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Increasing Diversity in the Health Professions: Reflections on Student Pipeline Programs

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Abstract

Despite major advances and technological improvements in public health and medicine, health disparities persist by race and ethnicity, income and educational attainment, and in some cases are increasing (Jackson & Garcia, 2014). These health disparities among these populations have even worsened or remained about the same since the landmark 1985 Report of the Secretary's Task Force on Black & Minority Health released by then Secretary Margaret M. Heckler. Ensuring diverse public health and healthcare workforces to provide services to diverse populations, in combination with other strategies, can increase access to and quality of healthcare for vulnerable populations and decrease healthcare disparities. One mechanism for achieving a diverse public health and healthcare workforce is to establish, promote, and conduct student training programs in public health. The Office of Minority Health and Health Equity, Centers for Disease Control and Prevention (CDC), has partnered with institutions, colleges, universities, foundations, national organizations and associations to form and implement student training programs. This paper highlights a session "Public Health Professions Enhancement Programs" that was held during the 2015 symposium titled "National Negro Health Week to National Minority Health Month: 100 Years of Moving Public Health Forward" in Atlanta, Georgia. Presenters at the symposium consisted of interns and fellows who had participated in student programs in the Office of Minority Health and Health Equity at the CDC.

Disclaimer: The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention. The authors have no financial conflicts of interest in this article.

Keywords

Student Training Programs; Internship Programs; Fellowship Programs; Diversity; Health Equity; Disparities

Introduction

National data indicate that compared with the general population, racial and ethnic minority, low-income, and limited educational attainment populations have poorer health outcomes from several preventable and treatable diseases (CDC, 2013; CDC, 2011; NHQ & Disparities Report, 2015). Differences in access to healthcare, quality of care, and health measures, including life expectancy and infant mortality, have all been documented among racial and ethnic minority populations (Jackson & Garcia, 2014)). In 2013, the leading causes of death in the United States were 1) heart disease; 2) cancer; 3) chronic lower respiratory disease; 4) accidents (unintentional injuries); 5) stroke (cerebrovascular diseases); 6) Alzheimer's disease; 7) diabetes; 8) influenza and pneumonia; 9) nephritis, nephrotic syndrome, and nephrosis, and 10) intentional self-harm (suicide), which varied by race/ethnicity (Chang, Moonesinghe, Athar, Truman, 2015). Despite decades of technological advances in science and medicine, racial and ethnic minority populations are still experiencing disparities among most health status indicators. For some indicators and measures, the gaps in disparities are growing larger instead of becoming smaller (Artiga, Damico, Garfield, 2015).

In addition to racial and ethnic, low-income, and limited educational attainment populations, other characteristics make specific populations more vulnerable to health disparities, such as age, geographic location, language, gender, disability status, citizenship status and sexual identity and orientation (Jackson & Garcia, 2014). Responding to the persistent burden of racial and ethnic health disparities has been a federal priority since the release of the 1985 Secretary's Task Force Report on Black and Minority Health (Heckler, 1985). This landmark report provided several recommendations about strategies for improving minority health, including attention to the demographic makeup of the public health and healthcare workforces.

More recently, The Kelly Report reiterated the need for a diverse health workforce in her re-examination of racial and ethnic health disparities in the United States (Black Caucus Health Braintrust, 2015). The Kelly Report reinforces the need for diverse public health and healthcare workforce training programs that support improved public health and healthcare systems, by increasing opportunities for minority patients to be served by healthcare practitioners and public health professionals with whom they share a common race, ethnicity, culture or language (USDHHS, 2001).

Although the healthcare workforce is enumerated and defined, the public health workforce is only now being better defined and understood. Tison and Gebbie in 2004 defined the public health workforce as being composed of "those who work for official public health agencies at all levels of government, community-based, and voluntary organizations with a health promotion focus, the public health-related staff of hospitals and healthcare systems, and a

range of others in private industry, government, and the voluntary sector." While the healthcare workforce includes those who were "in instructional programs that prepare individuals to practice as licensed professionals and assistants in the healthcare professions, related clinical sciences, and administrative and support services" (U.S. Department of Education, 2010).

The increasing predictions of the multiculturalism or the magnitude of diversity of the U.S. population culminating in a "majority-minority" country by the middle of the 21st century, bring more of a demand to increase the diversity of health professionals in public health and healthcare (Jackson & Garcia, 2014). Given the changing demographics of the United States, and its increasing cultural and linguistic diversity, HHS released the first version of the National Standards for Culturally and Linguistically Appropriate Services in Health and Healthcare (CLAS) in 2000, and enhanced these standards in 2010 (U.S. Department of Health and Human Services, 2010). These enhanced standards "aim to improve healthcare quality and advance health equity" by establishing the delivery of respectful and effective services by health organizations in serving the nation's increasingly diverse populations (U.S. Department of Health and Human Services, 2001).

It is predicted that by 2020 there will be a shortage of public health professionals throughout the nation as "almost 110,000 workers were eligible to retire by 2012" and more are retiring every year (Johnson, 2008). As current population trends in the United States continue, the public health and healthcare workforces are facing a shortage of diverse public health workers and clinicians, leaving communities vulnerable to pending public health threats, infectious diseases, bioterrorism and other disasters (Association of American Medical Colleges, 2015; Johnson, 2008). Training programs for underrepresented minority populations in public health and healthcare are needed to help decrease and eliminate disparities in the United States (McClamrock & Montgomery, 2009).

Public health is concerned with protecting the health, safety, and welfare of the public, yet public health state, local and federal agencies are experiencing great losses in the workforce because of budget cuts and recruitment issues. The lack of public health training and limited public health training for public health employees is also a major concern for public health officials (Drehobl, Stover, Koo, 2014).

The case for diversity training and internship programs has been made as far back as 2004 with the publication of *In the Nation's Compelling Interest: Ensuring Diversity in the Health Care Workforce* by the Institute of Medicine (Institute of Medicine, 2004). This report discussed the under representation of Blacks (African Americans), Hispanics and Native Americans within the healthcare professions, and provided a number of recommendations for healthcare profession and educational institutions. Among other suggestions, it called for public–private collaborations to support the development of a more diverse healthcare workforce.

Also in 2004, the Sullivan Commission on Diversity in the Health Care Workforce published *Missing Persons: Minorities in the Health Professions* (The Sullivan Commission, 2004). The Commission, named after former Secretary of Health and Human Services, Louis W.

Sullivan, M.D., made systems and policy recommendations to address the small numbers of minorities in the healthcare professions. The Commission noted that increasing the diversity of healthcare providers would enhance culturally competent care and improve the health outcomes of minority populations. Similar to the IOM report, this report provided multiple recommendations for increasing minority students' access to the educational pipeline to healthcare careers. The report emphasizes the need for leadership, commitment, and accountability in institutions of learning and in national professional organizations, and called for legislative options and a presidential task force to give urgency and focus to the problem (The Sullivan Commission, 2004; AAMC, 2015).

As the nation is becoming more diverse, the Association of American Medical Colleges (AAMC) produced a report to determine why applicants for medical schools had increased for all races with the exception of African American males, even though pipeline programs have been established to increase diversity. In this report, the AAMC mentioned two promising programs for minority youth interested in medicine. Those programs are (1) an inaugural class at Howard University called "Young Doctors DC" which is a peer-mentoring program designed to expose young black men to educational and career opportunities (AAMC, 2015) and (2) Minority Men in Medicine (MMM) at the University of North Carolina (UNC) which is designed as a mentoring program for minority males interested in medical and dental schools (AAMC, 2015).

More recent reports from the U.S. Department of Health and Human Services have further emphasized the importance of a diverse health workforce. Goal II of the *HHS Action Plan to Reduce Racial and Ethnic Health Disparities: A Nation Free of Disparities in Health and Health Care* is to "strengthen the nation's health and human services infrastructure and workforce" (USDHHS, 2011). One mechanism the action plan identifies is to "create a pipeline program for students to increase racial and ethnic diversity in the public health and biomedical sciences professions" (USDHHS, 2011). The other report, *The National Partnership for Action to End Health Disparities* (NPA), includes among its strategies, increasing "diversity and competency of the health workforce and related industry workforces through recruitment, retention, and training of racially, ethnically, and culturally diverse individuals, and through leadership action by healthcare organizations and systems" (OASH, 2011). Other plans and initiatives have been put in place at federal, state and local levels to increase diversity in the public health and health professions workforces (OASH, 2011). Training and internship programs for minority populations are widely utilized and are important mechanisms to create a diverse workforce among public health and healthcare professions (McClamrock & Montgomery, 2009; Smedley, Butler, Bristow, 2004).

Student pipeline and internship programs that enhance recruitment of underrepresented minorities can increase the likelihood of achieving a diverse workforce (Duffus, Trawick, Moonesinghe, Tola, Truman, Dean, 2014), and there are opportunities to create these programs in many locations where the right stakeholders and resources are present. This paper highlights past and present training programs at the CDC, sponsored by the OMHHE, as examples of efforts to increase the diversity of the nation's workforce in public health and the healthcare professions in an effort to decrease and eliminate health disparities. These training programs were discussed in the concurrent session "Public Health Professions

Enhancement Programs" during the 2015 symposium titled "National Negro Health Week to National Minority Health Month: 100 Years of Moving Public Health Forward" in Atlanta, Georgia.

Student Training Programs Sponsored by CDC's Office of Minority Health and Health Equity

From its inception, the Office of Minority Health and Health Equity (OMHHE) at the CDC has partnered with institutions, colleges, universities, foundations, national organizations and associations to create and implement student training and internship programs. Over the years, the OMHHE has supported and managed training, internship, and fellowship programs through cooperative agreements (Duffus, Trawick, Moonesinghe, Tola, Truman, Dean, 2014).

Currently, four institutions are partnering with the OMHHE to provide the CDC Undergraduate Public Health Scholars Program (CUPS): the Summer Public Health Scholars Program at Columbia University; the Maternal Child Health Careers/Research Initiatives for Student Enhancement-Undergraduate Program, the Dr. James A. Ferguson Emerging Infectious Diseases Graduate Fellowship Program and the Public Health Leadership and Learning Undergraduate Student Success Program all at the Kennedy Krieger Institute; Project IMHOTEP at Morehouse College; and the Future Public Health Leaders Program at the University of Michigan. The Dr. James A. Ferguson Emerging Infectious Diseases Graduate Fellowship Program and Project IMHOTEP are training and internship programs that have been supported by the OMHHE for more than 20 years and have been successful in encouraging undergraduate and graduate students to pursue careers in public health and the healthcare professions (CDC, 2015; Duffus, Trawick, Moonesinghe, Tola, Truman, Dean, 2014).

The Summer Public Health Scholars Program (SPHSP)

The SPHSP is a 10-week summer training program hosted by Columbia University for junior and senior undergraduates and recent baccalaureate students. The program begins with visits to the CDC and introductions to public health professionals working at the federal level. The summer experience provides an overall orientation to public health, leadership training, and work experience. Students also gain experience in presenting an oral presentation given at the end of their work experience and preparing a final paper (CDC, 2015).

Kennedy Krieger Institute (KKI) Programs

One program housed at the KKI is called the Maternal Child Health Careers/Research Initiative for Student Enhancement which is an Undergraduate Program (MCHC/RISE-UP). This program is also a 10-week summer training program for junior and senior undergraduates and recent baccalaureate students. The program consists of a national consortium of institutions: Kennedy Krieger Institute; Maryland Center for Developmental Disabilities; Johns Hopkins University School of Medicine, Nursing, and Public Health; University of Southern California, California State University – LA; and the University of

South Dakota - Sanford School of Medicine for Disabilities. Students are trained in clinical practice, research, or community engagement and advocacy (CDC, 2015).

Dr. James A. Ferguson Emerging Infectious Diseases Graduate Fellowship Program (Ferguson Fellows)

The Ferguson Fellows Program, is another program hosted by the Kennedy Krieger Institute (KKI), in nine weeks a research experience is provided for full-time medical, dental, pharmacy, veterinary, or public health graduate students interested in infectious diseases and health disparities research. These students present their work at the end of the program and are encouraged to submit their research for presentation at national meetings and for publication in peer-reviewed journals. The program is named after one of its founders, Dr. James A. Ferguson, Dean, School of Veterinary Medicine at Tuskegee University (CDC, 2015).

The Public Health Leadership and Learning Undergraduate Student Success (PLLUSS) Program

The PLLUSS Program, also hosted by the KKI, is an 8-week summer public health leadership and research program that provides 150 hours of student support during the academic year. The PLLUSS Program is for undergraduate sophomore and junior students minoring or majoring in public health. The PLLUSS program is conducted at several collaborative research sites: Kennedy Krieger Institute and Johns Hopkins Medical Institutions, University of Cincinnati, the National Institute for Occupational Safety and Health, and California State University – Los Angeles. PLLUSS students participate in public health research, educational opportunities pertaining to health disparities and urban health issues, professional development, and community health promotion activities. Students are encouraged to submit research papers to national meetings and produce peer-reviewed publications. Students receive mentorship to help them gain acceptance to complete graduate professional programs in schools of public health (CDC, 2015).

Project IMHOTEP

The IMHOTEP internship at Morehouse College is an 11-week summer program designed for undergraduate junior and senior students and recent baccalaureate students. The internship was designed to increase the knowledge and skills of underrepresented students in public health and to promote the quality and quantity of well-trained professionals in the public health workforce. During the internship, students are engaged in a public health curriculum, enrichment activities, training, and mentoring. At the conclusion of the program, these interns deliver oral presentations, poster presentations, and a written manuscript suitable for publication in a scientific journal (CDC, 2015).

The Future Public Health Leaders Program (FPHLP)

The FPHLP at the University of Michigan is a 10-week summer program designed for undergraduate junior and senior students and recent baccalaureate degree students. These students participate in seminars, workshops, and community-based research activities. Also,

these students receive leadership training, orientation to public health, real-world work experience, and tour the CDC (CDC, 2015).

Additional Training Programs in the OMHHE

For many years, the CDC-OMHHE sponsored a cooperative agreement with the Hispanic-Serving Health Professions Schools to implement the *Hispanic-Serving Health Professions Schools - Graduate Fellowship Training Program* (GFTP). Now the OMHHE has a Memorandum of Understanding with the Hispanic Serving Health Professions Schools to mentor some of its fellows in the fellowship program. The fellowship provides training opportunities for graduate, doctoral students, and recent college graduates who are interested in Hispanic health research within government agencies (CDC, 2015).

The OMHHE also partners with the *CDC-Tuskegee Public Health Ethics Internship Program* (for Undergraduates) based in Atlanta, Georgia, and the *CDC-Tuskegee Public Health Ethics Fellowship Program* (MPH students) based in Tuskegee, Alabama. These programs are jointly coordinated by the CDC's Public Health Ethics Unit, Office of Scientific Integrity, Office of the Associate Director for Science in the Office of the Director and the Office of Health Equity, Division of STD Prevention, National Center for HIV/STD Prevention, Viral Hepatitis, Sexually Transmitted Diseases, and Tuberculosis and the Tuskegee University's National Center for Bioethics in Research and Health Care at Tuskegee, Alabama (CDC, 2015).

Student Feedback from Recent Training Programs

Informal feedback was gathered from students and interns who have participated in the OMHHE student programs. These are among the responses of several students:

"A few months after finishing my summer fellowship at OMHHE I was recommended for an ORISE position as a communications specialist. During that time, I worked as a health communicator on high visibility projects such as the Surgeon General's Call to Action to Prevent Skin Cancer and the Melanoma Vital Signs…. I encourage other students to consider student, fellowship and internship programs as an opportunity to learn firsthand what CDC has to offer and to ultimately decide if it's the type of career they would like to pursue."

"The summer program was an amazing opportunity that provided me with my first professional experience in the field of public health. The first two weeks were difficult, but provided the foundation that would help me to understand some of my tasks in the coming months, such as preparing literature reviews, writing manuscripts, performing data analyses using SAS, and interpreting data. I enjoyed meeting people from diverse backgrounds and making lasting friendships."

"I gained mentors, friends, experiences that I have kept until this day. It helped to shape my understanding of the CDC and see firsthand the programs that had been created to help form future public health leaders. It showed me another side of public health. I believe that including other types of agencies in the program would be beneficial for all involved, such as nonprofits, community based organizations, and other non-federal agencies."

These comments from participating students reflect their enthusiasm about entering the field of public health.

CDC'S Long-Standing Commitment to Training Programs

In addition to the training programs mentioned, other examples of student programs previously administered by OMHHE and supported by Centers, Institutes, and Offices (CIOs) at the CDC include 1) The Annual Symposium on Career Opportunities in Biomedical Sciences and Health Professions; 2) The Starlab Middle School Pipeline Science Summer Program; 3) The Public Health Summer Fellowship Program; 4) Increasing Minority Populations in Public Health; 5) The Environmental Medicine Rotation Program; 6) The Master of Public Health Program at Morehouse School of Medicine; and 7) The Regional Research Center for Minority Health (RRCMH) (CDC, 2011). The OMHHE as well as other CIO's throughout the CDC were instrumental in helping to start and fund the Master of Public Health Program at Morehouse School of Medicine (CDC, 2011).

These student training programs introduced historically-underrepresented minority students to the field of public health and career choices in more clinically-oriented health professions (such as medicine, dentistry, pharmacy, nursing, etc.). Most of the programs were established to provide research, public health practice and theory, and evaluation experience to students interested in pursuing careers in public health or medicine. Students interacted with public health researchers, top level officials, public health practitioners, and public health partners.

Feedback from Previous Students Now Public Health Professionals

Feedback was received from two previous students of CDC's student programs who are now public health professionals. The responses from these previous students are as follows:

"The overall program had a tremendous impact on my current career. It inspired and encouraged me to pursue education beyond the Master's degree level and complete a Ph.D. degree. I teach leadership and healthcare research methods classes at the undergraduate and graduate college levels. Credit for the majority of the early skills that were acquired in research and administration goes to my internship program."

"Being involved in the student program helped me to realize that I needed to pursue graduate education and become a public health practitioner. The program helped me realize how public health is needed in the United States and very much needed by minority populations. I am now working in public health to give back to the community in which I came from and to make a difference in the health of minority populations."

Recruitment of Underrepresented Populations

A review by the U.S. Bureau of Health Professions identified several advantages to recruiting health professionals from underrepresented minority groups (USDHHS, 2001): 1) these professionals disproportionately serve minority populations, 2) minority patients tend to receive better care from providers who are demographically similar or of the same racial

and ethnic background, and 3) persons for whom English is a second language, or if they don't speak English, communicate better with providers who speak their primary language, and they are more likely to keep follow-up appointments when treated by professionals who speak the same language. In addition, medical and public health professionals from underrepresented groups are likely to serve in poor or rural communities (Williams, Hansen, Smithey, Burney, Koplitz, Koyajma, … Bakos, 2014).

Thus, increasing the racial and ethnic diversity of the public health and healthcare workforces is essential for the adequate provision of culturally competent care to our nation's increasing racial and ethnic minority and other vulnerable populations (Cohen, Gabriel, Terrell, 2002; Rosenstock, Silver, Helsing, Evashwick, Katz, Kominski, … Sumaya, 2008; Betancourt, Green, Carrillo, Park, 2005; Grumback & Mendoza, 2008). For example, in 2014, the projected United States population was 318,857,056 people. Of that number, Black or African Americans represented 13.2% of the population; American Indians and Alaska Natives 1.2%; Asians 5.4%; Native Hawaiians and Other Pacific Islanders 0.2%; persons of two or more races 2.5%; and Hispanic or Latinos 17.4% (US Census Bureau, 2015).

In fact, one of the early initiatives of the CDC, Office of Minority Health and Health Equity after its establishment in 1988 was the implementation of the public health student pipeline programs to increase the diversity of the public health and healthcare workforces. The CDC established the Office of Minority Health and Health Equity, then called the Office of the Associate Director for Minority Health in response to the Heckler Report. The available literature suggests that "more underrepresented populations need to be trained in public health and healthcare" such as certain racial and ethnic minority populations (Institute of Medicine, 2004).

Identifying the best evidence-based public health and healthcare training practices and the education integration of social and public health training programs is critical for achieving health equity (Spencer, Schooley, Anderson, Kochtizky, DeGroff, Devlink, Mercer, 2013). There are many challenges facing the health professions workforce. A diverse public health and healthcare workforce is necessary for improving the health status of Americans and in decreasing and eliminating disparities (Cohen, Gabriel, Terrell, 2002).

Conclusion

As demographics of the U. S. population become more diverse with many different cultures, backgrounds, and languages, there is more of a demand to increase the diversity of the public health and healthcare workforces. There is a great need for more intentional efforts to recruit public health and healthcare professionals from populations most adversely affected by health disparities. Broad recruiting strategies that reach the general population are necessary, but not sufficient to accomplish this purpose (The National Academies Press, 2003). This article highlights the CDC's longstanding commitment to student training programs for certain underrepresented populations such as racial and ethnic minority and low-income populations. According to statements from a few of the former students in the CDC student training programs, these programs have been successful in encouraging

students to pursue careers in public health. Pipeline programs such as these at the CDC are critical for introducing racial and ethnic minority and low-income students to the fields of public health and healthcare. More evaluations should be conducted to determine the impact of these student training pipeline programs.

Student programs that enhance recruitment of underrepresented populations, in combination with other strategies, can increase access to and quality of healthcare for vulnerable populations and decrease healthcare disparities (The National Academies Press, 2003). There are opportunities to create these programs in many locations where the right stakeholders and resources are present (The National Academies Press, 2003). Current training programs are using innovative and creative designs for increasing the investment of student pipeline programs for public health and healthcare. These programs require early interventions and can be coupled with more innovative and creative designs, making opportunities more sustainable over the long term (The National Academies Press, 2003).

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References

Association of American Medical Colleges. Altering the course: Black males in medicine. Washington, DC: Association of American Medical Colleges; 2015.

Artiga, S., Damico, A., Garfield, R. The impact of the coverage gap for adults in states not expanding Medicaid by race and ethnicity. Menlo Park, CA: The Henry Kaiser Foundation; 2015.

Betancourt JR, Green AR, Carrillo JE, Park ER. Cultural competence and health care disparities: Key perspectives and trends. Health Affairs. 2005; 24(2):499–505. [PubMed: 15757936]

Black Caucus Health Braintrust. 2015 Kelly Report: Health Disparities in America. Washington, D.C: Congressional Black Caucus Health Braintrust; 2015. Retrieved from http://www.robinkelly.house.gov/sites/robinkelly.house.gov/files/2015%20Kelly%20Report.pdf

Cameron, AC., Trivedi, PK. Microeconometrics methods and applications. New York, NY: Cambridge University Press; 2008.

Centers for Disease Control and Prevention. Student training opportunities. 2015. Retrieved from http://www.cdc.gov/minorityhealth/internship/oppc

Centers for Disease Control and Prevention. National Negro health week to national minority health month: 100 years of moving public health forward. 2015. Retrieved from http://www.cdc.gov/minorityhealth/observances/BookerT.html

Centers for Disease Control and Prevention. CDC health disparities and inequalities report - United States. MMWR Surveill Summ. 2013; 63(3 Suppl)

Centers for Disease Control and Prevention. CDC health disparities and inequalities report - United States. MMWR Surveill Summ. 2011; 60(Suppl)

Centers for Disease Control and Prevention. OMHHE past program summaries – 2011. 2015. Retrieved from http://www.cdc.gov/minorityhealth/programs/2011/AMHPSProgram.htm

Chang MH, Moonesinghe R, Athar HM, Truman BI. Trends in disparity by sex and race/ethnicity for the leading causes of death in the United States. Journal of Public Health Management and Practice. 2015; 22(Suppl 1):S13–24.

Cohen JJ, Gabriel BA, Terrell C. Health care workforce: The case for diversity in the health care workforce. Health Affair. 2002; 21(5):90–102.

Drehobl P, Stover BH, Koo D. On the road to a stronger public health workforce. American Journal of Preventive Medicine. 2014; 47(5S3):S280–S285. [PubMed: 25439245]

Duffus WA, Trawick CT, Moonesinghe R, Tola J, Truman BI, Dean HD. Training racial and ethnic minority students for careers in public health sciences. American Journal of Preventive Medicine. 2014; 47(5S3):S368–S375. [PubMed: 25439259]

Grumbach K, Mendoza R. Disparities in human resources: Addressing the lack of diversity in the health professions. Health Affairs. 2008; 27(2):412–422.

Health Resources and Services Administration. The rationale for diversity in the health professions: A review of the evidence. U.S. Department of Health and Human Services, Bureau of Health Professions; Washington, D.C: U.S. Government Printing Office; 2006.

Heckler, MM. Report of the secretary's task force on black and minority health, volume I. Executive Summary. Washington, D.C: HHS; 1985.

Institute of Medicine. In the nation's compelling interest: Ensuring diversity in the healthcare workforce. The National Academies Press; 2004.

Jackson CS, Garcia JN. Addressing health and healthcare disparities: The role of a diverse workforce and the social determinants of health. Public Health Reports. 2014; 129(Suppl 2):57–61. [PubMed: 24385666]

Johnson TD. Shortage of U.S. public health workers projected to worsen: About 250, 000 new workers needed. The Nation's Health. 2008; 38(4)

LaVeist T, Gaskin D, Richard P. Estimating the economic burden of health inequalities in the United States. International Journal Health Services. 2011; 41(2):231–238.

McClamroch KJ, Montgomery JP. Epidemiology for high school students: Improving the public health pipeline. Public Health Reports. 2009; 124(6):898–904. [PubMed: 19894434]

National Healthcare Quality and Disparities Report. Agency for Healthcare Research and Quality; Rockville, MD: 2015. Retrieved from http://www.ahrq.gov/research/fiondings/nhqrdr/nhqdr14/intro.html

Office of the Assistant Secretary for Health (OASH). HHS action plan to reduce racial & ethnic health disparities: A nation free of disparities in health and health care. Washington, DC: Office of the Assistant Secretary for Health; 2011.

Rosenstock L, Silver GB, Helsing K, Evashwick C, Katz R, Klag M, … Sumaya C. On linkages: Confronting the public health workforce crisis: ASPH statement of the public health workforce. Public Health Reports. 2008; 123(3):395–398. [PubMed: 19006982]

Smedley, BD.Butler, AS., Bristow, LR., editors. In the nation's compelling interest: Ensuring diversity in the healthcare workforce. Washington, DC: Institute of Medicine; 2004.

Spencer LM, Schooley MW, Anderson LA, Kochtitzky CS, DeGroff AS, Devlin HM, Mercer SL. Seeking best practices: A conceptual framework for planning and improving evidence-based practices. Preventing Chronic Disease. 2013; 10(130186) http:dx.doi.org/10.5888/pcd10.130186.

The National Academies Press. Unequal treatment: Confronting racial and ethnic disparities in health care. Washington, D.C: The National Academies Press; 2003.

The Sullivan Commission. Missing persons: Minorities in the health professions: A report of the Sullivan Commission on diversity in the healthcare workforce. Sullivan Commission on Diversity in the Healthcare Workforce; 2004.

Tilson H, Gebbie KM. The public health workforce. Annu Rev Public Health. 2004; 25:341–56. [PubMed: 15015924]

U.S. Department of Education. Institute of Education Sciences, National Center for Education Statistics. 2010. Retrieved from http://www.nces.ed.gov

U.S. Department of Health and Human Services. HHS action plan to reduce racial and ethnic disparities: A nation free of disparities in health and health care. Washington, D.C: U.S. Department of Health and Human Services; 2011.

U. S. Department of Health and Human Services (Office of Minority Health). Think cultural health. 2010. Retrieved from https://www.ThinkCulturalhealth.hhs.gov/index.asp

U. S. Department of Health and Human Services. National standards for culturally and linguistically appropriate services in health care. PHSD, Office of Minority Health; Washington, D.C: 2001. Retrieved from http://minorityhealth.hhs.gov/assets/pdf/checked/finalreport.pdf

United States Census Bureau. State and county quickfacts. 2015. Retrieved from http://www.quickfacts.census.gov/gfd/states00000.html

Williams SD, Hansen K, Smithey M, Burnley J, Koplitz M, Koyajma K, … Bakos A. Using social determinants of health to link health workforce diversity, care quality and access, and health disparities to achieve health equity in nursing. Public Health Reports. 2014; 129(Suppl 2):32–36. [PubMed: 24385662]