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Health Care Disparities: They Exist and Are Relevant to the Orthopaedic Surgeon



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Introduction

America faces growing demographic and financial strains in terms of meeting health care needs, leading to tiered care that is not appreciated by most physicians. The United States Census Bureau projects a majority-minority nation by 2043 with more than doubling of the Hispanic, Asian, Native American, and multiracial populations from 2012 to 2060.¹ The poverty rate is slowly declining but still affects 39.7 million people as of 2017.² The number of people with health insurance coverage is increasing, but 28.5 million people did not have health insurance at any point in 2017.³ Such changes — or in some instances the lack thereof — affect the practice of medicine, including orthopaedics, which leads to different levels and quality of care. Many patients and their providers struggle to reconcile language and cultural barriers, particularly in a high-pressure system that rewards productivity and disincentivizes devoting more than the scheduled time to a visit. Patients sometimes find themselves unable to afford transportation or necessary medications, resulting in missed follow-up appointments, loss of continuity of care, and a severe decline in treating treatable conditions. Patients who do receive the treatment they need are subsequently left with the financial burden of astronomical bills from varying degrees of insurance coverage. Conversely, the most privileged patients and providers knowingly exploit their network to expedite or demand appointments, tests, and procedures that are then made readily available to them and are covered by a third party.

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Despite such obvious differences in access to and delivery of care prevalent in every practice, health care disparities remain underappreciated. This is reflected in a recent survey of members of the American Orthopaedic Association, where only 12 percent of 305 respondents agreed that racial and ethnic disparities exist in health care; nine percent believed disparities exist specifically in orthopaedics; three percent believed disparities exist in their hospital or clinic; and only one percent admitted that disparities exist in their practice.⁴ Health care disparity is a problem that appears to be under the radar, and surgeons seem to be either unaware or choose to dismiss a growing number of studies published in the medical and orthopaedic literature.^{5,6}

This paper is intended to raise awareness regarding the disparities in health care in general, briefly describe some of the progress in other fields, discuss why it is relevant to orthopaedic surgery, and explore how surgeons can help by modification of their practices and environments to achieve equity for all.

What Are Health Care Disparities?

Health care disparities are differences “closely linked with social or economic disadvantage”⁷ and include race and ethnicity, socioeconomic status, geographical location, education, gender, sexual orientation, disability, and age.⁷⁻⁹ The presence of disparities, in turn, has been found to affect quality of care and outcomes.^{5,9-16} In 1985, then Secretary of the United States Department of Health and Human Services Margaret Heckler published the landmark “Heckler Report” that more formally and completely analyzed the disparity that was already known to exist in black and minority populations.¹⁷ The Secretary’s task force statistically analyzed “excess death” in the minority versus nonminority population and identified six causes that together accounted for greater than 80 percent of the excess death: cancer, cardiovascular disease, chemical dependency, diabetes, homicide and accidents, and infant mortality. They reported that about 45 percent of deaths before age 70 in the black population would have been avoidable if better evaluation, detection, and treatment had been available.¹⁸

Special entities have since been established to more consistently collect quality data and monitor programs dedicated to improving the disparities. These include medical groups such as the American College of Surgeons Committee on Health Care Disparities⁶; non-profit organizations such as the Kaiser Family

Foundation⁸; and government agencies such as the Health Resources and Services Administration (HRSA), which focuses on areas such as maternal and child health, primary care access and quality, HIV/AIDS, mental and behavioral health, chronic disease prevention, health workforce, and rural-urban disparities¹⁹; and the Agency for Healthcare Research and Quality (AHRQ), which focuses on six priority areas that include: person-centered care, patient safety, healthy living, effective treatment, care coordination, and care affordability.¹⁵ Regularly updated reports are now available from these organizations, making it quite clear that disparities persist and the magnitude of improvement over the years remains variable.^{5,15,16} According to the 2017 AHRQ National Healthcare Quality and Disparities Report (QDR), there was no improvement from 2000 to 2016 in the priority area of care affordability. Accordingly, the poor (currently defined as at or below the Federal Poverty Level of \$25,100 for a family of 4²⁰) are more likely to lack insurance and access.¹⁵ Other examples of highlighted findings from the QDR are:

- Lower life expectancy for black Americans
- Higher infant mortality for black infants
- Increased asthma risk in poor children
- Increased incidence of serious psychological distress with less education
- Greater numbers of uninsured in the minority population
- Increased suicide risk in western and Appalachian regions

Progress in Cardiovascular and Cancer Care

In 2003, the Institute of Medicine (IOM) published a lengthy Executive Summary of its study committee’s findings and recommendations on racial and ethnic disparities, a report initiated at the request of Congress.⁹ Entitled “Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care,” this report details findings that 1) worse outcomes are associated with health care disparities; 2) such disparities occur in the setting of general inequality and discrimination in America; 3) health systems, providers, patients, and utilization managers all contribute to the disparities; 4) health care provider bias, stereotyping, prejudice, and clinical uncertainty may be significant; and 5) the disparities cannot be fully explained by the number of minority patients refusing

treatment, which is in reality generally small. The report goes on to make specific recommendations, including increasing awareness of disparities; increasing diversity among health professionals; promoting equity through the use of evidence-based guidelines; providing financial incentives for practices that reduce barriers; supporting the use of interpretation services; implementing patient education programs; integrating cross-cultural education into training of health professionals; collecting and reporting data; and conducting research.

One of the fields from which the IOM was able to draw the most robust evidence for the report was in cardiovascular care, which early began publishing data on disparities compared to other subspecialties. In 2004, the Centers for Medicare and Medicaid Services (CMS) Hospital Inpatient Quality Reporting Program was started to publicly report the quality of care delivered by hospitals specifically in the setting of acute myocardial infarction, congestive heart failure, and pneumonia.²¹ CMS subsequently tied the 17 quality measures outlined in the program to Medicare payments to hospitals.¹² By 2012 there was a marked improvement in quality of care at the participating hospitals based on the quality measures. However, the data was not stratified according to subgroups. Since public reporting and pay-for-performance can exacerbate disparities by penalizing institutions that disproportionately serve minority patients, Trivedi et al. analyzed the CMS data to determine whether the observed improvement over time in quality of care equitably affected black and Hispanic patients along with white patients.¹² Trivedi et al. found that quality measures did improve for all patients, and the gaps between race and ethnicities decreased. They observed improvement of disparities both within and between hospitals. There was, however, significant variation in the degree of improvement depending on the quality measure. For instance, the administration of aspirin at arrival and discharge, being simple and cheap, was found to be easily and equitably improved. One could argue this measure was achievable without having actually to address disparities. Smoking cessation counseling, on the other hand, is somewhat more involved and requires delegation of resources and efforts to effectively counsel a patient. Though beyond the scope of Trivedi's analysis, one could surmise that hospitals likely had to address cultural and language barriers and provide interpreters to ensure that providers could communicate with patients about smoking cessation. Thus, the finding that this measure, too, was equitably improved indicates that certain disparities were addressed.

One quality measure where a disparity gap was found to persist was the use of a percutaneous coronary intervention (PCI) within 90 minutes after arrival at the hospital.¹² This is a much more costly and invasive intervention that requires specialization and significantly more effort and resources than administration of aspirin or smoking cessation counseling. Though the gap persists, there has been a notable decrease in the magnitude of the gap compared to previous years, and this likely reflects some degree of systemic infrastructure change. Six specific strategies have been identified previously that are significantly associated with a faster "door-to-balloon" time, i.e., the interval between arrival at the hospital and intracoronary balloon inflation during primary PCI.²² Strategies such as expecting staff to arrive in the catheterization laboratory within 20 minutes after being paged and having an attending cardiologist always on site require an investment of resources by the hospital and system. The CMS data show that equity is achievable even in such more involved interventions, including at safety-net institutions that disproportionately serve the underserved population.

Cancer care is another field that the IOM investigated and reported evidence of health care disparities. There has been a less clear improvement of disparities in cancer care compared to cardiac care. Studies have shown that black patients are less likely to have sigmoidoscopic exams despite having a higher incidence of colon cancer and less likely to have surgery for resectable lung cancer.⁹ Black men with prostate cancer are less likely to receive treatment, and black women with breast cancer are less likely to receive progesterone receptor assays, radiation therapy, and rehabilitation support services following mastectomy.⁹ The mortality rate over the years has persistently been higher for black versus white women with breast cancer.^{9,13,23} Persistent disparities in cancer may have a lot to do with the prohibitive cost of treatment and disparities in health literacy and education, among other factors. Neuner et al. found that lower income was strongly associated with less receipt of neoadjuvant chemotherapy.²⁴ Some studies have found that black women are less willing to participate in clinical trials despite being disproportionately diagnosed with the more aggressive triple-negative breast cancer subtype.^{11,13} However, Echeverri et al. found that the majority of their questionnaire respondents were quite willing to participate in studies led by their health care providers and local hospitals and universities, and concluded that focusing on cancer health literacy may encourage minority participation in research.²⁵ The American Cancer Society remains optimistic about improvements in

disparity. Their most recent publication of breast cancer statistics reports a decrease in death rates in all racial and ethnic groups between 2006 and 2015, and highlights the fact that disparity between groups has not widened since 2011.²³ Rust et al. also maintain that disparities are not inevitable and discuss the success of four counties in the United States that have achieved equity in breast cancer outcomes for black women.²⁶ They recommend further study on these “deviance communities” to explore positive contributing factors, which may include health insurance reform and expansion of insurance coverage, changes in community interaction as high-income highly educated African-Americans move into an area, and establishment of specific interventions such as screening and treatment programs.²⁶ Compared to cardiac care, the necessary strategies to achieve equity in cancer care may involve additional efforts in education, building communication and trust between patient and provider, and breaking down existing biases and obstacles.

Why Is This Relevant to the Orthopaedic Surgeon?

As modern medicine evolves and life expectancy increases across all populations, attention is being refocused on more elective fields such as orthopaedic surgery. Excess death as an outcome measure may not be as applicable, but access to care, postoperative performance, and complications requiring additional medical resources are relevant to the orthopaedic practice. Joint arthroplasty, in particular, has become an area of interest and scrutiny as the field continues to grow and have a significant impact clinically and financially. Total knee arthroplasty (TKA) and total/partial hip arthroplasty were the third and fourth most common surgical procedures during inpatient stays in 2015.²⁷ By 2030, it is estimated that the demand for primary total hip arthroplasty (THA) will grow by 174 percent, primary TKA by 673 percent, revision THA by 137 percent, and revision TKA by 601 percent.²⁸ As such, most of the current orthopaedic literature on health care disparities arises from this subspecialty. Race differences, particularly between black and white patients, have been well established. Race affects whether the surgeon recommends arthroplasty, a patient’s preference for surgery, the number of patients having TKA/THA, the location of the surgery at a high- versus low-volume hospital, and outcomes including pain, function, and mortality.^{5,29–35} The United States Centers for Disease Control and Prevention (CDC) Medicare data show that the overall rate of TKA has been increasing similarly among white and black

patients, but the procedure rate remains 39 percent lower for black patients.³² Singh et al. also used Medicare data to conclude that over an 18-year period, racial disparities for joint arthroplasty did not improve. In fact, black-white disparities in 30-day hospital readmissions increased significantly from 1991 to 2008.³⁵ Zhang et al. found that along with black patients, Hispanic, Asian, and Native American patients had lower rates of TKA compared to whites, the minority groups were less likely to have surgery in a high-volume hospital, and perioperative mortality was significantly higher for black, Native American, and mixed-race patients.³¹ Studies published within the last year show significantly higher risk of complications including deep venous thrombosis (DVT) and pulmonary embolism following TKA in black patients,³⁶ and higher rates of emergency department (ED) visits and unscheduled inpatient readmissions within 90 days of discharge after arthroplasty in black or Hispanic patients.³⁷

Aside from race and ethnic disparities, disparities in income, insurance, and gender have been observed in arthroplasty as well. Goodman et al. found that among the patients in their hospital-based registry, the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) pain and function scores two years after TKA worsened with increasing levels of poverty, and to a greater extent among black patients.²⁹ SooHoo et al. found that among the patients in California’s Office of Statewide Health Planning and Development data, income is a statistically significant predictor of treatment at low-volume hospitals for THA, and Medicaid insurance is a statistically significant predictor of treatment at low-volume hospitals for TKA.^{33,34} Huerfano et al. found Medicaid coverage to be a predictor for ED visits and unscheduled inpatient readmissions within 90 days of discharge after TKA and THA in New York State.³⁷ Novicoff and Saleh discuss the underutilization of TKA in women, reporting that physicians are less likely to recommend the procedure to female versus male patients, and by the time women do have surgery, their joints are often at a more advanced arthritic stage.³⁸

Health care disparities have been evaluated in other areas of orthopaedic surgery. Patterson et al. found that in North Carolina, patients with private insurance were 8.8 times more likely to obtain an appointment for an acute rotator cuff tear compared to patients with Medicaid.³⁹ In a complementary study conducted by the same group, patients with private insurance were 2.2 times more likely to obtain an appointment for an acute flexor tendon laceration compared to patients with Medicaid.⁴⁰ Skolasky et al. reviewed the Nationwide Inpatient

Sample data from 2000 to 2009 and found that the overall surgical hospitalization rate for lumbar spinal stenosis increased by 30 percent, but this increase varied by race, with white patients being hospitalized at a significantly higher rate compared to black and Hispanic patients.⁴¹ Bolorunduro et al. reviewed the National Trauma Data Bank® data from 2002 to 2006 and found that uninsured patients with pelvic fractures received fewer diagnostic procedures and had a significantly higher mortality rate of 11.6 percent versus 5 percent ($p > 0.001$).⁴²

Two podium presentations at the October 2018 Musculoskeletal Tumor Society Annual Meeting discussed health care disparities in orthopaedic oncology. The first analyzed data from the Surveillance, Epidemiology, and End Results (SEER) database and found that patients living in a very rural county had increased mortality even after controlling for metastases and tumor size.⁴³ The second also used SEER data and found that patients with bone or soft tissue sarcomas who had Medicaid were more likely to have distant metastases on presentation, receive an amputation, and die from disease compared to patients with private insurance.⁴⁴

Where to Go From Here?

It is becoming increasingly difficult to ignore that health care disparities exist in orthopaedic surgery and affect patient outcomes. The effect it has on patient care is of utmost importance and should be motivation enough to change. After all, most health care professionals, including surgeons, sincerely believe in a moral duty to provide the best care to all patients without discrimination. This must be reconciled with the fact that the health care system as a business is comprised of nonmedical leaders who do not work directly with patients. As such, there are other major driving forces behind the growing interest in collecting data and reporting on the topic, including current Medicare reimbursement requirements.

Joint arthroplasty is at the forefront of the Medicare reimbursement discussion. The current Medicare-driven alternative payment models (APM) for arthroplasty favor the payor and may potentially worsen existing disparities. The APMs are focused on cost reduction and incentives based on variably measured health outcomes and percentile performance determined against competing hospitals and providers in a zero-sum setting without adequate risk adjustment.⁴⁵ This can lead to risk shedding and patient marginalization, further centralization of care, and a threat to safety-net hospitals that

care for uninsured and underinsured patients.^{46,47} Specifically regarding these current payment models for arthroplasty, Yates discusses some possible solutions:

- Addition of orthopaedic-specific risk factors to the current CMS measures
- Creation of a broader set of condition classes that currently are excluded
- Application of credit towards percentile rankings and higher price targets for hospitals that absorb sicker patients from surrounding hospitals that practice excessive risk avoidance
- Development of surgeon-driven performance measures based on professional society registry data rather than administrative datasets derived from billing codes⁴⁵

To implement such solutions, surgeons must get involved on a more systemic level to ensure that quality and equity are in alignment, and that creating incentives to reward positive outcomes and reduced disparities is a priority during these discussions.⁴⁷ Orthopaedic surgeons as major contributors to the health care system²⁷ and among the top earners in medicine⁵⁰ have great potential to serve as leaders and role models with a powerful collective voice on a systemic level. The common tendency of those who have political interests is to contribute money. While donating funds is simple and takes little time, it is often ineffective because the representing organization or person may not genuinely have the patients' best interests in mind, nor have the firsthand experience and knowledge of working on the inside. More effective is to contribute time, effort, and expertise by participating at the local, regional, national, or international level. Both new and seasoned practicing surgeons should be encouraged to get involved. The new surgeon can offer energy and motivation to improve the system as he or she joins a practice with a fresh and unadulterated eye. Instead of giving in to the status quo because "this is how it has always been," the question becomes: "How can this be done better?" The seasoned surgeon, at the same time, can offer valuable experience and a powerful network built over many years. He or she has already established credibility and respect from which to push forward.

All this being said, the crucial first step before pursuing a desired level of systemic involvement is for each individual surgeon to critically evaluate his or her own practice and recognize that a potential source of disparity is discrimination at the patient-provider level in the form of bias, greater clinical uncertainty when interacting with minority patients, and stereotypes.⁹

While one solution may be promoting diversity at the provider level, assuming that coming from a similar background will make it easier to empathize with patients, this is by no means a prerequisite to becoming a provider who sincerely cares for his or her patients. It is possible to have compassion without ever having been poor, a member of a minority group, from a rural county, or lacked access to care. Any orthopaedic surgeon can appreciate the blank stare as a patient fails to understand all the risks of a particular procedure, or the look of anxiety as a family wonders how they will pay for the recommended treatment for their loved one. The solution at the provider level should be focused on education and training dedicated explicitly to cultural competencies and overcoming biases, whether or not there is diverse representation among them.

Finally, the individual surgeon also must advocate for the necessary administrative support. Practice improvements such as employing and utilizing quality interpreters to promote communication and cultural understanding require an investment of money, resources, and time. Those in administration also should receive education and training to support the provider's direct efforts to address disparities and not just prioritize revenue and efficiency. Additionally, more surgeons should be encouraged to get involved in hospital leadership. A strong positive association between the ranked quality of a hospital and whether the CEO is a physician has been shown based on data collected on the CEOs at the top 100 hospitals in each of three medical fields: cancer, digestive disorders, and cardiovascular, including surgery.⁴⁸ The presence of a physician-CEO was analyzed to be equivalent to almost one standard deviation on the Index of Hospital Quality scale. In a *Harvard Business Review* article on "Why the Best Hospitals Are Managed by Doctors," the author discusses why doctors make good managers and how training can make them even better. The article goes on to advocate for focused training programs developed by health care institutions, medical societies, and business schools to cultivate physician-leaders.⁴⁹

Conclusion

Health care disparities have always existed, but the data has become more formalized and publicized in the last several decades. Now is a critical time to make use of the available data to address the disparities on every level, from the systemic to the individual. There is no better or more qualified group to advocate for patient care, quality, and equity than the providers themselves.

The goal of this paper was to raise awareness regarding the disparities in delivering health care in general, describe some of the progress in other fields, discuss why it is relevant to orthopaedic surgery, and explore how surgeons can help bring equal care to all.

The next time the American Orthopaedic Association is surveyed about health disparities, ideally 100 percent will respond and agree that disparities exist, and be eager to report on the various measures that have been taken to decrease these disparities and share their encouraging results.

References

1. United States Census Bureau: U.S. Census Bureau Projections Show a Slower Growing, Older, More Diverse Nation a Half Century from Now. *Press Release* 2012; 1-3. At <<http://www.census.gov/newsroom/releases/archives/population/cb12-243.html>>.
2. Semega JL, Fontenot KR, Kollar MA: Income and Poverty in the United States: 2016. 2017. At <<https://www.census.gov/library/publications/2017/demo/p60-259.html>>.
3. US Census Bureau, DeNavas-Walt C, Proctor BD, Smith JC. Income, Poverty, and Health Insurance Coverage in the United States: 2010. *US Census Bur Curr Popul Reports*. 2011; 60-239.
4. Adelani MA, O'Connor MI. Perspectives of Orthopedic Surgeons on Racial/Ethnic Disparities in Care. *J Racial Ethn Heal Disparities*. 2017; doi:10.1007/s40615-016-0279-z.
5. Pandya NK, Wustrack R, Metz L, Ward D. Current Concepts in Orthopaedic Care Disparities. *J Am Acad Orthop Surg*. 2018; 00: 1.
6. American College of Surgeons. Committee on Health Care Disparities. At <http://web6.facs.org/disparities/FMPro?-db=ACSLit_2008-2015combined&-format=search.htm&-view>.
7. U.S. Department of Health and Human Services: *The Secretary's Advisory Committee On National Health Promotion and Disease Prevention Objectives for 2020: Recommendations for the Framework and Format of Healthy People 2020*. (2008).
8. Kaiser Family Foundation: Disparities in Health and Health Care: Five Key Questions and Answers. 2012. At <<http://kff.org/disparities-policy/issue-brief/disparities-in-health-and-health-care-five-key-questions-and-answers/>>.
9. Smedley BD, Stith AY, Nelson AR. *Understanding Racial Disparities: Unequal Treatment*. (National Academies Press: 2003). doi:10.17226/12875.
10. Walker GV, Grant SR, Guadagnolo BA, Hoffman KE, Smith BD, Koshy M, Allen PK, Mahmood U. Disparities in Stage at Diagnosis, Treatment, and Survival in Nonelderly Adult Patients With Cancer According to Insurance Status. *J Clin Oncol*. 2014; 32: 3118-3125.
11. Aizer AA, Wilhite TJ, Chen MH, Graham PL, Choueiri TK, Hoffman KE, Martin NE, Trinh QD, Hu JC, Nguyen PL. Lack of Reduction in Racial Disparities in Cancer-specific Mortality Over a 20-year Period. *Cancer*. 2014; 120: 1532-1539.
12. Trivedi AN, Nsa W, Hausmann LRM, Lee JS, Ma A, Bratzler DW, Mor MK, Baus K, Larbi F, Fine MJ. Quality and Equity of Care in U.S. Hospitals. *N Engl J Med*. 2014; 371: 2298-2308.
13. Kim SJ, Glasgow AE, Karriem, Watson S, Molina Y, Calhoun EA. Gendered and Racialized Social Expectations, Barriers, and Delayed Breast Cancer Diagnosis. *Cancer Mon*. 2018; Epub Ahead of Print.

14. Adigun RO, Amber N, Boler PD, Mankad, R. Disparities in Cardiac Care of Women: Current Data and Possible Solutions. *Curr Treat Options Cardio Med*. 2018; 20: 87.
15. U.S. Department of Health and Human Services Agency for Healthcare Research and Quality: National Quality and Disparities. 2017.
16. Parikh-Patel A, Morris CR, Kizer KW. Disparities in Quality of Cancer Care: The Role of Health Insurance and Population Demographics. *Med (United States)*. 2017; 96.
17. U.S. Department of Health and Human Services: Report of the Secretary's Task Force on Black and Minority Health. 1985; 1.
18. Riley W. Health Disparities: Gaps in Access, Quality and Affordability of Medical Care. *Trans Am Clin Climatol Assoc*. 2012; 123: 164–167.
19. U.S. Department of Health and Human Services, Health Resources and Services Administration, Office of Health Equity: *Health Equity Report 2017*. (2017).
20. U.S. Department of Health & Human Services: U.S. Federal Poverty Guidelines Used to Determine Financial Eligibility for Certain Federal Programs. Office of the Assistant Secretary for Planning and Evaluation website. 2017. At <<https://aspe.hhs.gov/poverty-guidelines>>.
21. Centers for Medicare & Medicaid: Hospital Inpatient Quality Reporting Program. 2013; 1–6. At <<https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/HospitalQualityInits/HospitalRHQDAPU.html>>.
22. Bradley EH, Herrin J, Wang Y, Barton BA, Webster TR, Mattera JA, Roumanis SA, Curtis JP, Nallamothu BK, Magid DJ, et al. Strategies for Reducing the Door-to-Balloon Time in Acute Myocardial Infarction. *N Engl J Med*. 2006; 355: 2308–2320.
23. DeSantis CE, Ma J, Sauer AG, Newman LA, Jermal A. Breast Cancer Statistics, 2017, Racial Disparity in Mortality by State. *A Cancer J Clin*. 2017; 67: 439–448.
24. Neuner JM, Kong A, Blaes A, Riley D, Chrischilles E, Smallwood A, Lizarraga I, Schroeder M. The Association of Socioeconomic Status With Receipt of Neoadjuvant Chemotherapy. *Breast Cancer Res Treat*. 2018; doi:10.1007/s10549-018-4954-0.
25. Echeverri M, Anderson D, Nápoles AM, Haas JM, Johnson ME, Serrano FSA. Cancer Health Literacy and Willingness to Participate in Cancer Research and Donate Bio-Specimens. *Int J Environ Res Public Health*. 2018; 15: 2091.
26. Rust G, Zhang S, Malhotra K, Reese L, McRoy L, Baltrus P, Caplan L, Levine RS: Paths to Health Equity: Local Area Variation in Progress Toward Eliminating Breast Cancer Mortality Disparities, 1990–2009. *Cancer*. 2015; doi:10.1002/cncr.29405.
27. Healthcare Cost and Utilization Project: Most Common Hospital Inpatient Operations - *HCUP Fast Stats*. 2017. At <<https://www.hcupus.ahrq.gov/faststats/NationalProceduresServlet>>.
28. Kurtz S, Ong K, Lau E, Mowat F, Halpern M. Projections of Primary and Revision Hip and Knee Arthroplasty in the United States From 2005 to 2030. *J Bone Jt Surg - Ser A*. 2007; 89: 780–785.
29. Goodman SM, Mandl LA, Parks ML, Zhang M, McHugh KR, Lee YY, Nguyen JT, Russell LA, Bogardus MH, Figgie MP, et al. Disparities in TKA Outcomes: Census Tract Data Show Interactions Between Race and Poverty. *Clin Orthop Relat Res*. 2016; 474: 1986–1995.
30. Hausmann LRM, Mor M, Hanusa BH, Zickmund S, Cohen PZ, Grant R, Kresevic DM, Gordon HS, Ling BS, Kwok CK, et al. The Effect of Patient Race on Total Joint Replacement Recommendations and Utilization in the Orthopedic Setting. *J Gen Intern Med*. 2010; 25: 982–988.
31. Zhang W, Lyman S, Boutin-Foster C, Parks ML, Pan T-J, Lan A, Ma Y. Racial and Ethnic Disparities in Utilization Rate, Hospital Volume, and Perioperative Outcomes After Total Knee Arthroplasty. *J Bone Jt Surg*. 2016; 98: 1243–1252.
32. Centers for Disease Control & Prevention (CDC): Racial Disparities in Total Knee Replacement Among Medicare Enrollees — United States. *Morb Mortal Wkly*. 2009; 58: 2000–2006.
33. SooHoo NF, Farnig E, Zingmond DS. Disparities in the Utilization of High-volume Hospitals for Total Hip Replacement. *J Natl Med Assoc*. 2011; 103: 31–35.
34. SooHoo NF, Zingmond DS, Ko CY. Disparities in the Utilization of High-volume Hospitals for Total Knee Replacement. *J Natl Med Assoc*. 2008; 100: 559–564.
35. Singh JA, Lu X, Rosenthal GE, Ibrahim S, Cram P. Racial Disparities in Knee and Hip Total Joint Arthroplasty: An 18-year Analysis of National Medicare Data. *Ann Rheum Dis*. 2014; 73: 2107–2115.
36. Owens JM, Bedard NA, Dowdle SB, Gao Y, Callaghan JJ. Venous Thromboembolism Following Total Knee Arthroplasty: Does Race Matter? *J Arthroplasty*. 2018; 33: S239–S243.
37. Huerfano E, Gonzalez Della Valle A, Shanaghan K, Girardi F, Memtsoudis S, Liu J. Characterization of Re-admission and Emergency Department Visits Within 90 Days Following Lower-Extremity Arthroplasty. *HSS J®*. 2018; 14: 271–281.
38. Novicoff WM, Saleh KJ. Examining Sex and Gender Disparities in Total Joint Arthroplasty. *Clin Orthop Relat Res*. 2011; 469: 1824–1828.
39. Patterson BM, Spang JT, Draeger RW, Olsson EC, Creighton RA, Kamath GV. Access to Outpatient Care for Adult Rotator Cuff Patients With Private Insurance Versus Medicaid in North Carolina. *J Shoulder Elb Surg*. 2013; 22: 1623–1627.
40. Draeger RW, Patterson BM, Olsson EC, Schaffer A, Patterson JMM. The Influence of Patient Insurance Status on Access to Outpatient Orthopedic Care for Flexor Tendon Lacerations. *J Hand Surg Am*. 2014; 39: 527–533.
41. Skolasky RL, Maggard AM, Thorpe RJ, Wegener ST, Riley LH: United States Hospital Admissions for Lumbar Spinal Stenosis. Racial and Ethnic Differences, 2000 through 2009. *Spine (Phila Pa 1976)*. 2013; 38: 2272–2278.
42. Bolorunduro OB, Haider AH, Oyetunji TA, Khoury A, Cubangbang M, Haut ER, Greene WR, Chang DC, Cornwell EE, Siram SM. Disparities in Trauma Care: Are Fewer Diagnostic Tests Conducted for Uninsured Patients With Pelvic Fracture? *Am J Surg*. 2013; 205: 365–370.
43. Wendt R, Gao Y, Miller BJ. *MSTS Podium Presentation. Are Rural Osteosarcoma Patients at Risk for Worse Outcomes?* (NYC, 2018).
44. Jang ES, Smartt A, Tyler WK. *MSTS Podium Presentation. Socioeconomic Factors Affecting Outcomes of Surgical Treatment of Bone and Soft Tissue Sarcomas: A SEER Database Study.* (NYC, 2018).
45. Yates AJ. Assessing Quality in Alternative Payment Models. *Semin Arthroplasty*. 2016; 27: 166–171.
46. Yates AJ. Assessing Quality in Alternative Payment Models. *Semin Arthroplasty*. 2016; 27: 166–171.
47. Chin MH. How to Achieve Health Equity. *N Engl J Med*. 2014; 371: 2331–2332.
48. Goodall AH. Physician-leaders and Hospital Performance: Is There an Association? *Soc Sci Med*. 2011; doi:10.1016/j.socscimed.2011.06.025.
49. Stoller JK, Goodall A, Baker A. Why The Best Hospitals Are Managed by Doctors. *Harv Bus Rev*. 2016; doi:10.1080/00207728008967076.
50. Kane L. Medscape Physician Compensation Report 2018. *Medscape News Perspect*. 2018. At <<https://www.medscape.com/slideshow/2018-compensation-overview-6009667>>.

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