attempts to guess:

What I heard about them, like I heard these were . . . and I know that they’re . . . honestly, I literally couldn’t even tell you. [Laughs] Like, I know that some people, like it helps with like . . . “Oh, I want to like hallucinate or something, so let me take this”, or sorry, “I want to feel like, high, like up in the sky” . . . I’m not sure if that’s actually the right drugs . . . [Interview 7, women’s basketball]

I seriously do not know much about them at all. I haven’t heard anything about it. I don’t know anybody that takes them. That’s about all I can say about that. [Interview 30, co-ed track & field]

In terms of like prescribed opioids . . . yeah, I don’t know anybody that’s experienced that or have . . . I know, like in church one time, when I was younger, I had this one guy come to speak . . . and he was talking about how he got addicted to like abusing his migraine medicine . . . So it’s, it exists, like it’s out there, it damages people’s lives, but I, personally, haven’t had too much experience or like exposure to that type of thing. [Interview 12, women’s volleyball]

It should be noted that opioid naïve participants were not wholly unique in disclaiming little formal knowledge around these substances. While several interviewees who recounted prescription opioid use had not registered such experiences in their surveys (for lack of recognition), many additionally reported that they had had little prior knowledge of the drugs before their medical exposure. Instead, what distinguished the responses of individuals with no history of opioid consumption was fear, expressed in broad characterizations of opioids as dangerous, addictive, or life-threatening. Indeed, even those who denied knowing much about opioids still recognized their negative connotations, including the volleyball player quoted above:

. . . Like, I don’t want to die, so like, I’m not going to use a drug that can kill me in like two seconds or less, you know. [Interview 12, quoted previously]

I know people, like, take it for pain, but they can really get addicted to it really fast . . . that’s all I really heard about it. [Interview 9, co-ed tennis]

Um, I know that . . . commonly people misuse them or they’ll allow other people to take them . . . But that’s pretty much it . . . I don’t really know much about like, that situation, but like, I always see on the news like, “Oh this person, you know, might have overdosed or this person . . . Like usually, I only see when people are charged with something . . . opioids are like heroin? [Interview 20, women’s volleyball]

As also expressed implicitly in the statement above, several participants who claimed to know little about opioids as psychoactive substances did understand them as sites of social stigma. Similar to how Interview 20 associated opioids with local news reports around overdose and arrests, others referenced popular linkages between opioids and criminality, or socioeconomic disadvantage:

I think Percocet? I don't know, like OxyContin? [Looks for confirmation]. I always thought they were the same, but, like, I wasn't super sure. I know my grandpa took it when he broke his hip . . . I think they're highly addictive, but I'm not sure, because I don't know what the difference is between opioids and narcotics . . . because the only thing I know about narcotics is that, it's like very, very addictive, and that so is popping pills, so I've never popped pills . . . My grandpa is not like a criminal, but he does the thing that some criminals also do. [Interview 14, women's volleyball]

Yeah I know they're, like, incredibly addictive. I know they kind of, like, alter your brain chemistry a little bit, so you get . . . really hooked on them, and terrible withdrawals . . . I just knew they were a painkiller, so they make you feel, like, high . . . they're very stigmatized in my eyes. [Interview 18, co-ed track & field]

Apart from two participants who had discussed opioids alongside the topic of substance use disorders in psychology or biobehavioral health courses, interviewees denied learning about opioids or the opioid epidemic in the context of their college education. Instead, information about opioids was sourced from more informal or less creditable venues: hometown gossip, social media or local news, and non-evidence-based high school curricula. The DARE (Drug Abuse Resistance Education) program was specifically identified, dismissed, and sometimes ridiculed by participants, who noted the inadequacy of the program's messaging:

Not really a lot within my life, but I guess [opioids] could be prevalent . . . maybe with other athletes too, because like, that might help like pain interceptors so that's also an idea, mostly in the media . . . I went to a private middle school, so we covered a little bit, but we didn't really do a lot. Now there was, like, a DARE Program. But it was very brief, and it was, like, maybe a one-day thing. It was like, "Just don't do drugs", and I was like, "Okay . . ." They didn't really explain anything about, like, the effects . . . [Interview 6, men's swimming]

It's like, "Say, no, like, walk away" . . . It's like, it's almost like a movie-type thing where it's like, "Hey little fella, like want a candy?" type thing . . . those type of some, like, basic scenarios . . . You know what I mean. I know I came out of school disappointed that no stranger has ever offered me . . . [Interview 23, men's basketball]

Even as hardline drug abstinence education was mocked by some interviewees, others did report that they—or their parents—had indeed "just said no" when offered opioids in a medical context, following dental or sport-related surgery. Of the 12 interviewees who affirmed the past receipt of a prescription for opioids, three had declined to obtain or consume the medications, citing fear of potential consequences.

I had surgery a few years ago, just minor, you know, a few days recovery. But I was given stronger stuff to take, and I didn't touch it, just because I didn't want to risk getting addicted. [Interview 27, women's volleyball, co-ed track & field]

I was actually prescribed OxyContin after my wisdom teeth surgery, but with discussion with my parents, they decided that it'd be better to just stick with regular Advil to deal with the pain, and not run the risk of having that addiction, or any other side effects. [Interview 22, men's soccer]

I had it, but I don't remember taking it, because I was like . . . I think I might have gotten it. But I don't think my mom let me take it. [Interview 26, men's baseball]

5.4. Normalization of Opioids after Medical Exposure

Just under half of interview participants reported medical opioid exposure, with most (save the three individuals quoted above) choosing to use their medication. Nearly all such individuals had gotten their prescription following wisdom tooth extraction, while two soccer-playing participants were given prescription opioids after Anterior Cruciate

Ligament (ACL) reconstruction. Asked to characterize their experiences with the opioid medications, several participants struggled to articulate how the drugs made them feel, perhaps because their effective function was defined by the absence of feeling pain. However, some descriptions were doubly framed in the negative, as participants stated how the drugs did not make them feel, namely “high” or euphoric:

I guess it made me feel like, it just numbs the pain for me. Like my mouth is just really sore, it like alleviates that pain. I don’t think I really felt like doped-up or anything, I was just like, “Oh, no more pain in my mouth, like, I’m fine. [Interview 1, women’s soccer]

Personally, I never felt like a high from them . . . I mean, because I was taking them while in pain, so I would just feel the pain go away, so that was more, my only, like, mental connection with them like, I never associated a pleasure or any like really positive feelings, I really just had like, “Oh, it makes the pain go away”. [Interview 18, co-ed track & field]

Such unmet expectations were echoed by participants who reported more mixed experiences with prescription opioids, due to the drugs’ gastrointestinal side effects. While the first interviewee quoted below conceded that OxyContin served as an effective analgesic after ACL surgery, she lamented the chronic stomach upset that accompanied her use. By contrast, a women’s water polo player suffered acute nausea and vomiting whenever using hydrocodone, which ultimately negated the drug’s utility.

I was still taking the prescription, because it was finally managing the pain, but . . . I was like, I don’t know how people are addicted to these things because they’re . . . what is it, I can’t think of what they’re called. They make you constipated . . . Like, it’s basically just extra strength Advil, with the side effect of constipation, but other than that and a little bit of nausea, which I had an issue with in the beginning . . . that was another thing I was like, I don’t understand why people just take this drug, because this sucks. [Interview 2, women’s soccer]

When I was eighteen, they gave me hydro . . . hydrocodone? Hydrocodeine? And I took those, and I wouldn’t get the high from that, I don’t think. And then, you know, I used it a few times and was like, that’s it. I’m done. I don’t like it. [Interview 25, women’s water polo]

As might be expected of a category of drug known to produce feelings of euphoria in some consumers, a couple interviewees did describe an intensely pleasurable rush alongside medical use of opioids. In contrast to one participant’s (Interview 2) statement above, these individuals affirmed what they saw as the addictive potential of opioids, even while they did not personally struggle with physical dependence, cravings, or withdrawals. Both interviewees quoted below had received prescription opioids after wisdom tooth extraction in high school, and described their experiences as positive, if unnervingly so:

I felt like . . . I don’t know, it just made me feel so . . . Like invincible, because I was just like . . . “ I feel no pain, nothing can hurt me”, almost. That’s kind of where my mindset was at, but good. (Interview 10, women’s swimming)

I was like, I’m enjoying this a lot, like way too much. [laughs] I think that kind of scared me a little bit, because I was like . . . I never understood how people could, like, get addicted to pain meds and stuff and I was like . . . I kind of see it now. (Interview 17, women’s basketball)

Asked if they suffered any adverse side effects, or difficulties ending their opioid use, both interviewees responded in the negative. In fact, neither finished their full prescription. Here, it should be noted that both interviewees—similar to nearly all participants medically exposed to opioids—also described personal strategies and/or social support mechanisms that allowed them to manage their use after surgery (however minor). Both participants emphasized the roles played by their respective mothers in administering pain medication, a theme that was common throughout this subsample. (In a couple cases, in

fact, interviewees complained that their parents' hypervigilance led to unmanaged pain, a theme that will be discussed in the final section alongside other forms of substance use). Similarly, all but one participant claimed to have no trouble finishing their prescription—if they even finished it.

The only thing I can think of, was when I got my wisdom teeth taken out and, to be honest, I probably forgot to take it like half the time, because I just don't like medicine. [Interview 13, co-ed track & field, cross-country]

I believe I had to take it for like seven or nine days, but I only took it at night, to help me sleep . . . So when I did take it, like 8:00 or 9:00 at night, I could sleep. I didn't really have pain. It was just swelling and discomfort . . . And then, when I was done with it, I was done with it. [Interview 28, co-ed golf]

Um, it definitely knocked me out, like I didn't really feel much of anything and it made me tired, but . . . I was supposed to be on it for four days and I only used it for two, so I felt good enough to go back to just like an ibuprofen or something like that. [Interview 5, men's volleyball]

One participant in the interview sample did describe a period of opioid dependence and unmedicated withdrawal that followed a prescription for Percocet (hydrocodone) following complicated dental surgery. While his experience highlights the importance of social support, if not supervision, around medical opioid use among young adults, his exposure also occurred under circumstances extremely unique within this sample. Specifically, he had been given an extended prescription for opioids while stationed at an isolated Air Force base in Europe with few other personnel, and no advanced health care infrastructure. Moreover, he felt unable to seek medical or spiritual help, for fear of having his military record compromised:

So then I think I had, like, a prescription for two weeks . . . Then they said, OK, I was probably good to not come back, so they gave me a prescription for a month . . . and then I ended up getting, like, another two weeks, because I was still struggling after that month, so it was like I was taking opioids for two months . . . Yeah, that was hard to do in a place where I didn't know anybody, in a foreign country. I was very fortunate, I think, overall, like came out a much more functional human being. But it was pretty rough for a while, and I think I still struggle with anxiety and depression issues from that time. It's a lot less pronounced now than it used to be, but . . . Yeah, I think it got to the point . . . where I didn't realize how much at the time . . . I felt like mentally and emotionally like I was in the fetal position, just trying to make it through, and I would say that directly related to it was the withdrawals from opioids, like definitely played a serious role. [Interview 4, men's soccer]

Despite enduring a "traumatic" episode with medical opioid use, the same participant nevertheless affirmed his continued willingness to use prescription opioids in the future, if indicated by a health care professional. He is also one of three interview respondents who described some history of nonmedical opioid use, in an incident unrelated to the experience narrated above.

5.5. Nonmedical Use May Not Be Recognized

All of the individuals ($n = 3$) who identified a past instance or pattern of nonmedical opioid use had also received an opioid prescription at some point. However, for two out of three, the "qualifying" event involved an opioid medication prescribed to someone else—one of the very definitions of nonmedical use employed by this study, among others. Nonmedical opioid is commonly defined as the use of: (1) illicit opioids, such as heroin; (2) opioid medications prescribed to someone else; (3) opioid medications, more often than medically-advised; (4) opioid medications, at higher doses than medically-advised; or (5) opioid medications, for the express purpose of intoxication. While such criteria may be well-known among researchers or addiction specialists, participants in the study

were apparently unacquainted with such diverse forms of nonmedical use. While all three individuals freely related past experiences with nonmedical use in interviews, none indicated such a history in their survey responses (even as the above definition appeared on the survey instrument).

Participants' failure to recognize nonmedical use may stem from the fact that each had consumed non-prescribed opioids to manage pain, not to "get high". Before receiving his prescription for wisdom tooth extraction, the Air Force veteran cited above had taken opioid pills from a friend before getting a tattoo in a sensitive location. Another participant, also quoted in the previous section, had accepted an oxycodone from her grandmother when struck by sudden, debilitating back pain:

I was getting a tattoo, like I have like this huge rib piece tattoo and, like the ribs suck, if you've ever gotten tattoos, and my buddy had gotten a surgery, I think he'd like messed up his ankle at a training school and he had a couple like Percocet leftover, and he gave me a couple Percocet before I went into the tattoo session . . . [Interview 4, men's soccer]

I was at my granny's house when it started hurting again, because they didn't want to take me to the hospital that time, and I was literally crying in pain. She gave me . . . She goes on to Mexico all the time, and she comes back with cheaper prescription drugs than what she gets here, and she had Oxy, and she gave me a pill, and it still didn't help. I was throwing up still, and it wasn't from that. It was just the pain. [Interview 25, women's water polo]

Another interviewee described an ongoing, if necessarily limited, pattern of non-medical opioid use for pain management. After receiving hydrocodone after wisdom tooth removal, she retained her excess prescription, consuming them when faced with a particularly trenchant migraine:

Oh, I had oxycodone . . . One of those, I don't remember and then like, I have a few of those left, and I just take those whenever I have a migraine . . . So I try to save them for when it's really bad, and like obviously, [the prescription] was in 2018, so it's not like all the time, but if it gets really bad, I'm like, okay. [Interview 3, women's volleyball]

Perhaps due to the temporality (limited occurrences) or motivations (pain relief), participants showed little concern about their experiences with nonmedical opioid use, seeing little chance of dependency, overdose, or sociolegal sanctions. At the same time, these consumption patterns arguably carry certain risks within the larger context of participants' medical and nonmedical substance use, a theme that is developed further in the final section on unmanaged pain.

As shown in the three interviews excerpted above, participants' nonmedical opioid use was largely unrelated to their athletic participation, with only one (Participant 25) referring to undiagnosed back pain of uncertain origin. None had been prescribed opioids for a sport-related injury. Indeed, when asked about any perceived relationship between sports and opioid use—medical or nonmedical—all but a couple interviewees failed to observe a direct connection. While one interviewee, in men's basketball, said he had heard about nonmedical opioid use among "acquaintances, teammates, friends-of-friends", he had not personally witnessed such behavior (Interview 19). Two other participants with more specific knowledge of nonmedical consumption among teammates further complicated the "sport-opioid nexus", in characterizing peers' opioid use as unrelated to pain, or medical exposure. While one baseball team member understood opioid use to be more generally related to relaxation, a women's softball player who also managed men's basketball and baseball sketched the larger social ecosystem that animated opioid use among athletes:

No, I haven't heard anybody even mention like Percocet for their pain management . . . if they're doing anything, I think it's more entertainment-related, like listening to music . . . [Interview 21, men's baseball]

I know some of the players here, some of them take Percocet, some of them used to pop oxycodone so that their muscles wouldn't hurt when they were playing, and I was like, I could never do that. Well, and I mean like me personally, because I mean, I know people from my high school, like friends of older brothers' friends, like 'cause my town, we were very big in lacrosse, hockey, softball, soccer . . . yeah, and I know a lot of hockey players who would pop Vicodins, oxycodone before they would even play a game, and I was like, you've never even had a surgery. So where are you getting them from? And I think the biggest thing was, is, that, their parents have gotten it. [Interview 11, women's softball]

Overall, no interviewees characterized the theoretical sports pathway into nonmedical opioid use—athletic injury, followed by an opioid prescription that escalates into dependency or an opioid use disorder. Many participants, however, described other forms of drug use to deal with unmanaged pain, including practices that may imply both acute and chronic harms.

5.6. *Unmanaged Pain and Underinformed Pain Management*

Given the high rate of athletic injury reported by the interview sample, it is hardly surprising that many participants engaged in substance use related to pain management. Nearly every interviewee described rigorous, non-pharmacological pain management regimes (including physical therapy and electrical stimulation), yet most also conceded the convenience and accessibility of different psychoactive and non-psychoactive drugs for addressing residual pain. With reference to pain management, two primary categories of substance use emerged: cannabis and “over-the-counter” analgesics. Notably, every interviewee who reported past nonmedical opioid use also described the present consumption of cannabis, specifically for sport-related pain.

Just over half of interview participants affirmed a lifetime use of cannabis, with most identifying as “current” or past-year users. While a range of motives for cannabis consumption were reported—general relaxation, sociality and team bonding—pain management emerged as a top reason, with the drug prized both for its broad effectiveness and medical safety. Discussing her long battle to address chronic back pain, one participant identified cannabis as the sole useful remedy, while two others saw the drug as specifically benefiting their recuperation from sport.

Interviewer: I think I heard that [cannabis] is also useful for pain management for you?

Participant: That, and plus . . . some more sugar on top . . . I also have an eating disorder, too, so it helps me eat, and I have sleeping issues, so it helps me sleep, too. [Interview 25, women's water polo]

Personally, I think it helps me a lot. Like I said, most of the time when I get home, especially after a game, like my entire body is screaming, and so I'll take a nice, long hot shower, try to like relax my muscles . . . I'm still aching and then, by the time I get downstairs, I usually smoke, and then just lay on the couch and like watch a movie or something . . . [Interview 3, women's volleyball]

So, I love it. I love it and I also feel like this is the only opportunity that I might have ever to play collegiate level, so like, I gotta try to make the most of it . . . Like I said, my preference is to treat that with cannabis, like to kind of keep going, and I don't feel like it's making me worse. I think it's helping me . . . [Interview 4, men's soccer]

As noted, all three participants quoted above had also used prescription opioids—medically and nonmedically—to manage or prevent pain related to diverse medical conditions and circumstances, with two regarding such drugs warily, due to their side effects or potential for dependence. However, they were also aware of the diverse social and legal risks attached to consumption of an illegal and banned substance—prohibitions that also threatened participants' health, when buying cannabis from illicit markets:

It was bad in my last school, because we had to test for it and stuff, which was kind of obnoxious, and if you test the positive, you miss, like, half the season. Which was super bad, especially if you were doing it for something like pain management, or like sleeping . . . It didn't matter even if you had your medical card. You still weren't allowed. [Interview 3, women's volleyball]

There's a lot of adults that I know, like dealers. A lot of stuff up here like you have to be careful about . . . There's been a lot of cases where, like cards and weed pop up here, starting to be laced. [Interview 25, women's water polo]

Other interviewees who smoked cannabis to address sport-related pain were critical of how drug testing policies in athletics effectively incentivized not only opioid use, but high levels of over-the-counter drug consumption. A men's baseball pitcher reported using both "weed" and Ibuprofen to relieve soreness in his arm, but worried about consuming the former in-season, instead hoarding 800 milligram Ibuprofen pills:

I'm supportive of not testing for marijuana in athletes, because it's better for you than taking the drugs that they're going to give you to keep you in the sport, because, plus, it helps. I don't know. Maybe they have trouble sleeping. Maybe they're having trouble with their knee or something. It helps. That's the thing about weed. For like relatively little risk, it'll do a lot of things for you. It can help you a lot more than it can hurt you. [Interview 26, men's baseball]

Many participants described the heavy use of over-the-counter analgesics, namely acetaminophen (Tylenol), ibuprofen (Advil), or naproxen (Aleve), although they were not consistently reflexive around the associated risks. While some acknowledged the potential harms of overuse (such as stomach or liver damage), others joked about their high levels of consumption, including several who had declined to take prescribed opioids.

When I sprained my ankle up at [main campus], I didn't go to Med Express, I didn't go to like Urgent Care or whatever hospital, because I just knew the feeling. It's a sprained ankle. I just take like five Ibuprofen, and I'm good, which still isn't good for me, but . . . [Interview 14, women's volleyball]

When it's, you know, usually at the height of the season, I'll be taking ibuprofen before practice or two, you know. [Interview 27, women's volleyball, co-ed track & field]

Interviewer: How do you manage your injuries? What are your, kind of, "best practices"?

Participant: Lots and lots of stretching, and lots of Advil too. I'm sure that's probably the source of some of my stomach issues, hopefully not liver issues down the way, but I'm pretty certain that's one of the reasons I can't stomach alcohol very well, because of my use of Advil in my sports career. [Interview 22, men's soccer]

Yeah, hopefully I'm not addicted to [Tylenol]. [Interview 8, men's soccer]

In contrast to a sole allegation of nonmedical opioid use in men's baseball, discussions of a larger over-the-counter drug "culture" were more common, in baseball and beyond. Notably, each of the below participants played below the Division III level, within smaller regional conferences that largely involved inter-campus competition. Nevertheless, they described achievement-oriented team atmospheres that normalized preventive self-medication:

I know a lot of guys, like, after they pitch, they'll pop 800 milligrams of Tylenol or ibuprofen like, I know ibuprofen's a favorite of baseball players. I don't know, I think it's a pseudo effect . . . I mean, I'm not too in tuned in with what the risks are, necessarily . . . [Interview 15, men's baseball]

But I do know, like, people will take like ibuprofen often. Sometimes to practice hard, or before races and stuff like that. And some people take Aleve, and it's a

pretty, sometimes, regular thing. I'm not a big fan of that, but I know that's just the culture . . . I know teammates that have, even though they do focus on only taking before races, they have upped the dose now, and they take like three to four to five . . . [Interview 18, co-ed track & field]

Everyone on my team just carries [Ibuprofen] around . . . take a couple of those and you're good to go. [Interview 21, men's baseball]

6. Discussion

While restricted in its scope and generalizability, the data presented above do not support a persistent policy narrative alleging an opioid epidemic among young athletes. Both surveys and interviews found scant evidence of nonmedical opioid use (NUPO)—current or lifetime—among a population of college students athletes competing at or below the NCAA Division III level, with levels of reporting NUPO falling below those captured in other studies (Moore and Abbe 2021; National Collegiate Athletic Association 2018). Moreover, qualitative data demonstrated that participants' medical and nonmedical opioid use was rarely related to their sport careers. Where some research has highlighted both athletic involvement and injury as interacting risk factors for NUPO, interviews failed to illuminate the hypothesized "sports injury pathway" into medical, then nonmedical opioid consumption (Ford et al. 2018; Veliz et al. 2014). Instead, interviewees reported largely received prescription opioids following routine dental surgery, with most terminating their use earlier than expected—if they took the medication at all. All but one individual ended their medical opioid use without incident, with interviews demonstrating the importance of social support in inappropriate consumption.

At the same time, interviews did reveal fertile ground for the harmful use of assorted pain medications, by young athletes lacking sufficient resources and information. On the one hand, individuals with and without medical exposure to prescription opioids evinced little knowledge around such drugs, often misidentifying opioid medications, or mischaracterizing their effects. Among the opioid naïve, misapprehensions around such drugs were linked to an inadequate education—sometimes grounded in "just-say-no" truisms—which in turn fed an inarticulate fear. Such individuals may be, in turn, more vulnerable to the overuse of over-the-counter medications. At the same time, a handful of interviewees who had been medically exposed to opioids reported consuming the drugs in nonmedical ways, in order to address residual pain. Ironically, the same individuals largely professed an aversion to opioids, preferring to take the social and legal risks associated with cannabis, a federally-prohibited substance that is additionally banned by the NCAA. While athletes regarded cannabis as a relatively benign substances compared to opioid analgesics, they also conceded that a "safe supply" could not be guaranteed, when purchasing the drug from illicit sources.

Even as this study fails to reveal a "hidden epidemic" of opioid or other pain medication use among student-athletes, it does suggest the need for broader, evidence-based education around drugs and pain management in this population. Where most interviewees cited little formal education around opioids, those who recalled specific curricula (in college or high school) described their content as inadequate, if not misleading. Given the prohibition on nonmedical (or non-therapeutically-exempt) opioid use among NCAA athletes in particular, an abstinence-based approach, which emphasizes the harms associated with such drugs, may seem appropriate. However, this tact may fail to equip students with the information needed to safely consume a category of substance that is still commonly prescribed. As shown in the data above, medical exposure to opioids was widely reported by interview participants, while nearly a quarter of survey respondents had received a prescription for opioids in their lifetime. Curricula that advise student-athletes (or any students) to "just say no" do not appreciate this reality, and may further incite adverse consequences. Students who "say yes" may not be equipped to recognize their own nonmedical use, or may simply dismiss messaging around opioid risk as illegitimate fear-mongering. At the same time, students who are discouraged from accessing opioids

prescribed by a medical professional may seek to self-medicate using over-the-counter substances that are not addressed at all (or in the case of cannabis, not discussed for pain management). Indeed, several studies have demonstrated college student-athletes' low knowledge around nonprescription pain medications that are easy to purchase and commonly self-administered (Christopher et al. 2020; Matava 2016; Pedersen et al. 2022).

Though addressed only obliquely in this paper, this study also points to the perceived irrelevance of drug testing for student-athletes competing within the NCAA's lowest division or smaller regional conferences. While a couple students criticized banned substance lists and testing procedures that threatened their athletic participation in theory, such policies did not effectively deter their use of cannabis (prohibited by the NCAA, and by specific institutions). More participants laughed off the possibility of random testing, reporting that neither they, nor any known teammates, had ever been selected, sometimes go so far as to denigrate their level of competition. Student-athletes in this study harbored few aspirations around a post-collegiate sport career, and were more likely to identify their classes, social relationships, and employment (paid or internships) as the primary foci of their lives. In this way, social drug and alcohol use, within certain boundaries, may be prioritized—as adjacent to a normal college experience—over the formal or informal substance use policies stipulated by teams, athletics departments, or associations. Of course, this does not mean that less-elite student-athletes do not take their college sport participation seriously, or do not want to perform their best under the circumstances. Instead, certain cultures of over-the-counter analgesic use may emerge as a means of managing overpacked schedules, where athletes' final years of competition are stacked with rising academic and professional obligations.

This study, of course, is characterized by methodological limitations that temper the broad applicability of its conclusions. Though not the focus of this paper, survey participants were not sampled randomly, and while the recruitment target ($n = 280$) was calculated to ensure the adequate capture of a rare behavior, a declining rate of nonmedical opioid use in this population may require a larger sample. Survey participants, who attended a large state university in the northeast United States, may not be representative of all student-athletes at the university, student-athletes in other regions, or those enrolled at other types of institutions. Notably, over 80% of both survey and interview participants self-identified as white, but current enrollment statistics across the university's Commonwealth campuses revealed that white students comprised of less than 62% of the overall student body. While demographic information on student-athletes alone is unavailable, this discrepancy suggests that non-white students are significantly underrepresented in above data, for reasons that may not be random. Indeed, myriad studies have documented challenges to engaging underrepresented minority populations in health research specifically, with potential participant distrust representing a major barrier. In a study asking individuals to report highly-stigmatized, and sometimes illegal, behavior, non-white students may have felt greater reluctance to participate (particularly when receiving a remote invitation from an unknown researcher) (Wambua et al. 2022; Yancey et al. 2006). Ultimately, the resulting selection bias in the data presented here may have yielded overestimates of nonmedical opioid use in this population, with previous research showing higher levels of NUPO among white student-athletes (Denham 2014). Survey response rates may only be calculated for individuals invited directly by email, with 10.5% of students targeted through this recruitment method completing a survey—a response level in keeping with other web-based surveys of college students (Van Mol 2017).

While qualitative data are not intended to produce generalizable results, more restrictive interview eligibility criteria may have yielded other themes. All survey participants were eligible to participate in the interviews that informed this analysis. Recruitment that had focused solely on individuals with reported opioid experience (medical and non-medical) may have revealed different levels or kinds of opioid knowledge, attitudes, and consumption practices. Moreover, student-athletes' knowledge and attitudes around other forms of pharmacological pain management were not explicitly addressed in the interview

instrument. Rather, this information emerged in more general discussions of opioids and pain mitigation practices. Further studies might intentionally explore the relationship between student-athletes' knowledge, attitudes, and experiences around opioid use, and their consumption of other kinds of pain medication.

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