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Current Perceptions of Diversity Among Head Team Physicians and Head Athletic Trainers

Results Across US Professional Sports Leagues

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Background: Discrepancies in race, ethnicity, and sex among health care providers and their patients have been shown to affect the patient-provider relationship as well as the quality of care. Currently, minority and female representation among orthopaedic surgeons remains low. Given the large proportion of minority athletes and their degree of public visibility, professional sports serves as an important arena within which to analyze the diversity of health care providers.

Purpose: To describe and evaluate the current level of diversity of head team physicians (HTPs) and head athletic trainers (ATCs), primarily in terms of race and sex, within men's professional sports leagues in the United States.

Study Design: Cross-sectional study.

Methods: Five major US professional sports leagues were evaluated: National Basketball Association, National Football League, National Hockey League, Major League Soccer, and Major League Baseball. Publicly available data were collected to identify the HTPs and head ATCs for each team within these leagues. Two independent observers analyzed photographs and names of these individuals to determine his or her perceived race and sex, with disagreements being resolved by a third independent observer. Other physician data collected included graduate degree(s), specialty, and number of years in practice. Kappa coefficients (κ) were employed to evaluate interobserver reliability. Chi-square, Fisher exact, and *t* tests were used for statistical comparisons across leagues.

Results: The κ values for perceived race were 0.85 for HTPs and 0.89 for head ATCs, representing near-perfect interobserver agreement. Minorities comprised 15.5% of HTPs and 20.7% of ATCs ($P = .24$). Women comprised 3.9% of HTPs and 1.3% of head ATCs ($P = .017$). The majority of HTPs were orthopaedic surgeons with medical doctorates. Female HTPs had significantly fewer years in practice compared with male HTPs (15.0 ± 4.9 vs 23.1 ± 9.6; $P = .04$).

Conclusion: The lead physicians and athletic training providers for men's professional sports teams demonstrated low rates of minority and female representation, denoting a highly visible area for discussing the role of increased diversity in health care.

Keywords: diversity; professional sports; race; sex

Despite increased awareness of the importance of diversifying health care and physician workforces, the field of orthopaedics remains one of the least diverse in terms of minority and female representation within both its practicing surgeon and resident cohorts.[2,27-29,32,37,41] In their most recent report on the matter, the American Academy of Orthopaedic Surgeons (AAOS) reported that only 15.3% of the orthopaedic surgeons surveyed identified as minorities and only 7.6% as female.[1] Given the longstanding role of orthopaedic surgeons in the care of professional athletes, the demographics of the medical staff may be an important component to consider in the overall diversity of leadership positions within professional franchises in the United States. More recently, these leagues have been scrutinized for their lack of minority representation among ownership and coaching positions.[15-18]

Efforts to improve diversity among health care professionals take into account how important the patient-provider relationship is in administering quality care. Studies have shown that disparities in race and sex among providers can be a crucial element of the patient-physician relationship that may affect communication and decision-making.[6,40,42] Ultimately, these discordances in race between providers and patients negatively influence how

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treatments are administered and subsequent health outcomes across a number of fields.[3,9,12,20,21,31,49] For example, using national Medicare claims data, Skinner et al[43] showed that Black men and Asian women were significantly less likely to receive a clinically warranted total knee arthroplasty, even after controlling for income. Dy et al[11] studied the records of 197,290 patients in New York who underwent surgery for hip fracture and found that Black patients were at significantly greater risk for delayed surgery, reoperation, readmission, and 1-year in-hospital mortality than White patients.

American professional sports provide a unique area in which to study patient-physician relationships with regard to race and sex, especially given the traditional role of the orthopaedic surgeon as head team physician (HTP). According to The Institute for Diversity and Ethics in Sport 2020 annual report, minority athletes in the National Basketball Association (NBA) and Major League Soccer (MLS) comprised 83.1% and 60.1% of their leagues, respectively.[16,17] Compared with the US national race and ethnicity data, in which minorities make up approximately 40% of the US population, professional sports have a high degree of minority representation.[46] Maintaining the health of these athletes via close work with team physicians and athletic trainers is paramount for the success of individual players and the teams as well as the franchises for whom they play. However, little is known about the demographic makeup of the health professionals charged with caring for some of the public's most visible members. The aim of this study is to characterize the racial and sex demographics of the HTPs and the head certified athletic trainers (ATCs) for the major American professional sports leagues. This study will serve as a benchmark for understanding diversity trends over time, analyzing racial inequalities in the health care of high-level athletes, and provide data to help guide interventions aimed at improving inclusion for the benefit of health care providers and the athletes for whom they care.

METHODS

Data Collection

The leagues included in the study were the National Basketball Association (NBA), Major League Soccer (MLS), National Football League (NFL), National Hockey League (NHL), and Major League Baseball (MLB). These leagues were chosen based on their high viewership and visibility within the United States. Two independent investigators (A.J.W., O.A.) performed an online search of league websites and publicly available team information to identify the medical and training staff. Within the designated medical and training staff, the lead or HTP(s) and the lead ATC(s) were compiled for every team in each league. In the event that a team designated 2 or more persons as HTPs or head ATCs, all such individuals were included for analysis. Two independent observers (A.J.W., O.A.) reviewed photographs of each HTP and ATC and assigned each a perceived race designation. The following race designations were used: White, Black, Asian, Hispanic/Latino, and Native American. These designations were chosen to reflect the current race designations utilized by the AAOS in its biannual diversity report.[1] In the case of disagreement for race designation by the 2 independent observers, a third independent observer (A.D.) was utilized to make the final race determination for the purposes of statistical analysis.

The sex of each HTP and head ATC was determined by the 2 independent observers using photographs and publicly available biographical information with the binary designations of "male" or "female" as previously described.[13,30] This was performed keeping in mind the limitations of these designations in capturing the full spectrum of gender identities. Other data collected for the HTPs included whether each physician had obtained a medical doctor (MD) or doctor of osteopathy (DO) degree, his or her medical or surgical specialty, and the number of years in practice as designated by the year of residency completion or fellowship training, if applicable.

Statistical Analysis

To assess the interobserver agreement of race designations performed by the 2 independent observers, kappa coefficients (κ) were calculated and categorized according to the Landis and Koch[14] method. The chi-square and Fisher exact tests were used to analyze categorical variables, and t tests were used to compare continuous variables across leagues. Statistical analyses were performed using Prism 7 software (Version 7.0a; Graphpad Software) with statistical significance defined as $P < .05$.

RESULTS

HTP Demographics

Across all leagues, a total of 155 HTPs were identified, with every team in each league designating at least 1 HTP.

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Ethical approval was not sought for the present study.

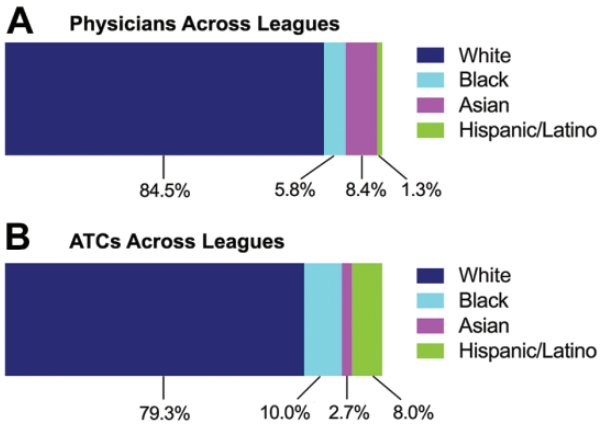

Figure 1. Percentage of (A) head team physicians and (B) head certified athletic trainers (ATCs) by race.

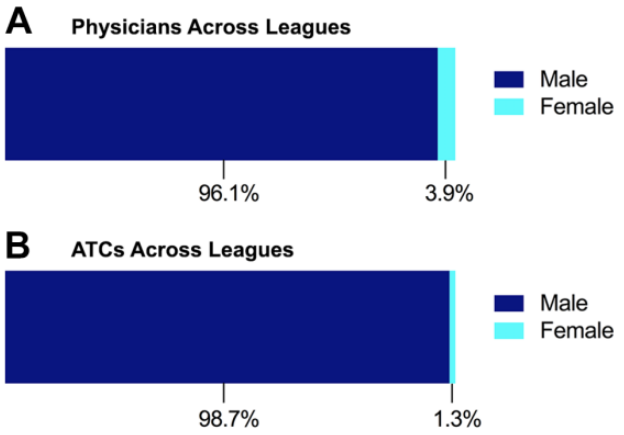

Figure 2. Percentage of (A) head team physicians and (B) head certified athletic trainers (ATCs) by sex.

TABLE 1
Comparison of HTPs and ATCs by Race[a]

	HTPs, %	ATCs, %	*P*
White	84.5	79.3	.239
Black	5.8	10	.174
Asian	8.4	2.7	**.03**
Hispanic/Latino	1.3	8	**.005**
Native American	0	0	>.999

[a]Bold *P* values indicate statistically significant between-group differences ($P < .05$). ATC, head athletic trainer; HTP, head team physician.

Interobserver agreement for HTPs race designations performed by the 2 independent observers was $\kappa = 0.85$, indicating near-perfect agreement. In total, there were 6 instances of disagreement for race designation, which required resolution by the third independent observer. Minorities comprised 15.5% of HTPs, with those of Asian background representing the largest proportion at 8.4% (Figure 1A and Table 1). With regard to sex, the vast majority of HTPs were men (96.1%), with women, all of whom were White, holding only 6 of the 155 HTP positions (Figure 2A). When examined by league, the NBA demonstrated the highest rate of minority HTPs at 23.3% and comprised predominantly HTPs with perceived African American heritage (Figure 3A and Table 2). With minorities comprising 11.8% of HTPs, the NFL was the league with the lowest rate of minority representation. Although there were variations in minority percentages, there were no significant differences in minority representation for HTPs when compared across the leagues ($P = .75$).

On average, minority HTPs had 19.6 ± 8.7 years in practice compared with White HTPs with 23.5 ± 9.62 years ($P = .07$) (Figure 4A). Female HTPs had significantly fewer years in practice than their male counterparts (15.0 ± 4.9 vs 23.1 ± 9.6; $P = .04$) (Figure 4B). All (100%) of the minority HTPs possessed an MD degree compared with 96.7% of White HTPs ($P = .39$). The remaining White HTPs had DO degrees. In terms of specialty, 78.1% of all HTPs were orthopaedic surgeons—all having completed fellowship training in sports medicine—with the NHL having the highest rate of non-orthopaedic surgeon HTPs (34.3%) across the leagues (Appendix Figure A1). Alternate specialties included primary care sports medicine physicians with backgrounds in either family medicine or physical medicine and rehabilitation. There were no significant differences in rates of orthopaedic surgeon specialization between White and minority HTPs (77.1% vs 83.3%; $P = .50$).

ATC Demographics and Comparison with HTPs

There were 150 head ATCs identified across the leagues with every team in each league designating at least 1 ATC. Interobserver agreement for head ATC race designations performed by 2 independent observers (A.J.W., O.A.) was $\kappa = 0.89$, indicating near-perfect agreement. In total, there were 7 instances of disagreement for race designation, which required resolution by the third independent observer (A.D.). When totaled across all leagues, head ATCs were 79.3% White and 20.7% minorities (Figure 1B). Although the total minority head ATC percentage did not differ significantly from the total minority HTP rate (15.5% vs 20.7%; $P = .24$), the composition of the minority cohorts for each group did show significant differences when compared with each other, specifically in rates of Asian and Hispanic/Latino representation (Table 1). There were similar rates of female representation among head ATCs compared with HTPs (1.3% vs 3.9%; $P = .017$) (Figure 2B).

For the head ATCs, there were significant variations in the percentage of minorities holding head ATC positions when compared across leagues ($P = .006$) (Figure 3B), most evidently demonstrated in the NFL (37.5%) and the NHL (0.0%). In addition, when examining minority HTP and head ATC rates within each league, both the NFL and NHL demonstrated significantly different minority rates between the 2 job classes (Figure 5 and Table 3).

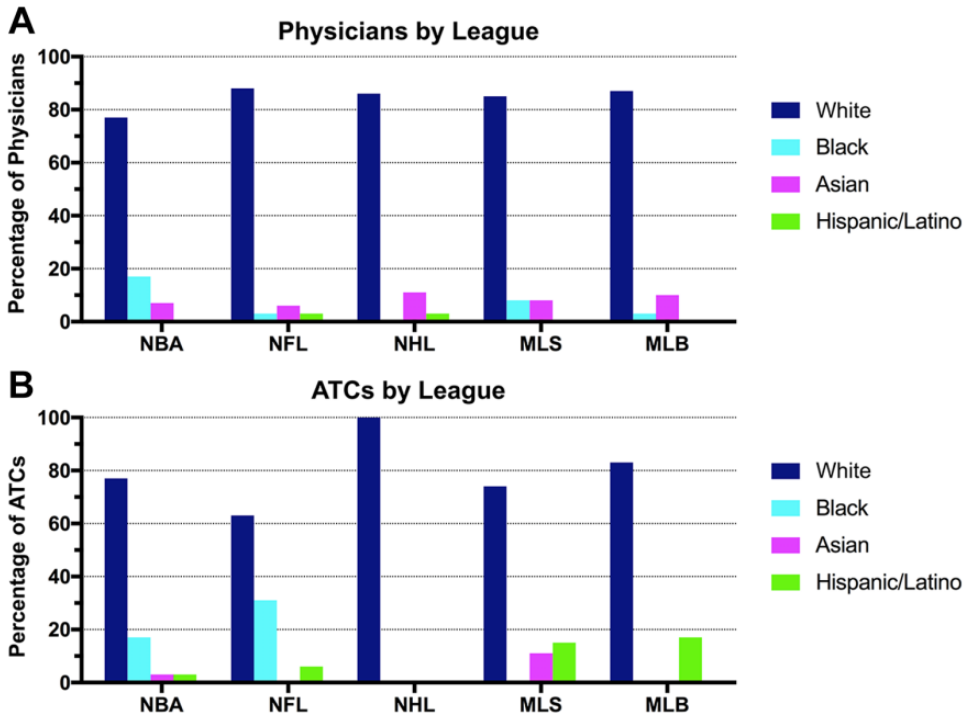

Figure 3. Percentage of (A) head team physicians and (B) head certified athletic trainers (ATCs) by race, stratified by professional sports league. MLB, Major League Baseball; MLS, Major League Soccer; NBA, National Basketball Association; NFL, National Football League; NHL, National Hockey League.

TABLE 2
HTPs and ATCs by Race and Sports League[a]

	Race, %				
	White	Black	Asian	Hispanic/Latino	Native American
HTPs	84.5	5.8	8.4	1.3	0.0
NBA	76.7	16.7	6.7	0.0	0.0
NFL	88.2	2.9	5.9	2.9	0.0
NHL	85.7	0.0	11.4	2.9	0.0
MLS	84.6	7.7	7.7	0.0	0.0
MLB	86.7	3.3	10.0	0.0	0.0
ATCs	79.3	10	2.7	8.0	0.0
NBA	76.7	16.7	3.3	3.3	0.0
NFL	62.5	31.3	0.0	6.3	0.0
NHL	100.0	0.0	0.0	0.0	0.0
MLS	74.1	0.0	11.1	14.8	0.0
MLB	83.3	0.0	0.0	16.7	0.0

[a]ATC, head athletic trainer; HTP, head team physician; MLB, Major League Baseball; MLS, Major League Soccer; NBA, National Basketball Association; NFL, National Football League; NHL, National Hockey League.

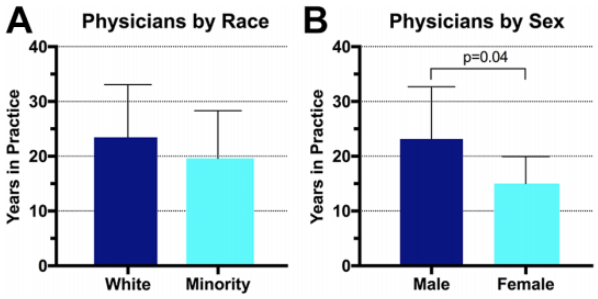

Figure 4. Years spent in practice for head team physicians by (A) race and (B) sex.

DISCUSSION

The acknowledgment of racial disparities among health care professionals, particularly among orthopaedic surgeons, has been followed by more direct efforts to increase the representation of historically marginalized groups. This may be reflected, in part, by our findings that minority and female head physicians had, on average, fewer years in practice. Although some studies have detailed modest gains in minority and female representation in orthopaedics, there remains a persistent deficit of diversity in comparison with other surgical fields and national demographics.[7,8,32] In this study, we evaluated the minority and female representation in the lead medical staff for the major professional leagues and demonstrated that similar disparities exist. Only 15.5% of all HTPs were identified as minorities, while, at 20.7%, slightly more head ATCs were of minority background. These low rates of minority individuals are made more evident by the often high percentage of minority athletes who play in those leagues. Furthermore, we found that women occupied an extremely low percentage of both HTP (3.9%) and head ATC (1.3%) positions. Significant differences were observed in minority

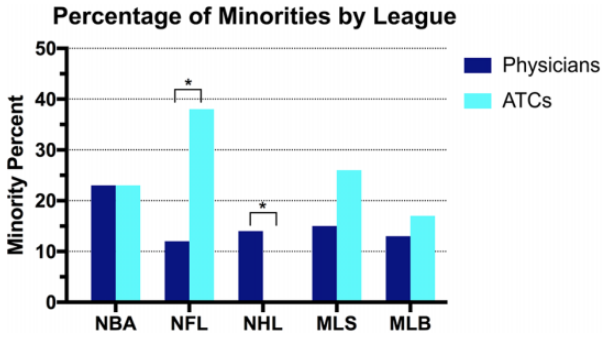

Figure 5. Percentage of minority head team physicians and head athletic trainers (ATCs), stratified by professional sports league. *Statistically significant difference ($P < .05$). MLB, Major League Baseball; MLS, Major League Soccer; NBA, National Basketball Association; NFL, National Football League; NHL, National Hockey League.

percentages of HTPs and head ATCs within the NFL and NHL; however, these differences were in opposite directions and not shared by the other leagues.

A related study by O'Reilly et al[30] used an online search of publicly available data to examine the percentage of all female team physicians across select National Collegiate Athletic Association Division I conferences, the MLB, NFL, NBA, and the Women's National Basketball Association (WNBA), and found that total female representation was 12.7%, with the greatest proportion found in the WNBA. Of the team physicians who were orthopaedic surgeons, women comprised 6.8% of these positions. These results show higher percentages of female team physicians than our study, likely due to the inclusion of a different set of leagues and the inclusion of team physicians outside of those designated "HTP." Hinkle et al[13] similarly conducted an internet search of publicly available data to identify team physicians in the NBA from 2009 to 2019 and found that only 3 of 125 (2.4%) were female. To the best of our knowledge, there are no studies available in the current scientific literature reporting on team physician race or ethnicity.

Compared with national demographic data, large differences exist in the rates of minorities in HTP and head ATC positions. For example, the most recent US census data show that individuals identifying as Black comprise 13.4% of the US population. This contrasts with just 5.8% of HTPs and 10% of head ATCs found in our study.[46] Wider discrepancies exist when evaluating Hispanic/Latino representation in the US population compared with HTPs and head ATCs (US population, 18.5%; HTP, 1.3%; ATC, 8.0%). These differences are magnified within the realm of professional sports given the large proportion of minority participation. In the NFL, 69.4% of its players are minorities while only 11.8% of its HTPs are.[18] The league with the most congruent racial demographics as shown in this study is the NHL, in which 85.7% of HTPs and 100% of its head ATCs are White, closely matching the approximately 95% to 97% of its players who are also White.[10,35]

Understanding the various national demographic trends of the orthopaedic specialty is an important component of

TABLE 3
Percentage of Minority HTPs and ATCs by Sports League[a]

League	HTPs, %	ATCs, %	*P*
NBA	23.3	23.3	>.999
NFL	11.8	37.5	**.015**
NHL	14.3	0.0	**.029**
MLS	15.4	25.9	.344
MLB	13.3	16.7	.362

[a]Bold *P* values indicate statistically significant between-group differences ($P < .05$). ATC, head athletic trainer; HTP, head team physician; MLB, Major League Baseball; MLS, Major League Soccer; NBA, National Basketball Association; NFL, National Football League; NHL, National Hockey League.

contextualizing the results found in our study.[25] In its biannual report on diversity, the AAOS reported that the national orthopaedic workforce was predominantly (84.7%) White.[1] Asian surgeons were second in representation at 6.7%, followed by Hispanic/Latino and Black at 2.2% and 1.9%, respectively. These statistics resemble the 8.4% Asian, 5.8% Black, and 1.3% of Hispanic/Latino HTPs detailed in the current study. With regard to sex, the AAOS reports that women comprise 7.6% of orthopaedic surgeons, approximately double the rate (3.9%) of female HTPs found across all leagues.[1] Shah et al[41] investigated national rates of female and minority academic faculty positions and reported that, in 2017, women occupied 17.9% and minorities occupied 6.1% of such positions. Female and minority representation in orthopaedic residency nationwide has also been studied.[7,28,33] Poon et al[32] studied orthopaedic demographic trends from 2005 to 2016 and found that among all the surgical specialties, orthopaedics consistently demonstrated some of the lowest rates of female and minority residents. Female resident representation increased from 10.9% to 14.4% during the study period (mean 13.3% over 10 years) but represented a significantly lower rate of increase compared with all surgical specialties, save urology. Minority representation decreased 32.5% over the study period, with a mean minority percentage of 25.6%, indicating that orthopaedic residency actually became less diverse.

Based on these studies, it is plausible that poor rates of minority and female representation at every level of orthopaedics is a main driver of the similar trends found among HTPs in our study.[27,33,34,41] We did not find any differences between White and minority HTPs in terms of type of medical degree obtained, orthopaedic specialization, or number of years in practice, suggesting that a credential-based rationale for the low rates of minority representation is less likely. Increasing the percentage of minority providers within professional sports may have a number of benefits, including improved player-provider communication and trust. Studies have shown that patients in race-concordant relationships with their physicians experience greater participation and satisfaction in their health visits, longer visit times, and more trust in the physician, with a greater intent to follow treatment recommendations.[5,6,40,42,44] Whether such efforts at increasing minority representation among HTPs and ATCs translates into

improved health outcomes and player-provider relationships will be the subject of future studies on this topic.

In terms of female representation, our study found low rates of both female HTPs and head ATCs across all leagues; female HTPs had significantly fewer years in practice compared with male HTPs (15.0 ± 4.9 vs 23.1 ± 9.6; $P = .04$). The reasons for this are likely multifactorial. Similar considerations to those posited for racial disparities, in reference to low rates of female orthopaedic surgeons nationally from which to hire, are applicable in this case. The sex discordance between the players of an all-male league and female HTPs may be an additional historical hurdle that has yet to be met effectively. Studies showing significantly increased rates of all female team physicians in women's collegiate and professional leagues are testament to this.[13,30] The issues of mentorship, bias, and recruitment likely play a role, as has been studied in orthopaedics more broadly.[19,22,26,28,32,38] Recent studies have shown evidence that female physicians may have better communication with patients and produce improved health outcomes.[39,45] Wallis et al[47] examined 104,630 patients treated by 3314 surgeons and found that patients treated by female surgeons had a significant decrease in 30-day mortality. Therefore, increased hiring of female team physicians among professional teams may not only aid in broader orthopaedic female recruitment efforts given the highly visible nature of such positions, but may also improve the health care the athletes receive.

There are limitations to this study. Race and sex designations were performed using publicly available information including online searches, team websites, and photographs. Given that our study does not rely on direct survey information from study participants on their race and sex, there is the possibility for incorrect categorization. Furthermore, instances of participants with multiracial backgrounds may be missed. Similar methods were used in 2 related studies examining the sex of team physicians.[13,30] In addition, the utilization of 2 independent observers in our study and calculation of κ of interrater agreement within the near perfect range for both HTPs and ATCs bolsters confidence in the accuracy of our designations. Survey-based demographic studies are often complicated by nonresponse and volunteer bias, which may skew results and produce incomplete data.[1,4,23,24,50] This study attempts to capture the entirety of HTP and head ATC perceived diversity, which may not be possible with survey techniques given the pitfalls mentioned above. Studies detailing associations among orthopaedic institutions' faculty diversity, resident diversity, and the diversity of the applicant pool of medical students suggest the perception of diversity is an important factor.[27,28,36,48] Additional investigation of these topics is warranted, for which our initial study may serve as a benchmark and impetus for increased participation from professional leagues, allowing for more robust data collection in future iterations.

CONCLUSION

This study demonstrates that the ongoing issue of low diversity within the medical field also persists at the level of professional athletics health care personnel. Efforts to bolster female and minority representation in this highly visible arena may augment the health care provided to the athletes by enhancing trust and communication. Additional benefits may include fostering an inclusive environment among these health professionals and the leadership positions at large in these organizations as well as aid in further recruitment of such underrepresented groups into medicine and orthopaedic surgery. Future studies on this topic will allow for assessing trends over time and aid in evaluating the efficacy of diversity and inclusion initiatives going forward, including any effects that these initiatives have on the quality of care provided to the athletes.

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APPENDIX

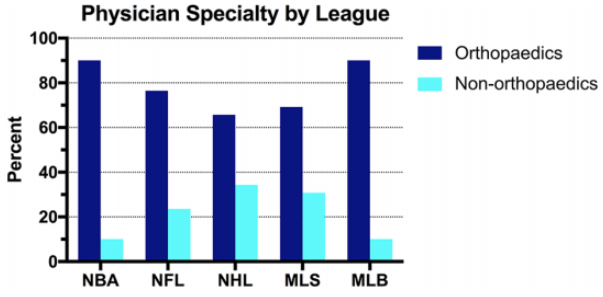

Figure A1. Percentage of head team physicians specializing in orthopaedics, stratified by professional sports league. MLB, Major League Baseball; MLS, Major League Soccer; NBA, National Basketball League; NFL, National Football League; NHL, National Hockey League.