

Metrics Toolkit Evidence Base and Rationales

Goal 1: Promote equity in educational pathways to health and science careers

Increasing educational attainment is core to the university's mission, and closing gaps in achievement will help universities prepare a 21st century workforce, particularly in the health professions. Significant educational disparities exist across geographic areas (Swanson, 2009), and sometimes within the same community (Kornhaber, Griffith & Tyler, 2014; New America Foundation, 2014). Low-income and first-generation students, racial and ethnic minorities, and immigrants are underrepresented among college students and graduates (Pascarella, Pierson, Wolniak & Terenzini, 2004; Johnson, 2011; Johnson, 2012; Aud et al., 2011; Ward, Strambler & Linke, 2013). Increasing educational attainment among certain student groups, and in geographic areas where it is lacking will advance the university's core mission, improve health overall and strengthen communities.

Workforce Strategy #1: Facilitate entry into health and STEM careers through pipeline programs

Rationale

- Many underrepresented students have not been exposed to information about health career options
- Pipeline programs inform students, stimulate interest in health careers and increase students' sense of self-efficacy
- Monitoring these programs helps universities know if the programs are helping to increase student participation and success in health professions fields

Evidence Base

Research shows that early and frequent positive interaction with health professionals (both inside and outside of clinical settings) has a positive impact on K-12 students' interest in health care careers (Zayas & McGuigan, 2006; Arora, Schneider, Thal, & Meltzer, 2011)¹. Many underrepresented racial/ethnic minority (URM) and low-income K-12 students lack role models in their families and communities who have pursued these professions, and may not "see" themselves in the

1 Similar interactions also stimulate interest in higher education attainment (Lent, Hackett & Brown, 1999).

field, or feel that such careers are achievable (Fouad & Smith, 1996; Baldwin & Agho, 2003; Cohen, Gabriel, & Terrell, 2002; Bluestein, et al., 2010). University pipeline programs for K-12 and undergraduate students, in particular post-baccalaureate programs (Grumbach & Chen, 2006), have succeeded in broadening student interests in STEM and health fields, strengthening student motivation and self-efficacy, and improving student academic outcomes (Lent & Brown, 1996; Arora, Schneider, Thal, & Meltzer, 2011; Patterson & Carline, 2006; Brooks, 2014; Unequal Treatment, 2003; Carline & Patterson, 2003; Patterson & Carline, 2006; Stroup and Thacker, 2007). Tracking the number of programs and participating students will help universities assess their reach. Each institution will need to develop its own metrics to assess program outcomes, but one long-term measure of success for all pipeline programs is students' degree attainment and entry into STEM/health fields.

Indicators and Measures

1. K-12 pipeline program participation, by student population

- a) Number of under-represented racial and ethnic minority (URM) students in health/STEM K-12 pipeline programs
- b) Number of low-income students in health/STEM K-12 pipeline programs

2. Undergraduate pipeline program participation, by student population

- a) Number of under-represented racial and ethnic minority (URM) students in health/STEM undergraduate pipeline programs
- b) Number of Pell grant recipients in health/STEM undergraduate pipeline programs
- c) Number of first-generation students in health/STEM undergraduate pipeline programs

3. Post-baccalaureate health program participation, by student population

- a) Number of under-represented racial and ethnic minority (URM) students in post-baccalaureate health programs
- b) Number of first-generation students in post-baccalaureate health programs

4. Pipeline participants' enrollment in health profession or STEM degree program

- a) Percent of K-12 pipeline participants who enroll in college with a declared STEM or health major
- b) Percent of undergraduate pipeline program participants who enroll in graduate-level STEM and health professions programs
- c) Percent of post-baccalaureate program participants who enroll in graduate-level STEM and health professions programs

Workforce Strategy #2: Recruit students from local areas and target communities

Rationale

- Increasing educational attainment among local students provides opportunities for entry into the health professions and STEM careers
- Universities may also target recruitment efforts in other types of communities, in alignment with the institution's mission and goals

Evidence Base

Between 1995 and 2005, only about half of high school students in the nation's 50 largest cities graduated from high school – well below the national average of 71 percent (Swanson, 2009) – and only 19 percent of graduates from urban school districts seek higher education, compared to 70 percent of their suburban peers (Wright, 2012; Kaufman & Rosenbaum, 1992). The rationale for investing locally is strong, as the majority of incoming freshmen who attend public 4-year colleges (57%) enroll at institutions located within 50 miles of their permanent home (Hillman & Weichman, 2016; Eagan et al., 2014). Low-income, Hispanic/Latino, Black/African American, and Native American/Alaska Native students are more affected by distance than their affluent and majority peers, and students from these groups are more likely to attend college close to home for family, cultural, or work-related reasons (Kohn, Manski, & Mundel, 1976; Ovink & Kalogrides, 2015; Hurtado, Inkelas, Briggs, & Rhee, 1997; McDonough, Antonio, & Trent, 1997; Pérez & McDonough, 2008; Somers et al., 2006; Perna, 2010). Targeting recruitment efforts to local students and other communities with demonstrated need - certain rural areas, under-resourced school districts, or counties with low college-going rates - will not only increase educational attainment overall, but will also provide opportunities for these students to enter the health professions and STEM careers.

Indicators and Measures

1. Undergraduate student enrollment from local areas

- a) Incoming first-time undergraduate students enrolled from nearby high schools, as a percentage of local high school graduates (i.e., college-eligible students)
- b) Incoming first-time undergraduate students enrolled from nearby high schools, as a percentage of total incoming first-time undergraduate students
- c) Incoming transfer undergraduate students enrolled from nearby 2- or 4-year colleges, as a percentage of total incoming transfer undergraduate students
- d) Incoming undergraduate students enrolled from nearby high schools/colleges, as a percentage of total incoming undergraduate students

2. Undergraduate student enrollment from target communities

- a) Incoming undergraduate students enrolled from target communities, as a percentage of total incoming undergraduate students

- 3. Graduate-level health professions students who originate from local areas**
 - a) Incoming graduate-level health professions students who originate from local areas, as a percentage of total incoming health professions students
- 4. Graduate-level health professions student who originate from target communities**
 - a) Incoming graduate-level health professions students who originate from target communities, as a percentage of total incoming health professions students

Workforce Strategy #3: Increase college success and equity

Rationale

- If students from under-represented student groups participate and are successful in college, they are more likely to advance to graduate health professions and STEM programs
- Measuring student outcomes along the educational continuum, with a focus on achieving equity, will inform leaders' decisions and university investments

Evidence Base

On a national level, we know that retention from the freshman to the sophomore year is an important determinant of student persistence and success (Lau, 2003; Herzog, 2005; Marsh, 2014). Retention rates are lower for under-represented racial/ethnic minority students, low-income students, and those who are the first in their family to go to college (Thayer, 2000; Carey, 2008). These low retention rates have an impact on downstream outcomes, including academic achievement, degree completion, and graduation (Lau, 2003). Although a variety of strategies may be used to increase student success, certain “High-Impact Practices” (HIPs) have been demonstrated effective and are backed by strong evidence. Research shows that participation in two or more HIPs increases retention, academic achievement, and degree completion (Kuh, 2008; Posselt & Black, 2012; Kuh & O’Donnell, 2013), particularly for under-represented minority students (Huber, 2010). Other factors, for example, the student-advisor ratio, mentoring, and psychosocial support (Rainey, 2001; Grumbach et al., 2002), may also predict undergraduate student success. Viewing student outcomes through an equity lens (i.e., disaggregating data across student groups) is important in order to understand who is or is not succeeding, as well as the barriers that certain groups may be facing. This data informs university actions so that all students succeed.

Indicators and Measures

- 1. Incoming student enrollment from target student groups**
 - a) Percent of first-year undergraduate students enrolled that are under-represented racial and ethnic minority (URM) students
 - b) Percent of first-year undergraduate students enrolled that are first-generation

- c) Percent of first-year undergraduate students enrolled that are Pell grant recipients

2. Participation in high-impact practices, by student population

- a) Percent of under-represented racial and ethnic minority (URM) degree recipients who participated in 2 or more high-impact practices, compared to non-URM degree recipients
- b) Percent of first-generation degree recipients who participated in 2 or more high-impact practices, compared to non-first-generation degree recipients
- c) Percent of degree recipients who participated in 2 or more high-impact practices and who received a Pell grant in the past, compared to degree recipients that did not receive a Pell grant

3. Academic advising experience

- a) Number of students per academic advisor
- b) Student satisfaction with academic advising effectiveness, as assessed by the Noel Levitz Student Satisfaction Inventory, the National Survey of Student Engagement (or other institutional survey)

4. First-year retention rates, by student population

- a) Percent of first-year, full-time under-represented racial and ethnic minority (URM) students who return the following fall semester
- b) Percent of first-year, full-time first-generation students who return the following fall semester
- c) Percent of first-year, full-time Pell grant recipients who return the following fall semester

5. 6-year graduation rates from the same institution, by student population

- a) Percent of first-year, full-time under-represented racial and ethnic minority (URM) students who graduate from the current institution within 6 years
- b) Percent of first-year, full-time first-generation students who graduate from the institution within 6 years
- c) Percent of first-year, full-time Pell grant recipients who graduate from the institution within 6 years
- d) Graduation rate for full-time transfer students from the same institution

6. 6-year graduation rates from any institution, by student population

- a) Percent of first-year, full-time under-represented racial and ethnic minority (URM) students who graduate from any institution within 6 years
- b) Percent of first-year, full-time first-generation students who graduate from any institution within 6 years
- c) Percent of first-year, full-time Pell grant recipients who graduate from any institution within 6 years

7. Graduates, by student population

- a) Number of graduates who are under-represented racial and ethnic minority (URM), by academic year
- b) Number of graduates who are first-generation, by academic year
- c) Number of graduates who have received a Pell grant, by academic year

8. Achievement gap, by student population

- a) Difference in first-year retention rate between under-represented racial and ethnic minority (URM) students and non-URM students
- b) Difference in 6-year graduation rate between under-represented racial and ethnic minority (URM) students and non-URM students (current institution)
- c) Difference in first-year retention rate between first-generation and non-first-generation students
- d) Difference in 6-year graduation rate between first-generation students and non-first-generation students (current institution)
- e) Difference in first-year retention rate between Pell grant recipients and non-Pell grant recipients
- f) Difference in 6-year graduation rate between Pell grant recipients and non-Pell grant recipients (current institution)

9. Credit hours at completion, by sub-population

- a) Number of credit hours at completion for students who are under-represented racial and ethnic minority (URM)
- b) Number of credit hours at completion for students who are first-generation
- c) Number of credit hours at completion for students who have received a Pell grant

Workforce Strategy #4: Broaden participation and success of students in STEM fields

Rationale

- Increasing participation and success of under-represented students in STEM fields will help those students advance into health professions and STEM programs
- Measuring outcomes for students in STEM fields will inform leaders' decisions and university investments

Evidence Base

A prerequisite for advancement into graduate STEM and health professions programs is successful completion of STEM and pre-health coursework during the undergraduate years. Students from under-represented groups are more frequently placed into remedial/developmental education

courses (Hu & John, 2001; Marsh, 2014; Keen-Rhinehart, Bolt-Michewicz & Black, 2014; Vandal, 2014; Malcom & Feder, 2016) which delay their progression into critical gateway courses (e.g., Chemistry 101); they also tend to leave STEM fields at higher rates than their peers (Balemian & Feng, 2013; Chang et al., 2010; Harackiewicz et al., 2014). These disparities persist at the graduate level. According to the Council of Graduate Schools, only 43 percent of Black/African American students completed STEM doctoral degrees within 10 years, compared to 56 percent of White students (Sowell, Zhang, Bell, & Redd, 2008). Monitoring student performance in STEM coursework, as well as the use of effective interventions such as undergraduate research and interaction with faculty outside of class (Zhao & Kuh, 2004; Kuh, 2008; Kuh & O'Donnell, 2013), will assist university leaders in their efforts to support URM student participation, retention and success in these critical fields.

Indicators and Measures

1. Participation of students under-represented in STEM and health majors

- a) Number of under-represented racial and ethnic minority (URM) students in STEM and health majors, by area of study
- b) Number of first-generation students in STEM and health majors, by area of study
- c) Number of female students in low-representation STEM fields, by area of study
- d) Number of students with a disability in STEM fields of study

2. Drop/Fail/Withdraw (DFW) rates in introductory STEM courses, by student population

- a) DFW rates in introductory STEM courses (i.e., “gateway” courses, 100-level courses) for under-represented racial and ethnic minority (URM) students in year one
- b) DFW rates in introductory STEM courses (i.e., “gateway” courses, 100-level courses) for women in low-representation STEM fields in year one
- c) DFW rates in introductory STEM courses (i.e., “gateway” courses, 100-level courses) for students with a disability in year one
- d) DFW rates in introductory STEM courses (i.e., “gateway” courses, 100-level courses) for students who are first generation in year one

3. Average number of STEM credits completed, by student population

- a) Average number of STEM credits completed in year one by under-represented racial and ethnic minority (URM) students
- b) Average number of STEM credits completed in year one by students with a disability
- c) Average number of STEM credits completed in year one by students who are first generation

4. Persistence in a STEM major, by student population

- a) Percent of under-represented racial and ethnic minority (URM) students with a declared major in a STEM field, who graduate with a STEM degree (within 6 years, at the same institution)
- b) Percent of female students with a declared major in a low-representation STEM field, who graduate with a degree in that field (within 6 years, at the same institution)
- c) Percent of students with a disability and a declared STEM major, who graduate with a STEM degree (within 6 years, at the same institution)
- d) Percent of first-generation students with a declared STEM major, who graduate with a STEM degree (within 6 years, at the same institution)

5. STEM remediation success rate

- a) Percent of students with passing grades in all remedial courses required to enter STEM “gateway” courses (i.e., 100-level courses)

6. Undergraduate research with faculty members, by student population

- a) Percent of under-represented racial and ethnic minority (URM) students in STEM majors who participate in undergraduate research with faculty members
- b) Percent of first-generation students in STEM majors who participate in undergraduate research with faculty members

7. Interacting with faculty outside of class, by student population

- a) Percent of under-represented racial and ethnic minority (URM) students in STEM majors that report high levels of engagement with faculty outside of class when responding to the National Survey of Student Engagement (NSSE), or other surveys
- b) Percent of first-generation students in STEM majors that report high levels of engagement with faculty outside of class when responding to the National Survey of Student Engagement (NSSE), or other surveys

8. Graduates with a STEM degree, by student population

- a) Number of graduates in STEM fields who are under-represented racial and ethnic minority (URM) students, by academic year
- b) Number of graduates in STEM fields who are first generation, by academic year
- c) Number of female graduates in low-representation STEM fields, by academic year
- d) Number of graduates in STEM fields, with a disability, by academic year

9. Participation of students from groups under-represented in STEM, who are enrolled in STEM doctoral programs

- a) Percent of under-represented racial and ethnic minority (URM) students in STEM doctoral programs, by field of study
- b) Percent of female students in low-representation STEM doctoral programs, by field of study
- c) Percent of first-generation students in STEM doctoral programs, by field of study

- d) Number of students with a disability in STEM doctoral programs, by field of study

Workforce Strategy #5: Broaden participation and success of students in health professions programs

Rationale

- Increasing participation and success of under-represented students in health professions programs will result in a more diverse health workforce
- Measuring outcomes for students in health professions programs will inform leaders' decisions and university investments

Evidence Base

The participation of under-represented students in health professions education programs (e.g., dentistry, pharmacy, public health, nursing and allied health) is a concern for many institutions. Certain racial/ethnic groups (African Americans, Hispanics, Native Americans, and Native Hawaiian/Pacific Islanders), women, individuals with disabilities, and socioeconomically disadvantaged individuals are persistently underrepresented in the health and biomedical research workforce (Valantine & Collins, 2015). A study of medical school graduates who failed Step 1 of the United States Medical Licensing Examination found significant differences by race/ethnicity (URM, Asian/Pacific Islander), gender (male), and age (older students). However, overall failure rates were extremely low (less than 7 percent of those who attempted the exam) (Andriole, & Jeffe, 2012). Measuring enrollment of underrepresented students in health professions programs, as well as student success outcomes such as graduation rates and passage rates on licensing exams, will assist university leaders in their efforts to build a diverse health workforce that meets community needs.

Indicators and Measures

- 1. Participation of students from groups under-represented in health professions**
 - a) Percent of under-represented racial and ethnic minority (URM) students, by health professions program
 - b) Percent of students from low-income backgrounds, by health professions program
 - c) Percent of male students in low-representation health fields (e.g., nursing and some allied health fields)
- 2. Health professions graduation rate, by student population**
 - a) Percent of incoming students who graduate, by health professions program
 - b) Percent of under-represented racial and ethnic minority (URM) students who graduate, by health professions program

- c) Percent of students from a low-income background who graduate, by health professions program

3. Clinical exam pass rate, by student population

- a) Percent of all students who pass clinical/licensure certification exams on their first attempt, by health professions program
- b) Percent of under-represented racial and ethnic minority (URM) students who pass clinical/licensure certification exams on their first attempt, by health professions program
- c) Percent of low-income students who pass clinical/licensure certification exams on their first attempt, by health professions program

Workforce Strategy #6: Provide access to financial resources for students in health professions programs

Rationale

- The cost of a health professions education is a barrier to broadening participation, particularly for low-income students
- Universities need to understand where and how to target scarce financial aid resources to achieve maximum benefit

Evidence Base

The cost of attending medical, dental, and pharmacy schools has increased faster than inflation over the last 20 years (Youngclaus & Fresne, 2013; Cain et al, 2014; American Dental Association, 2011; Diringer, Phipps & Carsel, 2013; Martin and Lehren, 2012; Fry, 2012), and grants and scholarships rarely cover the cost of attendance (Lynch, Engle & Cruz, 2011). These high tuition prices are a barrier for many students, particularly those from low-income and minority backgrounds. Only three percent of medical students come from the lowest quintile of family income (Youngclaus & Fresne, 2013). Heller (1999) found that Black/African American, Hispanic/Latino(a), and Asian American students are more sensitive to tuition increases than White students, and are less likely to enroll when prices rise. Need-based financial aid has positive effects on low-income and minority students' enrollment, first-year retention, and degree completion (Heller, 1999; Van Der Klaauw, 2002; Dynarski, 2003; Perna and Titus, 2004; Bettinger, 2004).

The cost of attendance and student debt can also impact students' professional choices in some disciplines. In dentistry, 41% of students said that their debt had a "great influence" on their career choices, with an increasing number choosing to join a group or corporate practice (Diringer, Phipps, & Carsel, 2013). Pharmacy student debt is reported to have a negative influence on graduates' willingness to pursue a residency and other post-graduate training opportunities (Johnson, 2008). However, in medicine debt levels actually play a relatively minor role in specialty choice (Rosenblatt & Andrilla, 2005; Kahn et al., 2006), with only 27 percent of graduates reporting that

their debt had a “strong” or “moderate” influence on their choice of specialty (Youngclaus & Fresne, 2013).

There is evidence to support the effectiveness of programs that provide financial support in exchange for service (e.g., National Health Service Corps, Indian Health Service-sponsored loan repayment programs). Pathman et al (2004) found that physicians participating in these service programs practiced in needier areas and cared for more uninsured and Medicaid patients. Retention rates in underserved areas were high, and half of participating physicians stayed more than eight years – suggesting that such programs do play a role in developing the physician workforce for underserved communities (see also Bärnighausen & Bloom, 2009).

Evaluating the impact of tuition costs, financial aid availability, and type of financial aid program on student access to and success in health professions programs will help institutions understand where to target financial assistance and support services. Health professions deans may also want to track average student debt for their graduates, and monitor the availability of institutional scholarships for health professions students, particularly disadvantaged students.

Indicators and Measures

1. Unmet financial need

- a) Average amount of unmet financial need
- b) Percent of students with high levels of unmet financial need

2. Tuition cost

- a) Average total tuition, fees, room and board for full-time students

3. Median student debt

- a) Median health professions school debt held by graduating students, by health professions program
- b) Median health professions school debt held by graduating students, by socioeconomic status of the student

4. Institutional grant total

- a) Total institutional dollars available for need-based scholarships, by health professions program

Workforce Strategy #7: Foster an inclusive climate to support student success

Rationale

- An inclusive climate helps students from all backgrounds thrive

- University actions can improve climate, and having good data on campus climate informs those actions.

Evidence Base

Students thrive in an educational environment that is inclusive and values diversity. An inclusive campus climate increases the persistence and success of under-represented students in particular; by fostering those students' sense of belonging, reducing incidences of racism and discrimination, and supporting academic achievement and social integration (Woodford & Kulick, 2015; Hernandez, Nguyen, Saetermoe, & Suarez-Orozco, 2013; Butts et al., 2012; Urban Institute, 2005). All students benefit by exposure to a wide variety of cultural perspectives that expand their worldview and aid development of critical thinking skills (Association of American Medical Colleges [AAMC], 2013b; Piercy et al., 2005). Climate is generally measured via surveys,² which assess perceptions of the institutional environment among students, faculty, and staff. Such surveys are also useful for assessing the extent to which certain groups of students experience harassment and discrimination, which negatively affect students' ability to thrive. Climate is highly malleable and can be improved through university intervention (Piercy et al., 2005; Jayakumar, Howard, Allen, & Han, 2009; O'Meara, Lounder & Campbell, 2014; Smedley, Stith & Nelson, 2003). Regularly monitoring institutional climate allows university leaders to assess progress toward the goal of an inclusive climate, identify areas for improvement, and determine the extent to which the university is meeting its mission.

Indicators and Measures

1. Perceptions of campus climate, by student population

- a) Percent of students surveyed who perceive campus climate positively
- b) Percent of under-represented racial and ethnic minority (URM) students surveyed who perceive campus climate positively
- c) Percent of first-generation students surveyed who perceive campus climate positively
- d) Percent of LGBTQ students surveyed who perceive the campus climate positively
- e) Percent of students with a disability who perceive the campus climate positively

2. Interactions with diverse students

² The timing of these surveys is critical. Representatives from a university participating in the Urban Universities for HEALTH Learning Collaborative cautioned against implementing the survey at the beginning of a student's first year because the results may be biased by enthusiasm for the new environment. If the survey is implemented at the time of graduation, it may be too late to use the results to improve support needed earlier in their study program. It would be preferable to collect data every two to three years to measure perception of institutional climate and be able to capture information that can be used for improving the campus.

- a) Percent of students reporting high levels of interactions with diverse others when responding to the National Survey of Student Engagement (NSSE) (or other institutional survey)

Goal 2: Increase the diversity of the leadership, faculty, and student body in the health professions

Diversity is integral to excellence. In higher education, a diverse student body enriches the learning environment for all students – not just minority students – expanding students’ perspectives, reducing levels of racial prejudice, and increasing tolerance for alternative points of view (Unequal Treatment, 2003; Gurin, 2002; Carnevale & Fry, 2000; Hurtado et al, 1998). Diversity in health professions schools results in a diverse health care workforce, which is essential to improving health among diverse patient populations and reducing health disparities (Unequal Treatment, 2003; Sullivan Commission, 2004). For example, racial/ethnic minority health care professionals serve the bulk of minority patients (HRSA, 2006), and analyses of patient satisfaction surveys associate greater patient-provider trust with racial/ethnic and gender concordance (Saha et al, 2000; Street et al, 2008). In addition, diverse teams are able to solve complex problems more quickly and effectively than homogeneous teams (Valantine & Collins, 2015; Page, 2008; Hong & Page, 2004) – a valuable skill in today’s growing interprofessional health care environment.

Many dimensions of diversity are germane to the health care context. Linguistic diversity is particularly important in the United States, as a significant number of Americans are foreign-born. Nearly 40 million Americans speak Spanish today (Gonzalez-Barrera & Lopez, 2013), and at least 350 other languages are spoken in American homes (US Census, 2015). Health professionals are more likely than ever to encounter patients with Limited English Proficiency (LEP), and must be prepared to provide them with quality care. LEP patients experience better interpersonal care, greater medical comprehension, and greater likelihood of keeping follow-up appointments when they visit with a language-concordant practitioner (Ngo-Metzger et al., 2007; Green et al., 2005; Wilson et al., 2005; Powe & Cooper, 2004; Seijo et al., 1991). Recruiting individuals proficient in languages other than English, and providing language instruction during health professions education, will produce a workforce prepared to serve linguistically diverse populations.

Workforce Strategy #8: Build a Diverse Student Body in the Health Professions

Rationale

- A diverse student body enriches the learning environment for all students
- Graduating health professionals from diverse backgrounds contributes to a diverse, culturally competent health care workforce
- Diversity should be considered broadly, with schools tracking data specific to mission/goals, the diversity needs of the field, and the community context

Evidence Base

Universities and health professions schools have a compelling interest in building a diverse student body to enrich the learning environment. When groups of students from different backgrounds and perspectives are brought together, all students benefit from increased exposure to ideas different from their own, resulting in improved educational outcomes (Astin, 1993; Hurtado et al, 1998; Chang, 1999; Orfield & Whitley, 1999; Carnevale & Fry, 2000; Gurin et al, 2002; Milem, 2003). Compositional diversity on campus also has a recursive effect, encouraging more individuals from diverse backgrounds to join the university community as new students, faculty and staff (Milem, O'Brien, & Bryan, 2013). Among health professions students, there is a positive impact on all students' attitudes regarding access to care and an increase in the number of students who indicate an interest and intent to work with the underserved (Saha et al., 2008). Educating students in environments that value diversity and inclusion produces graduates better prepared to practice in underserved communities and whose understanding of the cultural needs of patients improves patient satisfaction and trust.

A diverse student body leads to a diverse workforce. The need for diversity is particularly important in the health professions, where lack of diversity among professionals contributes to disparities in access to health care and services for minority populations (Smedley, Stith, and Nelson, 2003). Minority providers currently care for the bulk of minority patients in the United States and play a larger role than non-minority providers in treating patients in poor health (Edwards, Maldonado, & Engelgau, 2000; Terrell & Beaudreau, 2003; Komaromy et al., 1996; Marrast, Zallman, Woolhandler, Bor, & McCormick, 2013). When health care providers are similar to patients in important dimensions of identity (e.g. race, ethnicity, language), there can be effective communication and improvement in the provider-patient relationship (Ferguson & Canbib, 2002).

It is important to consider diversity broadly, not just in terms of race, ethnicity, and gender, but also socioeconomic status, sexual orientation/gender identity, disability, and other factors. For example, sexual and gender minorities receive poorer quality health care and have lower life expectancies (Institute of Medicine, 2011a; Grant, Mottet & Tanis, 2010), and nearly 40 percent of transgender Americans have experienced discrimination by health care providers in clinical settings (Grant, Mottet & Tanis, 2010). Students from low-income backgrounds express interest in serving low-income populations and the underserved at higher rates than their more affluent peers (Senf, Campos-Outcalt & Kutob, 2003; Campos-Outcalt et al, 2007). Students with disabilities are generally under-represented in higher education, and face barriers to access (Shevlin, Kenny & McNeela, 2010; Wilson, Getzel and Brown, 2000). Within the field of medicine, the matriculation and graduation rates of medical students with physical and sensory disabilities remain low (Eickmeyer, Kim, Kirschner & Curry, 2012).

Other aspects of diversity may be important to a university, depending on its own mission and unique local context. For example, the University of Washington-Tacoma is located in a community with large numbers of veterans. Having health care providers who are familiar with military culture and veterans' unique health needs may improve health outcomes for this patient population

(Williams & Jackson, 2015; Parker, Galkowski & Hayes, 2015). SUNY Downstate Medical Center is located in a community with a large immigrant population and has made an effort to recruit students who speak the languages spoken by the local patient population (Antoine, 2017). Finally, diversity priorities may vary by discipline. For example, males are under-represented in the field of nursing and certain allied health fields (Kelly, Shoemaker & Steele, 1996; IOM, 2011b; AACN, 2015).

Indicators and Measures

1. Student diversity, by sub-group

- a) Percent of under-represented racial and ethnic minority (URM) students, by health professions program
- b) Percent of students from low-income backgrounds, by health professions program
- c) Percent of male students in nursing programs
- d) Percent of male students in nursing programs, or other fields where men are under-represented
- e) Percent of students who are active military or veterans, by health professions program
- f) Percent of students who self-identify as LGBTQ, by health professions program
- g) Percent of students who are foreign born, by health professions program

2. Under-represented racial and ethnic minority (URM) admissions success rate, by admissions pathway

- a) Percent of applicants who are under-represented racial and ethnic minority (URM), by admissions pathway
- b) Percent of applicants offered admission who are under-represented racial and ethnic minority (URM), by admissions pathway

3. Percent of applicants who accepted an offer of admission who are under-represented racial and ethnic minority (URM), by admissions pathway

- a) Percent of applicants who enrolled who are under-represented racial and ethnic minority (URM), by admissions pathway

4. Admissions success rate for students from target communities, by admissions pathway

- a) Percent of applicants who are from target communities, by admissions pathway
- b) Percent of applicants offered admission who are from target communities, by admissions pathway
- c) Percent of applicants who accepted an offer of admission who are from target communities, by admissions pathway
- d) Percent of applicants who enrolled who are from target communities, by admissions pathway

5. Holistic Review practices

- a) Percent of health professions schools at the institution that state they are using a holistic admissions process
- b) Number of holistic review practices in use, by health profession school

Workforce Strategy #9: Increase linguistic diversity among students

Rationale

- Linguistic diversity is important because language concordance between the patient and provider improves patient satisfaction and trust, and may contribute to better health outcomes
- Universities can help meet local needs for providers that speak patient languages by recruiting students who are proficient in those languages and improving language education courses/opportunities for health professions students

Evidence Base

Language and cultural barriers limit the ability of providers to serve the needs of minority patients in ways that are linguistically and culturally relevant (Ferguson & Canbib, 2002; Manetta et al, 2007; Kirch, 2012). Graduates in the health professions who speak languages spoken by the local patient population will contribute to better quality care and improved population health outcomes (Manson, 1988; Baker et al, 1996; Perez-Stable, Napoles-Springer, and Miramontes 1997; Carter-Pokras et al. 2004; Fernandez et al. 2004; Green et al. 2005; Jacobs, Sadowski, and Rathouz 2007; Ngo-Metzger et al. 2007; Eamranond et al. 2009; Diamond, Luft, Chung, & Jacobs, 2012). Assessing the linguistic needs of the patient population, recruiting students who speak the target languages fluently, and improving the availability and quality of foreign language instruction in health profession schools are all methods for producing a workforce that is prepared to provide linguistically competent care (Huang, 2011).

Indicators and Measures

- 1. Enrollment of students who speak a foreign language**
 - a) Percent of incoming students who speak one or more languages other than English, by health professions program
- 2. Graduates' foreign language proficiency**
 - a) Percent of health professions graduates who have learned another language in training, by health professions program

Workforce Strategy #10: Diversify the health professions faculty and leadership

Rationale

- A diverse faculty enriches teaching and learning environments and contributes to the cultural competence of health professions students
- Having a diverse faculty contributes to retention of minority students and faculty
- Diversity among senior leaders contributes to an inclusive climate

Evidence Base

As the “designated socializing agents” in higher education (Hurtado et al, 1998), faculty play a role in exposing students to a wide variety of cultural perspectives that will expand their understanding of the world and help them develop critical thinking skills needed for success (AAMC, 2013). Faculty of different nationalities and ethnic backgrounds can contribute to the linguistic and cultural competency of health professions students and, by extension, the health care workforce (Cohen, Gabriel & Terrell, 2002). A diverse faculty is also essential to retaining underrepresented minority students, many of whom actively seek mentors and advisors who understand their perspectives (Urban Universities for HEALTH, 2015). Similarly, the process of recruiting and retaining minority faculty is aided by the existing presence of diverse faculty on campus, as minority faculty are more likely to stay, succeed, and thrive at institutions that already have a diverse group of scholars in place (Price et al, 2005; O’Meara, Lounder & Campbell, 2014).

Diversity at senior levels³ enriches discussion and decision-making and helps leaders find innovative solutions to problems (Page, 2003; Hong & Page, 2004; Flowers & Moore, 2008; Valentine & Collins, 2015; Sack & Yun, 2017). It also sends a powerful message to the campus community that diversity and inclusion are valued, which has a positive impact on institutional climate (Aguirre & Martinez, 2002; Jackson, 2003; Page, 2003; Flowers & Moore, 2008; Sack & Yun, 2017).

Indicators and Measures

- 1. Under-represented racial and ethnic minority (URM) faculty, by rank**
 - a) Percent of all faculty (by headcount) who are under-represented racial and ethnic minority (URM)
 - b) Percent of full-time tenure-track faculty who are under-represented racial and ethnic minority (URM)
- 2. Female faculty, by rank**

³ Senior leaders may include health professions deans/department directors, provosts, presidents/chancellors, and other senior administrative professionals.

- a) Percent of all faculty who are female
 - b) Percent of full-time tenure-track faculty who are female
- 3. Under-represented racial and ethnic minority (URM) faculty advancement**
- a) Percent of under-represented racial and ethnic minority (URM) faculty with tenure
 - b) Percent of under-represented racial and ethnic minority (URM) faculty who hold the rank of professor (highest rank)
 - c) Time in rank for URM tenure track faculty compared to non-URM tenure-track faculty
- 4. Female faculty advancement**
- a) Percent of female faculty with tenure
 - b) Percent of female faculty who hold the rank of professor (highest rank)
 - c) Time in rank for female tenure-track faculty compared to male tenure-track faculty
- 5. Under-represented racial and ethnic minority (URM) leadership, by rank**
- a) Percent of department chairs who are under-represented racial and ethnic minority (URM)
 - b) Percent of Deans or Vice Deans who are under-represented racial and ethnic minority (URM)
 - c) Percent of academic leadership/governance positions (including President/Chancellor, Provost, Associate Provost, Vice Presidents, Associate Vice Presidents, Board of Trustees) who are under-represented racial and ethnic minority (URM)
- 6. Female leadership, by rank**
- a) Percent of department chairs who are female
 - b) Percent of Deans or Vice Deans who are female
 - c) Percent of academic leadership/governance positions (including President/Chancellor, Provost, Associate Provost, Vice Presidents, Associate Vice Presidents, Board of Trustees) who are female
- 7. Under-represented racial and ethnic minority (URM) faculty ratio**
- a) Ratio of white to under-represented racial and ethnic minority (URM) faculty in tenure-track positions (who do not yet have tenure)
 - b) Ratio of white to under-represented racial and ethnic minority (URM) faculty with tenure
 - c) Ratio of white to under-represented racial and ethnic minority (URM) faculty who hold the rank of professor (highest rank)
- 8. Faculty gender gap/ratio**
- a) Ratio of male to female faculty in tenure-track positions (who do not yet have tenure)
 - b) Ratio of male to female faculty with tenure
 - c) Ratio of male to female faculty who hold the rank of professor (highest rank)

Goal 3: Integrate cultural competence and population health within health professions education

Cultural competency education is crucial for preparing future health professionals to care for a diverse patient population. Currently, individuals from diverse cultural backgrounds are unable to attain their highest level of health, due to legacies of discrimination and social injustice, various Social Determinants of Health (SDOH), and lack of culturally and linguistically appropriate health care services (US Department of Health and Human Services, 2010). Preparing all graduates to provide care that is respectful of, and responsive to, the linguistic and cultural needs of all individuals will improve the health of populations experiencing health disparities (Goode, Dunne and Brondheim, 2006; Beach et al, 2004). In addition, patient populations such as persons with disabilities, LGBTQ individuals, low-income individuals, and veterans may be better served by a workforce that understands their unique needs and perspectives (Senf, Campos-Outcalt & Kutob, 2003; Campos-Outcalt et al, 2007; Institute of Medicine, 2011a; Krahn et al, 2014; Parker, Galkowski & Hayes, 2015; Williams & Jackson, 2015). Developing a full understanding of the Social Determinants of Health and other contributors to health disparities will build graduates' capacity to provide quality care.

Workforce Strategy #11: Integrate Training to Develop Students' Cultural Competence

Rationale

- Cultural competence education can help prepare future health professionals to serve diverse patient populations
- Monitoring integration of cultural competency training into the curriculum ensures students will have adequate opportunities to learn about these concepts and develop critical skills.
- Directly evaluating student cultural competency with standardized patients is an emerging approach

Evidence Base

When integrated into the curriculum alongside clinical rotations and other practical experiences, cultural competency training helps students develop the cross-cultural communication skills, awareness of bias, and understanding of health disparities that they need to deliver quality care (HHS, 2001; Crandall et al., 2003; Betancourt, Green, Carillo, & Ananeh-Firempong, 2003; Beach et al, 2005; Huang, 2011; Holyfield & Miller, 2013). Although a variety of training models exist, core elements usually include: information about health disparities, training to increase awareness of bias and stereotyping, cross-cultural communication skills development, and understanding of

different philosophical approaches to health care (e.g., alternative medicine) (Lipson & Desantis, 2007; Lie et al, 2010; Holyfield & Miller, 2013; Echeverri, Brookover & Kennedy, 2013). Several tools exist to help health professions programs incorporate cultural competence into the curriculum, including the AAMC's Tool for Assessing Cultural Competence Training (TACCT) for medicine and the Dental Tool for Assessing Cultural Competence Training (D-TACCT) for dentistry (Lie et al, 2010; Holyfield & Miller, 2013).

Correct implementation of cultural competence education is critical. Many prior efforts have suffered shortcomings that include erroneous notions of race, stereotyping, and assumptions that all providers will be coming from the dominant group perspective (Gregorczyk & Bailit, 2008). Fortunately, several validated instruments exist for measuring student cultural competence and the outcomes of training (Gozu et al (2007). For nursing students, the Cultural Self-Efficacy Scale (CSES) measures student knowledge of cultural concepts, knowledge of cultural patterns and skills in performing key trans-cultural nursing functions (Bernal & Froman, 1987; Gozu et al, 2007; Center of Excellence for Cultural Competence, 2010; Herrero-Hahn et al, 2015). In medicine, one emerging method is to integrate questions about cultural competence into the Objective Structured Clinical Examination (OSCE) (Miller & Green, 2007; Balzora, Abiri, Wang, McKeever, Poles, Zabar, Gillespie, & Weinshel, 2015). In the OSCE, students rotate through stations where they perform a variety of clinical tasks under observation by examiners with structured marking sheets/rubrics (Sloan et al, 1996; Newble, 2004). Some of these tasks may be performed on standardized patients from diverse backgrounds and perspectives, enabling examiners to assess student clinical cultural competence (Miller & Green, 2007; Balzora, Abiri, Wang, McKeever, Poles, Zabar, Gillespie, & Weinshel, 2015).

Indicators and Measures

1. Integration of cultural competence into the curriculum

- a) Percent of required pre-clinical and clinical courses that have integrated cultural competency instruction
- b) Percent of TACCT items integrated across the curriculum (medical schools)
- c) Percent of D-TACCT items integrated across the curriculum (dental schools)

2. Students' cultural competence

- a) Percent of graduates with passing score on a validated cultural competency assessment

Workforce Strategy #12: Integrate Training to Develop Student Knowledge of Population Health

Rationale

- Educating students from a population health perspective can help prepare future health professionals to address the social determinants of health
- Monitoring integration of population health concepts into the curriculum ensures students will have adequate opportunities to learn about these concepts and develop critical skills.

Evidence Base

Exposing health professions students to population health concepts and increasing their awareness of the social determinants of health has several positive effects: it encourages entry into primary care fields, increases student interest in caring for low-income and minority patients, and improves clinical competence and quality of care (Drain et al, 2007; McNeal & Blumenthal, 2011; Simpson, 2014; Sabo et al, 2015). It also helps professionals change their focus from acute care to preventative care (Maeshiro, 2008) – an approach that will doubtless prove invaluable in addressing our nation’s chronic disease burden. A key driver of this paradigm shift⁴ was the *Healthy People 2010* goal of increasing the amount of preventative care content in educational programs across health professions. The Healthy People Curriculum Task Force developed the [Clinical Prevention and Population Health Curriculum Framework](#), which helps schools integrate population health material into curriculum, licensing exams, and certifications (Allan et al, 2004).

Since the development of that framework, some schools have built upon it and developed their own strategies for integration, monitoring, and evaluation of course content. For example, Stanford University required its medical students to participate in population health projects related to disease prevention and improving access to care, and content of each project was determined by a combination of student interests and local community needs (Chamberlain et al, 2008). Other successful strategies cited in the literature include learning experiences that require students to apply interdisciplinary concepts (e.g., from environmental science, economics, social science), and learning experiences that require students to engage in public policy and advocacy (Kinder et al, 2000).⁵

⁴ Further motivation to integrate public health content was provided by the passage of the Patient Protection and Affordable Care Act in 2010, which emphasized preventative care and health promotion (Simpson, 2014).

⁵ A number of resources are available to help schools integrate population health concepts into the curriculum including, but not limited to, [Community-Campus Partnerships for Health](#), the [Association for Community Health Improvement](#), and the [Community Tool Box](#).

Indicators and Measures

1. Integration of population health into curriculum

- a) Percent of required pre-clinical and clinical courses that have integrated content related to population health

Workforce Strategy #13: Expand community-based/service learning opportunities for students

Rationale

- Community-based educational opportunities increase cultural competence and the likelihood that graduates will go on to work in underserved communities
- Monitoring these opportunities will help universities build a robust network of community-academic partnerships for student learning, and to enhance quality of these experiences

Evidence Base

Providing service-learning and other experiential opportunities in communities where health disparities exist is an important strategy for increasing student cultural competence (Connors et al, 1996; Flannery & Ward, 1999; Holsapple, 2012) and motivation to serve the underserved (Ko et al, 2005; Huang, 2011).⁶ Exposure to underserved populations in these settings has been shown to have a positive impact on both student intentions *and* subsequent decisions to practice in high-needs communities (Verby, Newell & Andresen, 1991; Rabinowitz, Diamond, Markham & Paynter, 2001; Ko et al, 2005; Ko, Heslin, Edelstein & Grumbach, 2007; Sheu et al, 2012). These outcomes are consistent across the disciplines of medicine, nursing, and pharmacy (Sheu et al, 2012).

Service-learning experiences also improve student cultural competence, including their belief in the value of diversity, tolerance of difference, heightened multicultural awareness, empathy, compassion, and confrontation of stereotypes (Flannery & Ward, 1999; Clark et al, 2003; Holsapple, 2012). Other types of community-based learning experiences, for example, Community-Based Participatory Research (CBPR), may help both students and faculty develop a sense of ownership of community health issues and produce quality research outcomes that are informed by the needs of local patient populations (Israel et al., 1998). Universities and their health professions schools can work collaboratively with local community stakeholders to provide these learning opportunities for students.

⁶ It is also a required strategy for medical schools, as the Liaison Committee on Medical Education (LCME) revised its accreditation standards to include a new standard on service-learning in July 2008. The new standard requires medical schools to make sufficient opportunities for service-learning available to students, and to encourage and support student participation in those opportunities (Buckner et al, 2010).

Indicators and Measures

- 1. Undergraduate student participation in service learning**
 - a) Percent of undergraduate degree recipients who participated in a service learning course (as defined by the institution)
- 2. Health professions' student participation in community-based/service learning**
 - a) Percent of health professions degree recipients who participated in service learning courses, by health professions school
 - b) Percent of health professions degree recipients who engage in community-based activities
- 3. Campus organizations and partnerships that promote community-based/service learning**
 - a) Number of campus organizations offering community-based/service learning experiences for students

Goal 4: Graduate health professionals who will work with medically underserved populations and/or high-need specialties to improve access to care

Improving patient access to comprehensive and quality health care services is critical for achieving health equity (Bell et al, 2002; Smedley, Stith & Nelson, 2003). In order for health care to be truly accessible, every community should have a sufficient supply of health care providers in needed specialties (Cook et al, 2007). Our nation is experiencing a persistent shortage of primary medical, dental, and mental health providers (Wilson et al, 2009; Bodenheimer & Pham, 2010). These deficiencies are concentrated in Health Professional Shortage Areas (HPSAs) and Medically Underserved Areas (MUAs) (Sullivan Commission, 2004; HRSA, 2017), which are located in both rural and urban areas; these communities experience significantly poorer health outcomes (Dussault & Franceschini, 2006; Bodenheimer & Pham, 2010). Many shortage areas also lack a sufficient number of specialists (Cook et al, 2007). Finally, a decreasing number of providers are willing to accept Medicaid and other state-sponsored health insurance options (Cook et al, 2007; Hansen-Turnton, Ritter, & Torgan, 2008). To reduce these disparities, universities need to graduate health care professionals who are willing to care for low-income patients, and those living in underserved areas.

Health profession schools can influence the specialty choice and distribution of the future health care workforce in a number of ways. During the admissions process, health profession schools can recruit students with the backgrounds, qualities, and skills needed to provide care in underserved communities (Dussault & Franceschini, 2006; Grumbach & Mendoza, 2008; Bodenheimer & Pham, 2010). Strategies include the use of holistic review (Addams et al., 2010; Price & Grant-Mills, 2010; Wells et al., 2011; Witzburg and Sondheimer, 2013; Urban Universities for HEALTH, 2014) as well as specialized pathways (e.g., post-baccalaureate programs) (Roman, 2004; Grumbach & Chen, 2006). Universities and health profession schools can also influence student interest in working with the underserved through service-learning opportunities and clinical rotations in which they gain exposure to patients in low-income communities (Ko et al, 2007; Morris et al, 2008; Rabinowitz et al, 2000; Xu et al, 1997). Financial incentives such as scholarships, loan forgiveness, and support-for-service programs can motivate students to pursue high-needs specialties (e.g., primary care) and seek employment in underserved communities (Pathman et al, 2004; Bodenheimer, Berenson & Rudolf, 2007; Bärnighausen & Bloom, 2009; Phillips et al, 2013).

In addition, schools can directly impact the availability of care in underserved local areas by training and integrating non-traditional health care workers (e.g., community health workers) into the health care team. These workers, who come from high-needs communities themselves, are culturally competent and familiar with local health needs. (Andrews et al, 2004; APHA, 2009; Rosenthal et al, 2010). They can also reduce the workload for the professional workforce by taking

on tasks that do not need to be performed by a physician, nurse, dentist, or pharmacist (Jaskiewicz & Tulenko, 2012).

Workforce Strategy #14: Graduate health professionals who will work in local and/or high-need geographic areas

Rationale

- Graduating health professionals who go on to work in underserved communities is one indicator of progress toward a university's community health mission
- Tracking recent graduates and their locations of employment helps universities evaluate the success of their health workforce programs

Evidence Base

The health care workforce is maldistributed, and certain pockets of the country lack a sufficient number of primary care physicians, dentists, and mental health care professionals (Sullivan Commission, 2004; Dussault & Franceschini, 2006; Wilson et al., 2009; Bodenheimer & Pham, 2010; HRSA, 2017). To address these problems, universities are intervening at multiple transition points in the health professions pipeline to increase the number of graduates who will serve these communities. For universities with a mission to improve local community health, tracking the number of graduates who remain in the local area, and who practice in underserved neighborhoods, will help the university evaluate how well it is meeting that mission.

Indicators and Measures

- 1. Retention of health professions graduates within local communities**
 - a) Percent of practicing health professionals in the state who graduated from the institution
 - b) Percent of practicing health professionals in the local community who graduated from the institution
 - c) Percent of graduates who are retained within the state or local community
- 2. Graduates working in underserved areas**
 - a) Percent of graduates who work in primary care, mental health or dental Health Professions Shortage Areas (HPSAs)
 - b) Percent of health professions graduates who work in medically underserved areas (MUAs)
 - c) Percent of health professions graduates who work in areas of high poverty
- 3. National Health Service Corps participation**
 - a) Percent of incoming students who apply for the National Health Service Corps

- b) Number of graduates participating in the National Health Service Corps

Workforce Strategy #15: Align health professions admissions strategies with the school's mission

Rationale

- Health professions schools can improve access to care and health equity by admitting students with the backgrounds, qualities, and skills to meet community health needs.
- Using holistic review and developing targeted admissions pathways will help schools to better align their admissions practices to meet their mission.

Evidence Base

Schools can reduce disparities in access to care by recruiting, admitting, and graduating students with propensity to serve in the specialties and communities where they are most needed (Dussault & Franceschini, 2006; Grumbach & Mendoza, 2008; Bodenheimer & Pham, 2010; Urban Universities for HEALTH, 2014). Some health professions schools have begun to integrate holistic review into their admissions processes. Holistic review is an evidence-based practice that has been shown to increase diversity, while improving outcomes such as cooperation, community engagement, and openness to new perspectives (Addams et al., 2010; Price & Grant-Mills, 2010; Wells et al., 2011; Witzburg and Sondheimer, 2013; Urban Universities for HEALTH, 2014; Artinian et al, 2017). Through holistic review, schools evaluate an applicant's unique qualities and experiences alongside traditional achievement measures. For example, schools may assess characteristics such as: student diversity (broadly defined), plans to enter a high-needs specialty, experience with underserved populations, or interest in working with low-income and Medicaid populations. Many health profession schools have also developed special admissions pathways targeted to specific diversity and health equity goals. These may include combined BA/MD programs, post-baccalaureate programs linked to health professional school admission, urban/rural health programs, and accelerated BSN programs (Heller & Nichols, 2001; Roman, 2004; Grumbach & Chen, 2006).

Indicators and Measures

- 1. Under-represented racial and ethnic minority (URM) admissions success rate, by admissions pathway**
 - a) Percent of applicants who are under-represented racial and ethnic minority (URM), by admissions pathway
 - b) Percent of applicants offered admission who are under-represented racial and ethnic minority (URM), by admissions pathway

- c) Percent of applicants who accepted an offer of admission who are under-represented racial and ethnic minority (URM), by admissions pathway
 - d) Percent of applicants who enrolled who are under-represented racial and ethnic minority (URM), by admissions pathway
- 2. Admissions success rate for students from target communities, by admissions pathway**
- a) Percent of applicants who are from target communities, by admissions pathway
 - b) Percent of applicants offered admission who are from target communities, by admissions pathway
 - c) Percent of applicants who accepted an offer of admission who are from target communities, by admissions pathway
 - d) Percent of applicants who enrolled who are from target communities, by admissions pathway
- 3. Holistic review practices**
- a) Percent of health professions schools at the institution that state they are using a holistic admissions process
 - b) Number of holistic review practices in use, by health profession school

Workforce Strategy #16: Increase and sustain student interest in working with medically underserved populations

Rationale

- The education and training a student receives influences his/her interest in providing care to the underserved
- Health professions schools can influence student interest through scholarships, loan forgiveness programs, service-learning, and inclusion of health equity content in the curriculum.
- Monitoring student interests can help universities evaluate the effectiveness of programs designed to increase student interest in serving the underserved.

Evidence Base

Increasing and sustaining student interest in serving the underserved is essential to improving access to care in disadvantaged communities and reducing health disparities. Nearly one-third of all primary care physicians nationally refuse to accept new patients who expect to pay with Medicaid, and there are barriers to accessing specialty care by uninsured and Medicaid-insured populations (Hansen-Turnton, Ritter, & Torgan, 2008; Cook et al, 2007). Federally Qualified Health Centers (FQHCs), which primarily serve Medicaid-insured patients, have trouble recruiting and retaining health professionals to work at their clinics.

Health profession schools can influence student interests through financial incentives (e.g., scholarships, loan forgiveness), service-learning opportunities, health equity in the curriculum, and other programmatic interventions (Phillips et al, 2013). For example, collaborative partnerships with Community Health Centers (CHCs) and Family Medicine Residences (FMRs) have provided hands-on learning opportunities for students to work with underserved patients. Some evidence suggests that these partnerships produce physicians who go on to work in medically underserved areas and clinics (Ko et al., 2007; Morris et al. 2008; Rabinowitz et al, 2000; Xu et al., 1997). Monitoring student interest, intentions, and perceptions about working in underserved communities at various points in their education will not only help institutions measure the potential of the future workforce, but also assess the effectiveness of programmatic efforts to sustain student interest over time.

An example of a successful program is the joint University of California, Los Angeles/Charles R. Drew University Medical Education Program (UCLA/Drew), which increased both student intentions to provide care in underserved urban communities and graduates' decisions to practice and remain in those communities (Ko et al, 2005). A retrospective cohort study found that 53 percent of UCLA/Drew graduates are located in medically disadvantaged areas, in contrast to 26 percent of graduates of the traditional UCLA medical program (Ko, Heslin, Edelstein & Grumbach, 2007). Important lessons might also be gleaned from programs intended to increase the supply of rural primary care physicians (Lang et al, 2005; Smucny et al, 2005). The Physician Shortage Area Program (PSAP) at Jefferson Medical College and the University of Minnesota's Rural Physician Associate Program have leveraged curricular innovations to increase the number of graduates who go on to practice in high-needs communities (Verby, Newell & Andresen, 1991; Rabinowitz, Diamond, Markham & Paynter, 2001).

Indicators and Measures

1. Intent to work in medically underserved areas

- a) Percent of entering health professions students with an intent to practice in underserved urban or rural areas
- b) Percent of graduating health professions students with an intent to practice in underserved urban or rural areas

2. Intent to serve Medicaid and uninsured populations

- a) Percent of entering health professions students with an intent to serve Medicaid and uninsured populations
- b) Percent of graduating health professions students with an intent to serve Medicaid and uninsured populations

Workforce Strategy #17: Support education and training opportunities in medically underserved communities

Rationale

- Exposure to underserved populations increases student interest in serving those populations, as well as decisions to practice in high-needs communities
- Developing education and training opportunities in underserved communities takes concerted effort on behalf of universities
- Universities can monitor these investments – and the infrastructure that supports them – to ensure they are providing adequate opportunities for students to gain exposure to the underserved

Evidence Base

Exposure to medically underserved populations has a positive impact on student perception of those populations as well as their desire to work in disadvantaged communities after graduation (Ko et al., 2007; Morris et al. 2008; Rabinowitz et al, 2000; Xu et al., 1997). For example, medical residents who train in medically underserved areas are more likely to choose to work with similar populations after completion of their residencies, thereby improving workforce distribution and access to care (Griswold et al., 2006; Hershberger, Righter, Zryd, Little & Whitecar, 2008; Morris, Johnson, Kim, & Chen, 2008). Students who are exposed to healthcare delivery in underserved areas also have increased knowledge of the social determinants of health (Griswold et al., 2006). Monitoring the availability and quality of community-based clinical experiences (whether they are for course credit, or voluntary) will help institutions ensure adequate support for these important learning opportunities.

Indicators and Measures

1. Student training with medically underserved populations

- a) Percent of students who participate in clerkships/clinical rotations at sites with primary mission to care for underserved
- b) Number of required rotations at sites with primary mission to care for underserved

2. Clinical training sites/partnerships within medically underserved community

- a) Number of partnering community-based clinical placement sites with primary mission to care for underserved
- b) Number of community-based clinical placement sites located within urban or rural HPSAs

3. Student participation in medically underserved track or pathway

- a) Number of students who participate in designated tracks or pathways with focus on providing care to underserved areas

- b) Number of graduates from designated tracks or pathways who work in a HPSA or medically underserved areas (MUAs)

Workforce Strategy #18: Increase and sustain interest in primary care and high-needs specialties

Rationale

- Student perception about primary care and its value are influenced by their faculty, peers, and the educational environment.
- Valuing and promoting primary care will encourage more students to choose this pathway.
- Monitoring student interests can help universities evaluate the effectiveness of programs designed to increase student interest in primary care and other high-needs specialties.

Evidence Base

Our nation is facing a primary care crisis; by 2030, we may be short up to 43,100 primary care physicians (AAMC, 2017). These deficiencies are concentrated in Health Professional Shortage Areas (HPSAs) and Medically Underserved Areas (MUAs) (Sullivan Commission, 2004; HRSA, 2017), where health outcomes are poorer and disparities persist (Dussault & Franceschini, 2006; Bodenheimer & Pham, 2010). In addition to primary care, there are certain specialties with an insufficient number of professionals to meet demand, most notably psychiatry and general surgery (Cook et al, 2007; AAMC, 2016). The crisis may be ameliorated by the growing number of primary care nurse practitioners and physician assistants; however the health system will need to change in order to integrate these professionals most effectively (HRSA, 2013).

Health profession schools (and medical schools in particular) can be part of the solution. Promoting the benefits of primary care career pathways (e.g., building relationships with patients over time, playing a role in preventing disease, addressing health inequities) may help stimulate student interest, as will scholarships and other formal incentive programs. Adding more clinical rotations in community-based settings will increase students' exposure to primary care and other high-needs specialties (Xu et al., 1997; Rabinowitz et al, 2000; Ko et al., 2007; Morris et al. 2008). Most importantly, providing students with role models and mentors in primary care or other high-need specialties will help students see themselves in these roles, and contribute to positive perceptions about these fields (Erikson et al, 2013). Establishing measures that track student interests and career outcomes will help universities improve educational programs to better meet workforce needs.

Indicators and Measures

1. Student interest in primary care

- a) Percent of students indicating interest in pursuing primary care

2. Student interest in high-need specialties

- a) Percent of students indicating interest in pursuing high-need specialties

3. Graduates pursuing primary care

- a) Percent of medical graduates who pursue residencies in family medicine, internal medicine, or pediatrics
- b) Percent of health professions graduates practicing primary care, by health profession (i.e. physicians, nurse practitioners, physician assistants)

4. Graduates pursuing high-need specialties

- a) Percent of health professions graduates who pursue high-need specialties

Workforce Strategy #19: Train and integrate non-traditional health workers into clinical teams

Rationale

- Integrating non-traditional health workers into health care teams improves access to care and patient health outcomes.
- Educating and training these workers helps institutions meet their community health missions

Evidence Base

To improve access to care in local communities, universities may consider supplementing their core health professions programs with efforts to train non-traditional health care professionals to augment the health care team. Non-traditional health care professionals can include Community Health Workers (CHWs), Peer Wellness Specialists, Personal Health Navigators, Dental Therapists, and others (Angus, Cheney, Clark, Gilmer, & Wang, 2012). These professionals are often fully embedded in the community and possess deep knowledge of the community's needs (Andrews et al, 2004; APHA, 2009; Rosenthal et al, 2010).

For example, CHWs promote healthy behaviors among residents of underserved communities, help coordinate patient care, and provide contextual data about patient attitudes, behavior, and environment that can inform development of an effective care plan (Patient Protection and Affordable Care Act of 2010, 2012; CDC, 2016; Martinez, Ro, Villa, Powell & Knickman, 2011; Rosenthal et al., 2010). Clinical teams that incorporate CHWs have been associated with improved access to care and better health outcomes (Braun et al., 2013; Perry, Zulliger & Rogers, 2014). Monitoring university efforts to train and integrate non-traditional health workers will help institutions with a mission to improve community health bridge gaps in access to care for underserved populations.

Indicators and Measures

1. Training of community health workers

- a) Number of community health workers (CHWs) trained at the university (i.e., have earned credits through formal educational programs), by academic year
- b) Number of peer wellness specialists trained at the university (i.e., have earned credits through formal educational programs), by academic year
- c) Number of patient navigators trained at the university (i.e., have earned credits through formal educational programs), by academic year

2. Integration of community health workers in care teams

- a) Number of clinical training sites that have integrated community health workers into their care model
- b) Percentage of students who worked directly with community health workers in clinical training/rotations

Reference List

- Addams, A. N., Bletzinger, R. B., Sondheimer, H. M., White, S. E., & Johnson, L. M. (2010). *Roadmap to diversity: Integrating holistic review practices into medical school admission processes*. Washington, DC: American Association of Medical Colleges
- Aguirre, A., & Martinez, R. (2002). Leadership practices and diversity in higher education: Transitional and transformational frameworks. *Journal of Leadership Studies, 8*, 53-62.
- Allan, J., Barwick, T. A., Cashman, S., Cawley, J. F., Day, C., Douglass, C. W., ... Wood, D. (2004). Clinical prevention and population health. *American Journal of Preventive Medicine, 27*(5), 471–476. doi:10.1016/j.amepre.2004.08.010
- American Association of Colleges of Nursing. (2015). *Policy Brief: The Changing Landscape: Nursing Student Diversity on the Rise*. Accessed 1 February 2017: <http://www.aacn.nche.edu/government-affairs/Student-Diversity-FS.pdf>
- American Public Health Association. (2009). *Support for community health workers to increase health access and to reduce health inequities*. Washington, DC: <http://www.apha.org/advocacy/policy/policysearch/default.htm?id=1393>
- Association of American Medical Colleges. (2016). *The Complexities of Physician Supply and Demand: Projections from 2014 to 2025*. https://www.aamc.org/download/458082/data/2016_complexities_of_supply_and_demand_projections.pdf
- Andrews, J.O., Felton, G., Wewers, M.E. & Heath, J. (2004). Use of community health workers in research with ethnic minority women. *Journal of Nursing Scholarship, 36*(4): 358-365.
- Angus, L., Cheney, C., Clark, S., Gilmer, R., & Wang, E. (2012). *The role of non-traditional health workers in Oregon's health care system*. Salem, OR: Oregon Health Policy Board. http://chwcentral.org/sites/default/files/Oregon%20Health%20Authority_Role%20of%20non-traditional%20health%20workers.pdf
- Antoine, K.L. (2017). Message from the Assistant Vice President. *SUNY Downstate Medical Center*. Accessed 1 February 2017 <http://www.downstate.edu/diversity/message.html>
- Arora, V., Schneider, B., Thal, R., & Meltzer, D. (2011). Design of an Intervention to Promote Entry of Minority Youth into Clinical Research Careers by Aligning Ambition: The TEACH (Training Early Achievers for Careers in Health) Research Program. *Journal of Social Issues, 67*(3), 580–598. doi:10.1111/j.1540-4560.2011.01715.x
- Artinian, N., Drees, B., Glazer, G., Harris, K., Kaufman, L., Lopez, N. Danek, J.C., Michaels, J. (In press, 2017). Holistic admissions in the health professions: strategies for leaders. *College & University*.
- Association of American Medical Colleges. (2008). Diversity of US Medical Students by Parental Income. *Analysis in Brief, 8*(1). <https://www.aamc.org/download/102338/data/aibvol8no1.pdf>

- Association of American Medical Colleges [AAMC] (2013). *Assessing Institutional Culture and Climate: Webcast Supplemental Guide*. Retrieved from <https://www.aamc.org/download/335956/data/cultureclimatewebcastguide.pdf>
- Astin, A. W. (1993). Diversity and multiculturalism on campus: How are students affected? *Change*, 25(2), 44-49.
- Aud, S., Fox, M., and KewalRamani, A. (2010). Status and Trends in the Education of Racial and Ethnic Groups. (NCES 2010-015). *U.S. Department of Education, National Center for Education Statistics*. Washington, DC: U.S. Government Printing Office. <https://nces.ed.gov/pubs2010/2010015.pdf>.
- Aud, S., Hussar, W., Kena, G., Bianco, K., Frohlich, L., Kemp, J., ... Hannes, G. (2011). The condition of education 2011. *US Department of Education, National Center for Education Statistics*. <https://nces.ed.gov/pubs2011/2011033.pdf>
- Baker, D. W. (1996). Use and effectiveness of interpreters in an emergency department. *Journal of the American Medical Association*, 275(10), 783-788. doi:10.1001/jama.275.10.783
- Baldwin, A., & Agho, A. O. (2003). Student recruitment in allied health educational programs: The importance of initial source of contact. *Journal of Allied Health*, 32, 65-70.
- Balemian, K., & Feng, J. (2013). *First generation students: College aspirations, preparedness, and challenges*. Presented at the College Board AP Annual Conference, Las Vegas, NV <https://research.collegeboard.org/sites/default/files/publications/2013/8/presentation-apac-2013-first-generation-college-aspirations-preparedness-challenges.pdf>
- Balzora, S., Abiri, B., Wang, X. J., McKeever, J., Poles, M., Zabar, S., ... Weinshel, E. (2015). Assessing cultural competency skills in gastroenterology fellowship training. *World Journal of Gastroenterology*, 21(6), 1887-1892. DOI: 10.3748/wjg.v21.i6.1887
- Bärnighausen, T., & Bloom, D. E. (2009). Financial incentives for return of service in underserved areas: a systematic review. *BMC Health Services Research*, 9(1). doi:10.1186/1472-6963-9-86
- Beach, M.C., Price, E.G., Gary, T.L., Robinson, K., Gozu, A., Palacio, A., Smarth, C., Jenckes, M., Feuerstein, C., Bass, E.B., Powe, N.R., & Cooper, L.A. (2005). Cultural competence: A systematic review of health care provider educational interventions. *Medical Care*, 43: 356-373. 10.1097/01.mlr.0000156861.58905.96.
- Bell, J.D., Bell, J., Colmenar, R., Flournoy, R., McGehee, M., Rubin, V...Vasquez, V.B. (2002). *Reducing Health Disparities through a Focus on Communities*. Washington, DC: PolicyLink. https://www.policylink.org/sites/default/files/REDUCINGHEALTHDISPARITIES_FINAL.PDF
- Bernal, H. & Froman, R. (1987). Influences on the Cultural Self-Efficacy of Community Health Nurses. *Journal of Trans-cultural Nursing*, 4(2), 24-31.
- Betancourt, J. R. (2003). Defining Cultural Competence: A Practical Framework for Addressing Racial/Ethnic Disparities in Health and Health Care. *Public Health Reports*, 118(4), 293-302. doi:10.1093/phr/118.4.293
- Blustein, D. L., Murphy, K. A., Kenny, M. E., Jernigan, M., Pérez-Gualdrón, L., Castañeda, T., ... Davis, O. (2010). Exploring urban students' constructions about school, work, race, and ethnicity. *Journal of Counseling Psychology*, 57(2), 248-254. doi:10.1037/a0018939

- Bodenheimer, T., Berenson, R.A., & Rudolf, P. (2007). The Primary Care–Specialty Income Gap: Why It Matters. *Annals of Internal Medicine*, 146: 301-306. doi: 10.7326/0003-4819-146-4-200702200-0001
- Bodenheimer, T., & Pham, H. H. (2010). Primary Care: Current Problems And Proposed Solutions. *Health Affairs*, 29(5), 799–805. doi:10.1377/hlthaff.2010.0026
- Braun, R., Catalani, C., Wimbush, J., Israelski, D. (2013) Community Health Workers and Mobile Technology: A Systematic Review of the Literature. *PLOS ONE* 8(6): e65772. doi: 10.1371/journal.pone.0065772
- Braveman, P., Egerter, S., & Williams, D. R. (2011). The Social Determinants of Health: Coming of Age. *Annual Review of Public Health*, 32(1), 381–398. doi:10.1146/annurev-publhealth-031210-101218
- Brooks, D.L. (2014). *Underrepresented minorities and social cognitive career theory: an investigation of the effectiveness of increasing math and science interest and self-efficacy in the context of a healthcare career intervention with rural Latino and White-identified middle school students*. PhD (Doctor of Philosophy) thesis, University of Iowa. <http://ir.uiowa.edu/etd/4583>.
- Buckner, A. V., Ndjakani, Y. D., Banks, B., & Blumenthal, D. S. (2010). Using Service-Learning to Teach Community Health: The Morehouse School of Medicine Community Health Course. *Academic Medicine*, 85(10), 1645–1651. <http://doi.org/10.1097/ACM.0b013e3181f08348>
- Campos-Outcalt, D., Senf, J., Pugno, P.A., McGaha, A.L. (2007). Family medicine specialty selection: a proposed research agenda. *Family Medicine*, 39(8): 585-589.
- Carey, K. (2008). Graduation rate watch: Making minority student success a priority. *Education Sector*.
- Carline, J. D., & Patterson, D. G. (2003). Characteristics of Health Professions Schools, Public School Systems, and Community-based Organizations in Successful Partnerships to Increase the Numbers of Underrepresented Minority Students Entering Health Professions Education. *Academic Medicine*, 78(5), 467–482. doi:10.1097/00001888-200305000-00008
- Carnevale, A. P., & Fry, R. (2000). *Crossing the great divide: can we achieve equity when Generation Y goes to college?* Princeton, NJ: Educational Testing Service.
- Carter-Pokras, O., O'Neill, M.J., Cheanvechai, V., Menis, M., Fan, T., & Solera, A. (2004). Providing Linguistically Appropriate Services to Persons with Limited English Proficiency: A Needs and Resources Investigation. *American Journal of Managed Care*, 10: 29-36.
- Carnes, M., Devine, P. G., Manwell, L. B., Byars-Winston, A., Fine, E., Ford, C. E., . . . Sheridan, J. (2015). The Effect of an Intervention to Break the Gender Bias Habit for Faculty at One Institution. *Academic Medicine*, 90(2), 221-230. doi:10.1097/acm.0000000000000552
- Center of Excellence for Cultural Competence. (2010). *Cultural Competence Assessment Tools*. New York, NY. <http://www.dbhds.virginia.gov/library/cultural%20and%20linguistic%20competence/language%20access/assessments%20and%20checklists/ny%20center%20for%20excellence%20clc%20assessment%20tools.pdf>

- Centers for Disease Control. (2013). National Ambulatory Medical Care Survey: 2013 State and National Summary Tables. Atlanta, GA: US Department of Health and Human Services. https://www.cdc.gov/nchs/data/ahcd/namcs_summary/2013_namcs_web_tables.pdf
- Centers for Disease Control. (2016). Collaborating with Community Health Workers to Enhance the Coordination of Care and Advance Health Equity. Atlanta, GA: US Department of Health and Human Services. <https://www.cdc.gov/nccdphp/dch/pdfs/dch-chw-issue-brief.pdf>
- Chamberlain, L. J., Wang, N. E., Ho, E. T., Banchoff, A. W., Braddock, C. H., & Gesundheit, N. (2008). Integrating Collaborative Population Health Projects into a Medical Student Curriculum at Stanford. *Academic Medicine*, 83(4), 338–344. doi:10.1097/acm.0b013e318166a11b
- Chang, M. J. (1999). Does diversity matter? The educational impact of a racially diverse undergraduate population. *Journal of College Student Development*, 40, 377-395.
- Chang, M. J., Sharkness, J., Hurtado, S., & Newman, C. B. (2014). What matters in college for retaining aspiring scientists and engineers from underrepresented racial groups. *Journal of Research in Science Teaching*, 51(5), 555–580. doi:10.1002/tea.21146
- Civil Rights Act of 1964, 42 U.S.C. §§ 2000d et seq. (2012)
- Clark, D.L., Melillo, A., Wallace, D., Pierrel, S., Buck, D.S. (2003). A multidisciplinary, learner-centered, student-run clinic for the homeless. *Family Medicine*, 35(6):394-397.
- Clegg, B. A., Mckernan, B., Martey, R. M., Taylor, S. M., Stromer-Galley, J., Kenski, K., . . . Strzalkowski, T. (2015). Effective Mitigation of Anchoring Bias, Projection Bias, and Representativeness Bias from Serious Game-based Training. *Procedia Manufacturing*, 3, 1558-1565. doi:10.1016/j.promfg.2015.07.438
- Cohen, J.J., Gabriel, B.A., & Terrell, C. (2002). The case for diversity in the health care workforce. *Health Affairs*, 21(5): 90-102.
- Commission on Social Determinants of Health (2008). *Closing the gap in a generation: health equity through action on the social determinants of health*. Final Report of the Commission on Social Determinants of Health. Geneva, World Health Organization. http://apps.who.int/iris/bitstream/10665/43943/1/9789241563703_eng.pdf.
- Connors, K., Seifer, S., Sebastian, J., Cora-Bramble, D. & Hart, R. (1996). Interdisciplinary collaboration in service-learning: lessons from the health professions. *Michigan Journal of Community Service Learning*, 3(1).
- Cook, N.L., Hicks, L.S., O'Malley, A.J., Keegan, T., Guadagnoli, E. & Landon, B.E. (2007). Access to Specialty Care and Medical Services In Community Health Centers. *Health Affairs*, 26(5): 1459-1468.
- Corbie-Smith, G., Thomas, S. B., & St George, D. M. (2002). Distrust, Race, and Research. *Archives of Internal Medicine*, 162(21), 2458-2463. doi:10.1001/archinte.162.21.2458
- Crandall, S. J., George, G., Marion, G. S., & Davis, S. (2003). Applying Theory to the Design of Cultural Competency Training for Medical Students. *Academic Medicine*, 78(6), 588–594. doi:10.1097/00001888-200306000-00007

- Diamond, L. C., Luft, H. S., Chung, S., & Jacobs, E. A. (2012). "Does This Doctor Speak My Language?" Improving the Characterization of Physician Non-English Language Skills. *Health Services Research, 47*(1 Pt 2), 556–569. <http://doi.org/10.1111/j.1475-6773.2011.01338.x>
- Drain, P. K., Primack, A., Hunt, D. D., Fawzi, W. W., Holmes, K. K., & Gardner, P. (2007). Global Health in Medical Education: A Call for More Training and Opportunities. *Academic Medicine, 82*(3), 226–230. doi:10.1097/acm.0b013e3180305cf9
- Duguid, M. M., & Thomas-Hunt, M. C. (2015). Condoning stereotyping? How awareness of stereotyping prevalence impacts expression of stereotypes. *Journal of Applied Psychology, 100*(2), 343–359. doi:10.1037/a0037908
- Dussault, G., & Franceschini, M. C. (2006). Not enough there, too many here: understanding geographical imbalances in the distribution of the health workforce. *Human Resources for Health, 4*, 12. <http://doi.org/10.1186/1478-4491-4-12>
- Eagan, K., Stolzenberg, E.B., Ramirez, J.J., Aragon, M.C., Suchard, M.R., & Hurtado, S. (2014). *The American Freshman: National Norms Fall 2014*. Los Angeles, CA: Cooperative Institutional Research Program at the Higher Education Research Institute. <https://www.heri.ucla.edu/monographs/TheAmericanFreshman2014-Expanded.pdf>
- Eamranond, P. P., Davis, R. B., Phillips, R. S., & Wee, C. C. (2009). Patient-Physician Language Concordance and Lifestyle Counseling Among Spanish-Speaking Patients. *Journal of Immigrant and Minority Health, 11*(6), 494–498. doi:10.1007/s10903-008-9222-7
- Easterly, D.M. & Ricard, C.S. (2011). Conscious Efforts to End Unconscious Bias: Why Women Leave Academic Research. *Journal of Research Administration, 42*(1): 61-73.
- Echeverri, M., Brookover, C., & Kennedy, K. (2013). Assessing Pharmacy Students' Self-Perception of Cultural Competence. *Journal of Health Care for the Poor and Underserved, 24*(1 0), 64–92. <http://doi.org/10.1353/hpu.2013.0041>
- Edelstein, B. L. (2011). Examining Whether Dental Therapists Constitute a Disruptive Innovation in US Dentistry. *American Journal of Public Health, 101*(10), 1831–1835. <http://doi.org/10.2105/AJPH.2011.300235>
- Edwards, J. C., Maldonado Jr, F. G., & Engelgau, G. R. (2000). Beyond affirmative action: One school's experiences with a race-neutral admission process. *Academic Medicine, 75*(8), 806-815.
- Engberg, M. E. (2004). Improving Intergroup Relations in Higher Education: A Critical Examination of the Influence of Educational Interventions on Racial Bias. *Review of Educational Research, 74*(4), 473–524. doi:10.3102/00346543074004473
- Erikson, C. E., Danish, S., Jones, K. C., Sandberg, S. F., & Carle, A. C. (2013). The Role of Medical School Culture in Primary Care Career Choice. *Academic Medicine, 88*(12), 1919–1926. doi:10.1097/acm.0000000000000038
- Eyler, J. & Giles, D. (1999). *Where's the learning in service-learning?* San Francisco: Jossey-Bass.
- Ferguson, W. J., & Candib, L. M. (2002). Culture, language, and the doctor-patient relationship. *FMCH Publications and Presentations, 61*.

- Fernandez, A., Schillinger, D., Grumbach, K., Rosenthal, A., Stewart, A. L., Wang, F., & Pérez-Stable, E. J. (2004). Physician language ability and cultural competence. *Journal of General Internal Medicine*, *19*(2), 167–174. doi:10.1111/j.1525-1497.2004.30266.x
- Flannery, D. & Ward, K. (1999). Service learning: A vehicle for developing cultural competence in health education. *American Journal of Health Behavior*, *23*(5), 323-331.
- Flowers, L.A. & Moore, J.L. (2008). Unraveling the composition of academic leadership in higher education: exploring administrative diversity at 2-year and 4-year institutions. *Journal of Thought*, *43*(34): 71-81.
- Ford, J. G., Howerton, M. W., Lai, G. Y., Gary, T. L., Bolen, S., Gibbons, M. C., . . . Bass, E. B. (2008). Barriers to recruiting underrepresented populations to cancer clinical trials: A systematic review. *Cancer*, *112*(2), 228-42. doi:10.1002/cncr.23157.
- Fouad, N. A., & Smith, P. L. (1996). A test of a social cognitive model for middle school students: Math and science. *Journal of Counseling Psychology*, *43*(3), 338–346. doi:10.1037/0022-0167.43.3.338
- Ganyaupfu, E.M. (2013). Teaching methods and students' academic performance. *International Journal of Humanities and Social Science Invention*, *2*(9): 29-35.
- Godkin, M.A. & Savageau, J.A. (2001). The effect of a global multiculturalism track on cultural competence of preclinical medical students. *Family Medicine*, *33*(3): 178-186.
- Goldrick-Rab, S., & Han, S. W. (2011). Accounting for Socioeconomic Differences in Delaying the Transition to College. *Review of Higher Education*, *34*(3), 423–445. doi:10.1353/rhe.2011.0013
- Gonzalez-Barrera, A. & Lopez, M.H. (13 August 2013). *Spanish is the most spoken non-English language in U.S. homes, even among non-Hispanics*. Washington, DC: Pew Research Center.
- Goode, T.D., Dunne, M.C., & Bronheim, S.M. (2006). *The Evidence Base for Cultural and Linguistic Competency in Health Care*. Washington, DC: The Commonwealth Fund.
<http://www.commonwealthfund.org/publications/fund-reports/2006/oct/the-evidence-base-for-cultural-and-linguistic-competency-in-health-care>
- Gordon, M. (18 September 2014). Why I'm Becoming a Primary Care Doctor. *The Atlantic*.
<https://www.theatlantic.com/health/archive/2014/09/why-im-becoming-a-primary-care-doctor/379231/>
- Gozu, A., Beach, M. C., Price, E. G., Gary, T. L., Robinson, K., Palacio, A., ... Cooper, L. A. (2007). Self-Administered Instruments to Measure Cultural Competence of Health Professionals: A Systematic Review. *Teaching and Learning in Medicine*, *19*(2), 180–190. doi:10.1080/10401330701333654
- Grant, J.M., Mottet, L.A., Tanis, J. (2010). National Transgender Discrimination Survey Report on health and health care. Washington, DC: National Center for Transgender Equality.
http://www.thetaskforce.org/static_html/downloads/resources_and_tools/ntds_report_on_health.pdf
- Green, A. R., Ngo-Metzger, Q., Legedza, A. T. R., Massagli, M. P., Phillips, R. S., & Iezzoni, L. I. (2005). Interpreter services, language concordance, and health care quality. *Journal of General Internal Medicine*, *20*(11), 1050–1056. doi:10.1111/j.1525-1497.2005.0223.x

- Gregorczyk, S.M. & Bailit, H.L. (2008). Assessing the cultural competency of dental students and residents. *Journal of Dental Education*, 72(10): 1122-1127.
- Griswold, K., Kernan, J. B., Servoss, T. J., Saad, F. G., Wagner, C. M., & Zayas, L. E. (2006). Refugees and medical student training: results of a programme in primary care. *Medical Education*, 40(7), 697-703. doi:10.1111/j.1365-2929.2006.02514.x
- Grumbach, K., Coffman, J., Muñoz, C., Rosenoff, E., Gándara, P., Sepulveda, E. (2002). *Strategies for Improving the Diversity of the Health Professions*. University of California, San Francisco: Center for California Health Workforce Studies.
- Grumbach, K. & Chen, E. (2006). Effectiveness of University of California Postbaccalaureate Premedical Programs in Increasing Medical School Matriculation for Minority and Disadvantaged Students. *Journal of the American Medical Association*, 296(9):1079-1085. doi:10.1001/jama.296.9.1079
- Grumbach, K. & Mendoza, R. (2008). Disparities in human resources: addressing the lack of diversity in the health professions. *Health Affairs*, 27(2): 413-422. doi: 10.1377/hlthaff.27.2.413
- Gurin, P., Dey, E. L., Hurtado, S., & Gurin, G. (2002). Diversity and higher education: Theory and impact on educational outcomes. *Harvard Educational Review*, 72(3), 330-367.
- Hansen-Turton, T., Ritter, A. & Torgan, R. (2008). Insurers' Contracting Policies on Nurse Practitioners as Primary Care Providers. *Policy, Politics & Nursing Practice*, 9(4): 241-248.
- Harackiewicz, J. M., Canning, E. A., Tibbetts, Y., Giffen, C. J., Blair, S. S., Rouse, D. I., & Hyde, J. S. (2014). Closing the social class achievement gap for first-generation students in undergraduate biology. *Journal of Educational Psychology*, 106(2), 375-389. doi:10.1037/a0034679
- Health Resources and Services Administration. (2006). *The Rationale for Diversity in the Health Professions: A Review of the Evidence*. Washington, DC: US Department of Health and Human Services.
- Health Resources and Services Administration. (2013). *Projecting the Supply and Demand for Primary Care Practitioners through 2020*. <https://bhwh.hrsa.gov/sites/default/files/bhwh/nchwa/projectingprimarycare.pdf>
- Health Resources and Services Administration [HRSA]. (2017). *Shortage Designation*. Accessed 8 February, 2017, at <https://bhwh.hrsa.gov/shortage-designation>
- Heller, B. & Nichols, M.A. (2001). Workforce development in nursing: priming the pipeline. *Nursing and Health Care Perspectives*, 22(2).
- Herrero-Hahn, R., Rojas, J. G., Ospina-Díaz, J. M., Montoya-Juárez, R., Restrepo-Medrano, J. C., & Hueso-Montoro, C. (2017). Cultural Adaptation and Validation of the Cultural Self-Efficacy Scale for Colombian Nursing Professionals. *Journal of Transcultural Nursing*, 28(2), 195-202. doi:10.1177/1043659615613419
- Herring, C. (2009). Does Diversity Pay?: Race, Gender, and the Business Case for Diversity. *American Sociological Review*, 74(2), 208-224. doi:10.1177/000312240907400203
- Paul J. Hershberger, Elisabeth L. Righter, Teresa W. Zryd, David R. Little, & Philip S. Whitecar. (2008). Implementation of a Process-Oriented Cultural Proficiency Curriculum. *Journal of Health Care for the Poor and Underserved*, 19(2), 478-483. doi:10.1353/hpu.0.0005

- Herzog, S. (2005). Measuring determinants of student return vs. dropout/stopout vs. transfer: A first-to-second year analysis of new freshmen. *Research in Higher Education, 46*(8), 883-928
- Hillman, N., & Taylor, W. (2016). *Education Deserts: The Continued Significance of "Place" in the Twenty-First Century. Viewpoints: Voices from the Field*. Washington, DC: American Council on Education. <http://www.acenet.edu/news-room/Documents/Education-Deserts-The-Continued-Significance-of-Place-in-the-Twenty-First-Century.pdf>.
- Holsapple, M.A. (2012). Service-Learning and Student Diversity Outcomes: Existing Evidence and Directions for Future Research. *Michigan Journal of Community Service Learning, Spring 2012*: 5-18.
- Holyfield, L.J. & Miller, B.H. (2013). A tool for assessing cultural competence training in dental education. *Journal of Dental Education, 77*(8): 990-997.
- Hong, L., & Page, S. E. (2004). Groups of diverse problem solvers can outperform groups of high-ability problem solvers. *Proceedings of the National Academy of Sciences, 101*(46), 16385–16389. doi:10.1073/pnas.0403723101
- Hu, S., & John, E. P. S. (2001). Student persistence in a public higher education system: Understanding racial and ethnic differences. *Journal of Higher Education, 72*(3), 265-286.
- Huang, W.Y. (2011). Learning to Care for the Underserved—Making the Most of Opportunities in Medical School. *Virtual Mentor, 13*(8): 544-549.
- Huber, B. J. (2010). Does Participation in Multiple High Impact Practices Affect Student Success at Cal State Northridge?: Some Preliminary Insights. *Office of Institutional Research, California State University Northridge*. <http://www.calstate.edu/engage/documents/multihpoverviewfinal.pdf>
- Hunt, V., Layton, D., & Prince, S. (2015). *Why diversity matters*. Retrieved from <http://www.mckinsey.com/business-functions/organization/our-insights/why-diversity-matters>
- Hurtado, S., Inkelas, K.K., Briggs, C., & Rhee, B. (1997). Differences in college access and choice among racial/ethnic groups: identifying continuing barriers." *Research in Higher Education, 38* (1): 43–75.
- Hurtado, S., Clayton-Pedersen, A. R., Allen, W. R., & Milem, J. F. (1998). Enhancing Campus Climates for Racial/Ethnic Diversity: Educational Policy and Practice. *The Review of Higher Education, 21*(3), 279–302. doi:10.1353/rhe.1998.0003
- Institute of Medicine (2011a). *The Health of Lesbian, Gay, Bisexual, and Transgender People: Building a Foundation for a Better Understanding*. Washington, DC: The National Academies Press.
- Institute of Medicine (2011b). *The Future of Nursing: Leading Change, Advancing Health*. Washington, DC: The National Academies Press.
- Institute of Medicine. (2014). *Graduate medical education that meets the nation's health needs*. Washington, DC: The National Academies Press.
- Israel, B.A, Schulz, A.J., Parker, E.A., & Becker, A.B. (1998). Review of community-based research: Assessing partnership approaches to improve public health. *Annual Review of Public Health, 19*, 173-202.

- Jackson, J.F.L. (2000). Administrators of color at predominately White institutions. In L. Jones (Ed.), *Brothers of the academy: Up and coming African-Americans earning our way in higher education* (pp. 42-52). Sterling, VA: Stylus.
- Jacobs, E. A., Sadowski, L. S., & Rathouz, P. J. (2007). The Impact of an Enhanced Interpreter Service Intervention on Hospital Costs and Patient Satisfaction. *Journal of General Internal Medicine*, 22(S2), 306–311. doi:10.1007/s11606-007-0357-3
- Jaskiewicz, W., & Tulenko, K. (2012). Increasing community health worker productivity and effectiveness: a review of the influence of the work environment. *Human Resources for Health*, 10(1). doi:10.1186/1478-4491-10-38
- Johnson, R. C. (2011). *Long-run impacts of school desegregation & school quality on adult attainments*. Cambridge, Massachusetts: Working Paper 16664. Cambridge, MA. National Bureau of Economic Research.
- Johnson, R. C. (2012). *The impact of parental wealth on college enrollment & degree attainment: Evidence from the housing boom & bust*. Working Paper, 2012. University of California Berkeley: Goldman School of Public Policy. Retrieved from http://socrates.berkeley.edu/~ruckerj/RJabstract_ParentalWealth_KidCollege_12-11.pdf.
- Kaufman, J. E., & Rosenbaum, J. E. (1992). The Education and Employment of Low-Income Black Youth in White Suburbs. *Educational Evaluation and Policy Analysis*, 14, 229-240. DOI: 10.3102/01623737014003229
- Keen-Rhinehart, E., Bolt-Michewicz, J., Black, J. (2014). Model students in foundation science courses improves retention and performance in undergraduate STEM programs. *FASEB Journal*, 28(1): 531.21.
- Kerkering, K. W., & Novick, L. F. (2008). An Enhancement Strategy for Integration of Population Health into Medical School Education: Employing the Framework Developed by the Healthy People Curriculum Task Force. *Academic Medicine*, 83(4), 345–351. doi:10.1097/acm.0b013e318166a9ec
- Kelly, N.R., Shoemaker, M., Steele, T. (1996). The Experience of Being a Male Student Nurse. *Journal of Nursing Education*, 35(4): 170-174.
- Kelly, P.J. (2013). *Addressing Cultural Competency Through Service-Learning*. PAEA Annual Education Forum 2013 Spotlight Presentation #1090.
- Kinder, G., Cashman, S. B., Seifer, S. D., Inouye, A., & Hagopian, A. (2000). Integrating Healthy Communities concepts into health professions training. *Public Health Reports*, 115(2-3), 266–270.
- Kirch, D. G. (2012). Transforming admissions: The gateway to medicine. *Journal of the American Medical Association*, 308(21), 2250-2251
- Ko, M., Edelstein, R. A., Heslin, K. C., Rajagopalan, S., Wilkerson, L., Colburn, L., & Grumbach, K. (2005). Impact of the University of California, Los Angeles/Charles R. Drew University Medical Education Program on Medical Students??? Intentions to Practice in Underserved Areas. *Academic Medicine*, 80(9), 803–808. doi:10.1097/00001888-200509000-00004

- Ko, M., Heslin, K. C., Edelstein, R. A., & Grumbach, K. (2007). The Role of Medical Education in Reducing Health Care Disparities: The First Ten Years of the UCLA/Drew Medical Education Program. *Journal of General Internal Medicine, 22*(5), 625–631. doi: 10.1007/s11606-007-0154-z
- Kohn, M. G., Manski, C.F., & Mundel, D.S. (1976). An empirical investigation of factors which influence college-going behavior. In *Annals of Economic and Social Measurement, 5*(4): 391-419. Cambridge, MA: National Bureau of Economic Research.
- Komaromy, M., Grumbach, K., Drake, M., Vranizan, K., Lurie, N., Keane, D., & Bindman, A. B. (1996). The role of black and Hispanic physicians in providing health care for underserved populations. *New England Journal of Medicine, 334*(20), 1305-1310.
- Kornhaber, M.L., Griffith, K., & Tyler, A. (2014). It's not education by zip code anymore – but what is it? Conceptions of equity under the Common Core. *Education Policy Analysis Archives, 22* (4). <http://dx.doi.org/10.14507/epaa.v22n4.2014>
- Krahn, G. L., Walker, D. K., & Correa-De-Araujo, R. (2015). Persons With Disabilities as an Unrecognized Health Disparity Population. *American Journal of Public Health, 105*(S2), S198–S206. doi:10.2105/ajph.2014.302182
- Kuh, G. (2008). *High-Impact Educational Practices*. Washington, DC: Association of American Colleges and Universities.
- Kuh, G., & O'Donnell, K. (2013). *Ensuring Quality & Taking High-Impact Practices to Scale*. Washington, DC: Association of American Colleges and Universities.
- Kulik, C. T., & Roberson, L. (2008). Common Goals and Golden Opportunities: Evaluations of Diversity Education in Academic and Organizational Settings. *Academy of Management Learning & Education, 7*(3), 309–331. doi:10.5465/amle.2008.34251670
- Lang, F., Ferguson, K.P., Bennard, B., Zahorik, P., Sliger, C. (2005). The Appalachian Preceptorship: over two decades of an integrated clinical-classroom experience of rural medicine and Appalachian culture. *Academic Medicine, 80*(8):717-723.
- Lau L. K. (2003). Institutional factors affecting student retention. *Education, 124*, 126–136.
- Lent, R. W., & Brown, S. D. (1996). Social Cognitive Approach to Career Development: An Overview. *The Career Development Quarterly, 44*(4), 310–321. doi:10.1002/j.2161-0045.1996.tb00448.x
- Lent, R. W., Hackett, G., & Brown, S. D. (1999). A Social Cognitive View of School-to-Work Transition. *The Career Development Quarterly, 47*(4), 297–311. doi:10.1002/j.2161-0045.1999.tb00739.x
- Lie, D. A., Lee-Rey, E., Gomez, A., Bereknyei, S., & Braddock, C. H. (2010). Does Cultural Competency Training of Health Professionals Improve Patient Outcomes? A Systematic Review and Proposed Algorithm for Future Research. *Journal of General Internal Medicine, 26*(3), 317–325. doi:10.1007/s11606-010-1529-0
- Lipson, J. G., & Desantis, L. A. (2007). Current Approaches to Integrating Elements of Cultural Competence in Nursing Education. *Journal of Transcultural Nursing, 18*(1 suppl), 10S–20S. doi:10.1177/1043659606295498

- Lohfink, M., & Paulsen, M. B. (2005). Comparing the Determinants of Persistence for First-Generation and Continuing-Generation Students. *Journal of College Student Development, 46*(4), 409–428. doi:10.1353/csd.2005.0040
- Maeshiro, R. (2008). Responding to the Challenge: Population Health Education for Physicians. *Academic Medicine, 83*(4), 319–320. doi:10.1097/acm.0b013e318166ae9f
- Malcom, S., & Feder, M. (2016). *Barriers and Opportunities for 2-Year and 4-Year STEM Degrees: Systemic Change to Support Students' Diverse Pathways*. Washington, DC: National Academies Press.
- Manetta, A., Boker, J., Rea, J., Stephens, F., & Koehring, N. (2007). A Study of the Physician Workforce Supply for the Latino Population in California. *Academic Medicine, 82*(2), 127–132. doi:10.1097/acm.0b013e31802d8798
- Manson, A. (1988). Language Concordance as a Determinant of Patient Compliance and Emergency Room Use in Patients with Asthma. *Medical Care, 26*(12), 1119–1128. doi:10.1097/00005650-198812000-00003.
- Marrast, L.M., Zallman, L., Woolhandler, S., Bor, D.H., McCormick, D. (2014). Minority physicians' role in the care of underserved patients: diversifying the physician workforce may be key in addressing health disparities. *Journal of the American Medical Association, 174*(2), 289-91
- Marsh, G. (2014). Institutional Characteristics and Student Retention in Public 4-Year Colleges and Universities. *Journal of College Student Retention: Research, Theory and Practice, 16*(1), 127–151. doi:10.2190/cs.16.1.g
- Martinez, J., Ro, M., Villa, N. W., Powell, W., & Knickman, J. R. (2011). Transforming the Delivery of Care in the Post-Health Reform Era: What Role Will Community Health Workers Play? *American Journal of Public Health, 101*(12), e1–e5. <http://doi.org/10.2105/AJPH.2011.300335>
- Mason, J. L. (1995). *Cultural competence self-assessment questionnaire: A manual for users*. Portland, OR: Portland State University, Research and Training Center on Family Support and Children's Mental Health
- Maurana, C.A. & Goldenberg, K. (1996). A successful academic-community partnership to improve the public's health. *Academic Medicine, 71*(5): 425-431.
- McDonough, P.M., Antonio, A.L., & Trent, J.W. (1997). Black students, black colleges: An African American college choice model. *Journal for a Just and Caring Education, 3*(1): 9–36.
- McNeal, M. S., & Blumenthal, D. S. (2011). Innovative Ways of Integrating Public Health Into the Medical School Curriculum. *American Journal of Preventive Medicine, 41*(4 0 3), S309–S311. <http://doi.org/10.1016/j.amepre.2011.06.013>
- Medical Group Management Association. (2014). *MGMA Physician Compensation and Production Survey: 2014 Report Based on 2013 Data*. http://www.mgma.com/Libraries/Assets/Key-Findings-PhysComp_FINAL-with-copyright.pdf

- Milem, J. F. (2003). The educational benefits of diversity: Evidence from multiple sectors. In M.Chang, D. Witt, J. Jones, & K. Hakuta (Eds.), *Compelling interest: Examining the evidence on racial dynamics in higher education* (pp. 126-169). Stanford, CA: Stanford University Press.
- Milem, J. F., O'Brien, C. L., and Bryan, W. P. (2013). The matriculated student: Assessing the impact of holistic review. In *Roadmap to excellence: Key concepts for evaluating the impact of medical school holistic admissions* (pp. 19-29). Washington, DC: Association of American Medical Colleges.
- Miller, E., & Green, A. R. (2007). Student reflections on learning cross-cultural skills through a “cultural competence” OSCE. *Medical Teacher, 29*(4), e76–e84. doi:10.1080/01421590701266701
- Morris, C., Johnson, B., Kim, S., & Chen, F. (2008). Training family physicians in community health centers: a health workforce solution. *Family Medicine, 40*: 271.
- National Resident Matching Program. (2014). *Results and Data: 2014 Main Residency Match*. <http://www.nrmp.org/wp-content/uploads/2014/04/Main-Match-Results-and-Data-2014.pdf>
- National Survey of Student Engagement (2013). *NSSE Research Brief on High-Impact Practices*. Bloomington, IN: Indiana University Center for Postsecondary Research. http://nsse.indiana.edu/pdf/HIP_brief_final.pdf.
- New America Foundation (n.d.) *Federal Education Budget Project, School Finance Inequity among Districts*. Retrieved January 30, 2017 from <http://febp.newamerica.net/k12>.
- Newble, D. (2004). Techniques for measuring clinical competence: objective structured clinical examinations. *Medical Education, 38*(2), 199–203. doi:10.1111/j.1365-2923.2004.01755.x
- Ngo-Metzger, Q., Sorkin, D. H., Phillips, R. S., Greenfield, S., Massagli, M. P., Clarridge, B., & Kaplan, S. H. (2007). Providing High-Quality Care for Limited English Proficient Patients: The Importance of Language Concordance and Interpreter Use. *Journal of General Internal Medicine, 22*(Suppl 2), 324–330. <http://doi.org/10.1007/s11606-007-0340-z>
- O’Meara, K., Lounder, A., & Campbell, C. M. (2014). To Heaven or Hell: Sensemaking about Why Faculty Leave. *The Journal of Higher Education, 85*(5), 603–632. doi:10.1353/jhe.2014.0027
- Orfield, G., & Whitley, D. (1999). *Diversity and legal education: Student experiences in leading law schools*. Cambridge, MA: Civil Rights Project at Harvard University.
- Ovink, S. M., & Kalogrides, D. (2015). No place like home? Familism and Latino/a–white differences in college pathways. *Social Science Research, 52*, 219–235. doi:10.1016/j.ssresearch.2014.12.018.
- Page, O. C. (2003). Promoting diversity in academic leadership. In S. L. Hoppe & B. W. Speck (Eds.), *Identification of desirable academic leadership characteristics: Changes and complexity of the responsibilities of academic leaders in the U.S. New Directions for Higher Education, 124*: 79-86.
- Page, S. E. (2008). *The Difference: How the Power of Diversity Creates Better Groups, Firms, Schools, and Societies*. Princeton, NJ: Princeton University Press.

- Parker, M. H., Galkowski, J. M., & Hayes, B. P. (2015). How Community Health Providers Can Help Patients Connect to Veterans Affairs Resources. *North Carolina Medical Journal*, 76(5), 328–331. doi:10.18043/ncm.76.5.328
- Pascarella, E. T., Pierson, C. T., Wolniak, G. C., & Terenzini, P. T. (2004). First-Generation College Students: Additional Evidence on College Experiences and Outcomes. *Journal of Higher Education*, 75(3), 249–284. doi:10.1353/jhe.2004.0016
- Pathman, D. E., Konrad, T. R., King, T. S., Taylor, D. H., & Koch, G. G. (2004). Outcomes of States: Scholarship, Loan Repayment, and Related Programs for Physicians. *Medical Care*, 42(6), 560–568. doi:10.1097/01.mlr.0000128003.81622.ef
- Patient Protection and Affordable Care Act of 2010, 42 U.S.C. §§ 280g-11 (2012).
- Patterson, D. G., & Carline, J. D. (2006). Promoting Minority Access to Health Careers through Health Profession Public School Partnerships: A Review of the Literature. *Academic Medicine*, 81(Supplement), S5–S10. doi:10.1097/01.acm.0000225247.84379.9c
- Perez, P. A., & McDonough, P. M. (2008). Understanding Latina and Latino College Choice: A Social Capital and Chain Migration Analysis. *Journal of Hispanic Higher Education*, 7(3), 249–265. doi:10.1177/1538192708317620
- Pérez-stable, E. J., Nápoles-Springer, A., & Miramontes, J. M. (1997). The Effects of Ethnicity and Language on Medical Outcomes of Patients with Hypertension or Diabetes. *Medical Care*, 35(12), 1212–1219. doi:10.1097/00005650-199712000-00005
- Perna, L.W. (2010). *Understanding the Working College Student: New Research and Its Implications for Policy and Practice*. Herndon, VA: Stylus Publishing.
- Perry, H. B., Zulliger, R., & Rogers, M. M. (2014). Community Health Workers in Low-, Middle-, and High-Income Countries: An Overview of Their History, Recent Evolution, and Current Effectiveness. *Annual Review of Public Health*, 35(1), 399–421. doi:10.1146/annurev-publhealth-032013-182354
- Price, E. G., Gozu, A., Kern, D. E., Powe, N. R., Wand, G. S., Golden, S., & Cooper, L. A. (2005). The role of cultural diversity climate in recruitment, promotion, and retention of faculty in academic medicine. *Journal of General Internal Medicine*, 20(7), 565–571. doi:10.1111/j.1525-1497.2005.0127.x
- Price, S.S., Grant-Mills, D. (2010). Effective admissions practices to achieve greater student diversity in dental school. *Journal of Dental Education*, 74(10 supplement), s87-s97.
- Prince, M. (2004). Does active learning work? A review of the research. *Journal of Engineering Education*, 93(3):223-231.
- Posselt, J. R., & Black, K. R. (2012). Developing the research identities and aspirations of first-generation college students: Evidence from the McNair scholars program. *International Journal for Researcher Development*, 3(1), 26-48. <http://dx.doi.org/10.1108/17597511211278634>

- Powe, N.R. & Cooper, L.A. (2004). *Disparities in Patient Experiences, Health Care Processes, and Outcomes: The Role of Patient-Provider Racial, Ethnic, and Language Concordance*. New York, NY: The Commonwealth Fund. <http://www.commonwealthfund.org/publications/fund-reports/2004/jul/disparities-in-patient-experiences--health-care-processes--and-outcomes--the-role-of-patient-provide>
- Rabinowitz, H.K., Diamond, J.J., Markham, F.W., & Hazelwood, C.E. (1999). A Program to Increase the Number of Family Physicians in Rural and Underserved Areas: Impact after 22 Years. *Journal of the American Medical Association*, 281(3): 255-260. doi:10.1001/jama.281.3.255
- Rabinowitz, H.K., Diamond, J.J., Markham, F.W., Paynter, N.P. (2001). Critical Factors for Designing Programs to Increase the Supply and Retention of Rural Primary Care Physicians. *Journal of the American Medical Association*, 286(9): 1041-1048. doi:10.1001/jama.286.9.1041
- Rainey, M.L. (2001). How do we retain minority health professions students? In *The Right Thing to Do, The Smart Thing to Do: Enhancing Diversity in the Health Professions*. Washington, DC: National Academy Press, p.p. 328–357.
- Roksa J., Calcagno J. C. (2008). Making the transition to four-year institutions: Academic preparation and transfer. *CCRC Working Paper No. 13*. New York, NY: Teachers College, Community College Research Center, Columbia University. <http://ccrc.tc.columbia.edu/media/k2/attachments/making-transition-four-year-institutions.pdf>
- Rosenthal, E.L., Brownstein, J.N., Rush, C.H., Hirsch, G.R., Willaert, A.M., Scott, J.R....Fox, D.J. (2010). Community health workers: part of the solution. *Health Affairs*, 29(7): 1338-1342.
- Rudman, L. A., Ashmore, R. D., & Gary, M. L. (2001). “Unlearning” automatic biases: The malleability of implicit prejudice and stereotypes. *Journal of Personality and Social Psychology*, 81(5), 856–868. doi:10.1037/0022-3514.81.5.856
- Sabin, J.A., Nosek, B.A., Greenwald, A.G., & Rivara, F.P. (2009). Physicians’ Implicit and Explicit Attitudes About Race by MD Race, Ethnicity, and Gender. *Journal of Health Care for the Poor and Underserved*, 20(3), 896–913. doi:10.1353/hpu.0.0185
- Sabo, S., de Zapien, J., Teufel-Shone, N., Rosales, C., Bergsma, L., & Taren, D. (2015). Service Learning: A Vehicle for Building Health Equity and Eliminating Health Disparities. *American Journal of Public Health*, 105(Suppl 1), S38–S43. <http://doi.org/10.2105/AJPH.2014.302364>
- Sack, N. & Yun, J.W. (2017). *Strengthening the diversity of top academic leaders Findings and insights from Egon Zehnder’s Global Academic Leadership Survey*. Washington, DC: Egon Zehnder. <http://www.egonzehnder.com/leadership-insights/strengthening-the-diversity-of-top-academic-leaders.html>
- Saha, S., Taggart, S. H., Komaromy, M., & Bindman, A. B. (2000). Do patients choose physicians of their own race? *Health Affairs*, 19, 76-83
- Seifer, S.D. (1998). Service-learning: community-campus partnerships for health professions education. *Academic Medicine*, 73(3): 273-277.

- Seijo, R., Gomez, H., & Freidenberg, J. (1991). Language as a Communication Barrier in Medical Care for Hispanic Patients. *Hispanic Journal of Behavioral Sciences, 13*(4), 363–376. doi:10.1177/07399863910134001
- Senf, J.H., Campos-Outcalt, D., Kutob, R. (2003). Factors related to the choice of family medicine: A reassessment and literature review. *Journal of the American Board of Family Medicine, 16*: 502-512.
- Sheu, L., Lai, C. J., Coelho, A. D., Lin, L. D., Zheng, P., Hom, P., ... O'Sullivan, P. S. (2012). Impact of Student-Run Clinics on Preclinical Sociocultural and Interprofessional Attitudes: A Prospective Cohort Analysis. *Journal of Health Care for the Poor and Underserved, 23*(3), 1058–1072. doi:10.1353/hpu.2012.0101
- Simpson, V., & Richards, E. (2015). Flipping the classroom to teach population health: Increasing the relevance. *Nurse Education in Practice, 15*(3), 162–167. doi:10.1016/j.nepr.2014.12.001
- Sloan, D. A., Donnelly, M. B., Schwartz, R. W., Felts, J. L., Blue, A. V., & Strodel, W. E. (1996). The Use of the Objective Structured Clinical Examination (OSCE) for Evaluation and Instruction in Graduate Medical Education. *Journal of Surgical Research, 63*(1), 225–230. doi:10.1006/jsre.1996.0252.
- Smedley, B.D., Stith, A.Y., Nelson, A.R. (2003). *Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care*. Washington, DC: National Academies Press.
- Smedley, B.D., Butler, A. S., Bristow, L.R., Eds. (2004). *In the Nation's Compelling Interest: Ensuring Diversity in the Health Care Workforce*. Washington, DC: National Academies Press. <https://www.nationalacademies.org/hmd/Reports/2004/In-the-Nations-Compelling-Interest-Ensuring-Diversity-in-the-Health-Care-Workforce.aspx>
- Smucny, J., Beatty, P., Grant, W., Dennison, T., Wolff, L.T. (2005). An evaluation of the Rural Medical Education Program of the State University of New York Upstate Medical University, 1990-2003. *Academic Medicine, 80*(8):733-738.
- Somers, P., Haines, K., Keene, B., Bauer, J., Pfeiffer, M., McCluskey, J., ... Sparks, B. (2006). Towards a Theory of Choice for Community College Students. *Community College Journal of Research and Practice, 30*(1), 53–67. doi:10.1080/10668920500248886
- Roman, S.A. (2004). Addressing the Urban Pipeline Challenge for the Physician Workforce: The Sophie Davis Model. *Academic Medicine, 79*(12): 1175-1183.
- Street, R. L., O'Malley, K. J., Cooper, L. A., & Haidet, P. (2008). Understanding Concordance in Patient-Physician Relationships: Personal and Ethnic Dimensions of Shared Identity. *Annals of Family Medicine, 6*(3), 198–205. <http://doi.org/10.1370/afm.821>
- Stroup, D. F., & Thacker, S. B. (2007). Epidemiology and education: Using public health for teaching mathematics and science. *Public Health Reports, 122*, 283.
- Sullivan Commission on Diversity in the Health Care Workforce (2004). *Missing Persons: Minorities in the Health Professions*. Alexandria, VA: The Sullivan Alliance. <http://www.aacn.nche.edu/media-relations/SullivanReport.pdf>.

- Swanson, C.B. (2009). Closing the Graduation Gap: Educational and Economic Conditions in America's Largest Cities. *Editorial Projects in Education Research Center*.
http://www.edweek.org/media/cities_in_crisis_2009.pdf.
- Terrell, C., & Beaudreau, J. (2003). 3000 by 2000 and beyond: Next steps for promoting diversity in the health professions. *Journal of Dental Education*, 67(9), 1048-1052.
- Thayer, P. B. (2000). *Retention of students from first generation and low income backgrounds*. Washington, DC: Council for Opportunity in Education.
- Urban Universities for HEALTH. (2014). *Holistic Admissions in the Health Professions: Findings from a National Study*. Washington, DC.
<http://urbanuniversitiesforhealth.org/media/documents/holisticadmissionsinthehealthprofessions.pdf>
- Urban Universities for HEALTH. (2015). *Faculty Cluster Hiring for Diversity and Institutional Climate*. Washington, DC.
http://urbanuniversitiesforhealth.org/media/documents/Faculty_Cluster_Hiring_Report.pdf
- U.S. Department of Health and Human Services, Office of Minority Health. (2001). *National Standards for Culturally and Linguistically Appropriate Services in Health Care*. Accessed 1 February, 2017 at <http://www.omhrc.gov/assets/pdf/checked/executive.pdf>.
- U.S. Department of Health and Human Services (2010). Healthy People 2020: An Opportunity to Address Societal Determinants of Health in the United States.
<http://www.healthypeople.gov/2010/hp2020/advisory/SocietalDeterminantsHealth.htm>
- Valantine, H. A., & Collins, F. S. (2015). National Institutes of Health addresses the science of diversity. *Proceedings of the National Academy of Sciences*, 112(40), 12240-12242. doi:10.1073/pnas.1515612112
- Vandal, B. (2014). Promoting Gateway Course Success: Scaling Corequisite Academic Support. *Complete College America*. <http://completecollege.org/wp-content/uploads/2014/06/Promoting-Gateway-Course-Success-Final.pdf>
- Ward, N.L., Strambler, M.J. & Linke, L.H. (2013). Increasing Educational Attainment among Urban Minority Youth: A Model of University, School, and Community Partnerships. *Journal of Negro Education*, 82(3), 312-325. doi:10.7709/jnegroeducation.82.3.0312
- Warm, E. J., & Goetz, C. (2013). Too Smart for Primary Care? *Annals of Internal Medicine*, 159(10), 709. doi:10.7326/0003-4819-159-10-201311190-00009
- Wells, A., Brunson, W. D., Sinkford, J. C., & Valachovic, R. W. (2011). Working with dental school admissions committees to enroll a more diverse student body. *Journal of Dental Education*, 75(5), 685-695.
- Williams, J. W., & Jackson, G. L. (2015). Utilizing Evidence to Address the Health and Health Care Needs of Veterans. *North Carolina Medical Journal*, 76(5), 294-298. doi:10.18043/ncm.76.5.294

- Wilson, E., Hm Chen, A., Grumbach, K., Wang, F., & Fernandez, A. (2005). Effects of limited English proficiency and physician language on health care comprehension. *Journal of General Internal Medicine, 20*(9), 800–806. doi:10.1111/j.1525-1497.2005.0174.x
- Wilson, N.W., Couper, I.D., De Vries, E., Reid, S., Fish, T., Marais, B.J. (2009). A critical review of interventions to redress the inequitable distribution of healthcare professionals to rural and remote areas. *Rural and Remote Health, 9*: 1060.
- Witzburg, R. A., & Sondheimer, H. M. (2013). Holistic review: Shaping the medical profession one applicant at a time. *New England Journal of Medicine, 368*(17), 1565-1567.
- Working Group on Diversity in the Biomedical Research Workforce. (2012). *Draft Report of the Advisory Committee to the Director Working Group on Diversity in the Biomedical Research Workforce*. Bethesda, MD: National Institutes of Health.
- Zayas, L. E., & McGuigan, D. (2006). Experiences promoting healthcare career interest among high-school students from underserved communities. *Journal of the National Medical Association, 98*, 1523.
- Zhao, C. M., & Kuh, G. D. (2004). Adding value: Learning communities and student engagement. *Research in Higher Education, 45*(2), 115-138.