The President's STEM Initiative: Opportunities for Expanding Diversity in the Health Professions Workforce

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Report of a summit convened by the National Hispanic Health Foundation
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The Health Care Workforce of Tomorrow

As a result of both increased insurance coverage under the Affordable Care Act (ACA) and a growing Medicare-eligible population, the Association of American Medical Colleges (AAMC) projects that by 2020 there will be a shortage of more than 90,000 physicians, 45,000 of which will be primary care providers. By the year 2042, more than half of the American population will be members of minority populations. Latinos will account for one out of four Americans. Despite major transformations in health care, minorities continue to face health and health care disparities. Obesity and chronic diseases in particular remain disproportionately high in minority populations. As millions more Americans gain access to and utilize health care services, there is an urgent need for new approaches to developing the health professions workforce, in the case of this summit, to ensure that enough physicians are available, and that there is successful recruitment and outreach to underrepresented groups, especially Hispanics and African-Americans.

Cultural competence and language services are now required and essential for health care providers and staff, and for medical education and public health education. In addition, the transition to value-based payments with health information technology coordinated patient-centered care, and community-based health prevention and research requires a technologically skilled workforce.

> By 2020, the U.S. will face a shortage of over 90,000 physicians.
> —*AAMC*

Key elements of how we train and prepare the health care workforce for tomorrow include developing a workforce that is diverse; that looks like and has had experiences like the public it serves; that will assume primary care roles in areas of the country that are underserved; and that will work together in a collaborative team-based way and follow patients in coordinated care models, Accountable Care Organizations and Patient Centered Medical Homes. In addition, the health professionals of the future who are Hispanic and African American will be in demand to be leaders at the forefront of developing the innovative programs for the growing diverse American population – for population health and prevention as well as for medical care and behavioral health care. The current health care workforce falls far short of representing the diversity of the U.S. population. There is a link between the lack of diversity in the health care workforce, and disparities in care quality and health outcomes. Research suggests that minority physicians are, for example, more inclined to practice in areas with a high proportion of uninsured, and with a high proportion of underrepresented racial and ethnic groups. Studies also indicate that greater diversity among physicians is associated with improved access to care for racial and ethnic minority patients, greater patient choice and satisfaction, and better patient-clinician communication.

> Promoting diversity in the health care workforce is a practical, evidence-based approach to providing more equitable access to care, and reducing health disparities.

Promoting physician diversity is therefore a practical, evidence-based approach to providing equitable access to care and achieving equitable health outcomes across U.S. populations.

In November 2013, the National Hispanic Health Foundation (NHHF), with support from the Josiah Macy Jr. Foundation, convened a one-day summit at the U.S. Department of Education in Washington, DC to consider two inseparable issues for the future of the country:

- President Obama's science, technology, engineering, and mathematics (STEM) educational priorities that are essential to help keep the U.S. competitive in the global economy
- The express development of a diverse and professional health care workforce that can meet the growing demand for services as a result of expanded coverage under the ACA

Summit participants discussed opportunities to increase the number of underrepresented minorities in medicine and the health professions, specifically, by expanding the diversity programs that exist under current Federal STEM programs at the Department of Education, National Science Foundation, and at the Department of Health and Human Services and at other agencies that are provided to Hispanic-Serving Institutions (HSIs) and Historically Black Colleges and Universities (HBCUs) and their university partners. There were three focus areas for the participants to consider in developing consensus recommendations to increase the numbers of underrepresented students in medical school and aware of health professions: 1) enhancing STEM programs from K to 12th grade; 2) increasing student applicants to medical school in higher education; and 3) effective public and private partnerships.

Participants included representatives from the White House, Congress, the Department of Education, the National Institutes of Health (NIH), the Institute of Medicine (IOM), the National Science Foundation (NSF), the Health Resources and Services Administration (HRSA), medical school administrators and faculty, foundations, and nonprofit organizations (listed in Appendix A).

Reforming STEM Education: The President's STEM Initiative

In 2009, President Obama launched the *Educate to Innovate Initiative,* "to move American students from the middle to the top of the pack in science and math achievement." An inventory of federal STEM programs found over 220 STEM education programs funded across 13 federal agencies, resulting in a system that is fragmented, with programs that are not always accessible to the schools, teachers, and students who may need them the most. The President's 2014 STEM budget called for significant reorganization to create a system that is more accessible for the end user and provides higher quality, more effective programs. The number of

programs will be reduced by half after the elimination or consolidation of duplicative, underperforming, or lower priority programs, and programs will be reorganized into four priority areas:

- K-12 education
- Undergraduate education
- Graduate fellowships
- Informal STEM education

Goals include preparing 100,000 new and effective K-12 STEM teachers, increasing the number of undergraduate STEM degrees awarded by one million, and broadening participation in STEM fields by underrepresented groups. Specific leadership and implementation roles have been defined for the Department of Education (K-12 education), NSF (undergraduate and graduate programs), and the Smithsonian Institution (informal STEM education). It is intended that together, the programs funded through the FY2014 budget will identify and implement effective approaches for improving STEM teaching and learning; facilitate the dissemination and adoption of effective STEM instructional practices nationwide; and promote STEM education experiences that prioritize hands-on and project-based learning to increase student engagement, interest, and achievement in the STEM fields.

Starting at the Beginning: K-12 Initiatives for STEM Learning

The Department of Education is leading five initiatives as part of the President's 2014 proposed plan to increase the impact of the Federal investment in STEM; the STEM Innovation Networks program, to promote evidence-based practices and provide STEM learning opportunities to students, including support of a national virtual learning network that will enable STEM educators to exchange materials and best practices; the STEM Master Teachers Corps, offering the most accomplished STEM educators opportunities to serve as instructional leaders in their schools, additional pay, and membership in a national community of talented STEM teachers; the *STEM Teacher Pathways Program*, supporting the President's goal of recruiting and training 100,000 effective STEM teachers for high needs schools; *Improving Mathematics Achievement and Transition to College* from High School (IMATCH, under the Fund for Improving Education) with NSF, funding projects that develop, evaluate, and scale practices that increase students' math achievement during the transition period from the last two years of high school through the first two years of college; and the *Effective Teaching and Learning: STEM Initiative*, to improve STEM teaching and education through partnerships between local education agencies and institutions of higher education.

The Department of Education is also leading a number of other initiatives to address the underrepresentation of minorities in STEM educational pathways and careers. Programs discussed at the summit included the HSI STEM and Articulation

Programs (to build institutional capacity to offer programs in STEM at HSIs and to facilitate the movement of students in STEM fields from two-year to four-year higher education institutions); the Fund for the Improvement of Education (which authorizes the Secretary of Education to support nationally significant programs to improve the quality of elementary and secondary education at the state and local levels); the Teacher Incentive Fund (to increase the number of effective teachers teaching minority and disadvantaged students in hard-to-staff subjects); the Upward Bound Math and Science program (providing high school students with intensive math and science summer programs, counseling, and opportunities for research); and the Minority Science and Engineering Improvement Program (increasing the flow of undergraduate ethnic minorities into STEM careers). In addition, the department supports STEM education through foundational programs such as career and technical education, through programs with a STEM priority such as Investing in Innovation and through the Magnet Schools Assistance Program.

The NIH, although primarily focused on training and retaining a biomedical research workforce, also partners with its sister agencies and departments on STEM education broadly. One program discussed at the Summit was the Science Education Partnership Award, which funds K-12 STEM and informal science education projects that provide students with insights into biomedical science and research career opportunities.

Undergraduate and Graduate STEM Education and Research

While the number of bachelor's degrees earned by underrepresented minorities in psychology, social sciences, and computer sciences has increased since 1991, the number of degrees awarded in other STEM professions (math, engineering, physical sciences) has remained relatively flat. Under the President's proposal, NSF is the lead agency charged with improving undergraduate and graduate STEM education. Providing undergraduate students with research experiences has been shown to have a major impact on students' persistence in STEM. Through the Research Experiences for Undergraduates (REU) program, NSF-funded principal investigators can request a supplement to provide research experiences for their students. Another program, Improving Undergraduate STEM Education, supports the design, development, and implementation of effective STEM learning and teaching knowledge and practice.

NSF programs that relate to broadening participation include, for example, the HBCU Undergraduate Program; the Louis Stokes Alliances for Minority Participation; Centers for Research Excellence in Science and Technology (CREST); and the Tribal Colleges and Universities Program. The programs focus on improving STEM undergraduate programs, providing opportunities for faculty development, and, in the case of CREST, establishing research centers that provide opportunities for underrepresented faculty and students to access research experiences. Examples of projects that are funded by NSF include Bridge-to-the-Doctorate programs which support undergraduate students as they matriculate through STEM graduate programs, and Bridge-to-the-Baccalaureate, that provides articulation agreements between two- and four-year institutions (both under the Louis Stokes Alliances), and

Advanced Technological Education programs, focusing on two-year college education of technicians for high technology fields. Of note, the NSF does have an HSI STEM Program that has yet to have appropriations from Congress to address the growing Hispanic college student population.

As the steward of medical and behavioral research for the U.S., NIH also has a role in STEM undergraduate and graduate education. The majority of NIH efforts are on providing high quality research experiences for college students and science teachers in biomedical research settings. Doctoral education in biomedical research is still geared toward graduates pursuing a traditional, independent academic research career. One of the major recommendations from a high level NIH advisory committee on the biomedical research workforce was to modify training programs to include preparation for careers in science that are not the prototypical academic professor position. In this regard, NIH has launched the Broadening Experiences in Scientific Training program. Funding provided enables institutions to broaden graduate and postdoctoral training to include multiple different types of opportunities across a range of biomedical career options. The overarching strategy of the NIH diversity initiative includes four interrelated approaches: planning grants for the Building Infrastructure Leading to Diversity (BUILD) program; a National Research Mentoring Network; ensuring fairness in peer review; and increased engagement by all NIH leadership, including the creation of a Steering Committee Working Group on Diversity, and recruiting of a Chief Officer for Scientific Workforce Diversity.

The Health Resources and Services Administration (HRSA) also has several programs that are not linked to the STEM Programs to increase the number of minorities that are entering the health professions, such as Nursing Workforce Diversity and Scholarships for Disadvantaged Students programs, the Centers of Excellence grant program for underrepresented groups recruitment, retention, training at medical schools, and for minority students who are in medical school such as the National Health Service Corps (providing scholarship support and loan repayment in exchange for at least two years of service to medically underserved communities).

Broadening STEM Participation at HSIs and HBCUs

Despite the availability of grants and programs for STEM education, participants noted that many Hispanic-serving institutions are not competing for these resources. In addition, although the number of STEM professions is increasing, there is not active participation of Hispanic students. Reducing the information gap is critical to strengthening opportunities for HSIs and for the Hispanic community. In this regard, the White House Initiative on Educational Excellence for Hispanic Americans (established under President's Executive Order) has established a Federal Interagency Workgroup on Educational Excellence for Hispanics to better coordinate the federal resources available to Hispanic Serving Institutions (HSIs), and increase participation of the Hispanic community and HSIs in these programs. In addition,

the Office of Personnel Management established a Hispanic Federal Hiring Task Force that includes the National Hispanic Medical Association President & CEO, who has called for the coordination of efforts under the STEM programs for recruitment of Hispanic students and professionals to increase Federal Hispanic workforce.

The White House Educational Excellence for Hispanic Americans Director discussed the need to consider developing program priorities now that will transform education opportunities in STEM for Hispanic health professional students over the next 25 years.

Participants also discussed the role of the 106 Historically Black Colleges and Universities (HBCUs) across the U.S. in broadening the participation of underrepresented minority populations in STEM careers, including the health care workforce. While some HBCUs are science and technology oriented (having, for example, medical schools or colleges of pharmacy, or awarding graduate science degrees), others are developing bridge programs in association with four year higher education institutions or with mainstream higher education institutions to strengthen their science and technology programs, and enable students to pursue advanced programs and biomedical research. A representative of the White House Initiative on HBCUs stressed the importance of documenting the successes of STEM educational programs to be able to justify sustaining and expanding them. He suggested linking legislation for both Hispanic and HBCU programs for health care professionals by using the lessons learned of 2 models as we focus on policy recommendations to be approved over the next 3 years left in the Administration: 1)STEM Education for the HBCU students with a bridge to a four year university school and then on to medical school with increased focus on academic and test taking preparation; and 2)STEM Education that is provided by regional partnerships with the HBCU as the hub.

Bringing the Diversity of the Nation into the Health Workforce

The primary purpose of this summit was to develop recommendations for policy makers on expanding current STEM programs to increase the number of underrepresented minorities in the medicine and, then, the other health professions workforce. The lead staff from the Congressional Hispanic Caucus and the Congressional Hispanic Leadership Institute encouraged the participants to consider how critical it is to provide their expert input to the Reauthorization of the Higher Education Act this year. In addition, they encouraged participants to become more engaged in STEM education: 1)to develop the connections between the K-12 education and local school districts in order to work with champions who can help develop new programs for underrepresented students in STEM; and 2) to discuss the importance of STEM programs and the link to increasing the numbers of underrepresented students in medicine with your government affairs offices at your institutions with your elected officials who represent you and your interests in Congress.

Summit participants broke into working groups to consider the barriers to participation that underrepresented minority students, especially Hispanics and African Americans, face, and opportunities or proposed policies to address these under the Federal STEM initiative.

Barriers to Participation in the Health Professions

The barriers to increasing participation of underrepresented minority groups in the health professions are many, and there is not one governing body or one group that can fix all of these problems. Many parents of underrepresented students lack higher education backgrounds and do not appreciate the discipline and focus required for academic study, research, and critical analysis as well as the socialization into higher education world of new interactions and networks. Change in both policy and practice is needed at all levels of administration (local, state, federal) and education (Pre K, K-12, undergraduate, graduate/professional), and requires the participation and collaboration of government, academia, the private sector, healthcare professional associations and communities.

For students in K-12, the rigor of the academic preparation of students to reach the next level varies widely across the nation. Some students attend schools with well-trained and equipped teachers and access to technology, and have numerous in-school and informal out-of-school opportunities for STEM learning and hands-on experiences. Others complete their primary and secondary education still lacking sufficient reading and mathematics skills to succeed in college-level coursework. In addition, there is a need for counselors and teachers to better understand the importance of supporting math learning among all students with tutoring and technology supports to increase the applicant pool to healthcare professional schools.

Students who express an interest in STEM are often not advised about the range of health career options available to them. Many freshmen enter college wanting to be medical doctors, but many of them do not realize what it takes. And yet, they are not advised on other reasonable options they could pursue with their interests and talents in the biological sciences. Core classes in the sciences at colleges are often rote learning, and are not particularly inspiring for premedical, pre-health, and pre-biomedical science professions students. There are few if any adaptations for the diverse learning styles students may have, and many students end up being discouraged. In addition, advising does not follow the interest of students. For example, a student with a low grade in a general chemistry class may be automatically told to consider a different career path based on that one course.

Students who do progress through higher education continue to encounter barriers in their quest to become professionals of any kind, not just STEM or health professionals. For a very large number of underrepresented students, their pathway into higher education is through community colleges. But graduate and professional programs do not value the community college experience, which places a great proportion of potential minority candidates at a disadvantage during the admissions process. Standardized aptitude tests (e.g., MCAT, GRE) continue to be a barrier for

many students from underrepresented minority groups, and scores often do not reflect the student's overall academic achievement. Because of the reliance of many graduate and professional institutions on academic metrics, these students lose out in the process.

The cost of higher education is also a major and persistent barrier. Indebtedness has become overwhelming to students and families of the middle class. There is a lack of awareness of scholarships, discounts for graduate school test review courses, and loan payback programs among underrepresented students - for those who are interested in health disparities research, those interested in public service (working in non-profit sector), or for those clinicians who serve in community health centers.

With these concerns in mind, participants developed the following recommendations for increasing the number of underrepresented minority students in STEM fields in higher education, and entering and graduating from health professions schools.

Recommendations

The working groups addressed policy recommendations to improve diversity within K-12 education, the applicant pool to medical school, and public-private partnerships.

Overall recommendations

In developing their recommendations, participants felt it important to clearly establish that medicine and the health professions are an integral part of STEM.

There was consensus that the STEM high school and undergraduate student pool could become a greater target of academic and counseling and recruitment efforts to medical schools of the nation. This group could be supported through the Hispanic-Serving Institutions and Historically Black Colleges and Universities and their linkages to 4 year institutions and medical schools in a more comprehensive and coordinated continuum that could result in a greater outcome of more minority physicians for the nation.

Participants also felt that the National Hispanic Medical Association (NHMA) should coordinate more stakeholder input that is needed regarding the Federal STEM initiative reorganization. It was apparent from the discussions that there remain significant gaps in information about what works with regard to increasing participation of underrepresented minorities in medicine and the health professions.

K-12 Diversity in STEM Programs for the Health Professions Preparation

Participants highlighted several areas of focus for increasing the opportunities for STEM learning across the educational spectrum, such as focused efforts on more underrepresented students, empowering parents, better preparation and support of teachers, better curriculum alignment from end to end, stronger mentoring and advising of students, and the importance of informal STEM learning. Participants also saw a need for improved collaboration and coordination with communities' support for programs and initiatives in the STEM K-12 continuum, especially those linked to Hispanic-Serving Institutions and Historically Black Colleges and Universities.

Increasing Underrepresented Minorities Applicant Pool for Medical School

Participants agreed on the fundamental importance of the continued development of pathways from the Hispanic-Serving Institutions and Historically Black Colleges and Universities not only to four year higher education institutions, but to medical schools, and other health professional schools. Participants also agreed on increased advising and encouragement of underrepresented STEM students for medical school application.

Public Private Partnerships to Increase Diversity of STEM Students

Finally, participants discussed the need for more effective public private partnerships. A major issue for increasing access to higher education is the need for financial support, which takes many forms (e.g., fellowships, scholarships, loan forgiveness, funding of technology for distance education). There are numerous opportunities where public private partnerships can help to advance health professions and health care. Business partnerships and entrepreneurial relationships can be leveraged to create diverse funding streams (including tuition reimbursement for employees), as well as to provide mentors and research internships, and foster a climate for diversity in both the workplace and educational institutions.

Overarching Recommendations

- **Recognize that medicine and health professions are STEM disciplines and specifically include medical schools, other health professional institutions, and health care sector facilities in STEM career programs and initiatives.**
  Participants noted that there is an artificial distinction between STEM biomedical versus health professional career tracks. Biomedical research careers and the health professions are both part of STEM, and efforts to enhance science education and to expand the health professions workforce are linked. Health professionals play an important role in the research enterprise. There is a shortage of physician clinicians, and many physicians also have an interest in biomedical research, and translational research requires the expertise and contribution of both laboratory and clinical researchers.

- **Develop the evidence base for effective practices to broaden participation of underrepresented minorities in STEM fields in-general and in health professions specifically. Document and institutionalize best practices; transfer knowledge and successful models.**
  Participants discussed the lack of data about the diversity of the heath care workforce, as well as the lack of metrics and measures to assess the effectiveness of initiatives to broaden participation of underrepresented groups. It was noted that many of the programs that have been supported for many years have not been assessed, and many of those that have been documented as best practices have not been institutionalized. Participants called for better at tracking and evaluation of initiatives, and documenting and disseminating of best practices, so that successful approaches can be generalized and brought to scale. Understanding the return on the investment for initiatives will aid in securing further funding and achieving sustainability of effective programs. Participants acknowledged that there is not a one size fits all solution, and some successful initiatives cannot be scaled up or generalized. There need to be allowances for flexibility in individual settings.

- **NHMA recommended to-gather stakeholder input regarding the Federal STEM reorganization for Congress and the White House.**
  Participants expressed concerns that the Federal proposal for the reorganization of Federal STEM education programs was developed without health professional stakeholder input. The White House and the Office of Management and Budget should engage stakeholders in refining and implementing the reorganization. Organizations should contact their members of congress and ensure that their voices are heard. Participants also discussed the importance of stakeholders providing comments on the reauthorization of the Higher Education Act to the office of the Subcommittee on Higher Education and Workforce Training of the US House of Representatives Education and the Workforce Committee.

Increasing the Opportunities for STEM Learning Across the K-12 Educational Spectrum

- **Increase the STEM training of underrepresented students.**
  Many underrepresented students have aptitudes for science and math but may not be at the top of the class. It is important to train underrepresented students who are science and math performers from the middle to the top ranking of a class in order to reach more students.

- **Increase the engagement and empowerment of parents.**
  Many minority students are first generation in America and parents may face cultural and language challenges in navigating the education system on behalf of their children. Participants noted that there are a few examples of parent networks, but these programs are grassroots. It was noted that the parents need financial and linguistic literacy.

- **Increase the linkage of STEM programs with communities.**
  Encourage communities to actively support schools' STEM programs, and help them to understand the relevance of quality education to the ROI to the community.

- **Promote a greater national appreciation for the value of education and educators.**
  Participants expressed concern that as a nation, we do not seem to value education or our educators. Participants called for more attention to appropriate teacher salaries, professional development opportunities, and incentives to attract and retain high quality educators.

- **Give teachers the training and tools they need to successfully engage students from diverse backgrounds with different learning styles and needs.**
  This includes cultural and linguistic competence, and valuing what students and families of different cultures bring into the system. Leverage technology to expand the offerings available to teachers and students (e.g., e-learning, virtual engagement).

- **Address the general barriers to academic success early on in K-12, including basic math and reading skills.**
  Participants stressed the importance of reaching out to minority students in the early grades, even preschool, to address the barriers that prevent students from being successful, and to attract them to STEM fields. It was noted that nearly 60% of students enter college without the math skills they need to study a STEM discipline.

- **Strive for better curriculum alignment across the educational spectrum.**
  In many cases there are programs targeted to a specific age group (K-6, junior high, high school, college) and there is no connection with corresponding programs at the younger or older age groups. Curriculum alignment is important for continuity so that students remain engaged. The sciences (physics, chemistry, biology, etc.) must also be put into context for students, through thematic topics such as agriculture, health, energy, or climate change.

- **Promote more effective advising and mentoring relationships for students.**
  Participants expressed concerns about the lack of advising going on in schools. Advisors are often stretched beyond capacity dealing with other issues and often do not have time to help students navigate the system. Students are not getting access to the information they need regarding financial aid and career options. There are numerous disciplines across the health care workforce, yet most students are not aware of these options. Students also need roles models from similar backgrounds.

- **Place a higher priority on informal STEM learning.**
  With so much focus on formalized education, participants felt the need to highlight the value of informal STEM learning in engaging students at all levels, as well as their parents. Many of the opportunities children have for hands-on STEM exploration is done through the informal sector in the community (e.g., youth organizations). Participants discussed the need to think more holistically and systematically about how K-12 education and the learning that goes on outside of school can work together. There are opportunities to partner with community businesses and organizations (e.g., science centers) to offer meaningful engagement experiences.

- **Focus on evidence-based models that value underrepresented students, families, cultures in our communities.**
  Given the fact that counseling about academic and financial aid and academic skills-building have been part of programs for Hispanic and African American and other underrepresented pre-medical students for six decades, the new STEM premedical pathway counseling, skills-building, mentoring and information sharing programs should be based on lessons learned shared through internet – apps, webinars, portals that should be updated by a new national infrastructure within a STEM Federal office.

- **Continue targeted funding of programs to increase diversity in health professions including funding of STEM programs for K-12 students at HSIs and HBCUs.**
  Participants discussed the value HSIs and HBCUs and the need to ensure that they are aware of, and have access to federal STEM programs. Target funds for diversity STEM programs at HBCUs and HSIs to work with best practices to increase the pool of STEM underrepresented students.

Increasing Diversity in STEM Applicants to Medical School

- **Train science advisors on encouraging students to medical careers as well as about options beyond medicine.**
  Participants discussed the key role for premedical advisors in undergraduate education who encourage minority students to continue on the pathway to medical school. Pre-professional advisors for health careers should offer expert guidance on courses, volunteer activities, clinical experience, research courses, and other co-curricular opportunities. Financial aid, MCAT test, the medical school application, secondary applications, interview and key questions are key educational items for the premedical student. Advisors must encourage students on the path to medical school, and in some

cases, on other options with other health careers. Advisors need to understand learning styles of diverse students

- **Encourage higher education institution curricular reforms to support more underrepresented STEM students along pathways toward medical school.**
  Participants recommended curriculum reforms including science with new learning styles, MCAT and GRE test-taking, and mentoring and service learning to be included in curriculum.

- **Support collaboration among HSIs and HBCUs and their partner Institutions and Medical Schools.**
  HSIs and HBCUs should foster learning forums among their science faculty and with those from their partners and medical schools and to share and adapt best practices.

- **Link biomedical science & health professions.**
  Flexible metrics, but community ROI is needed to link biomedical science and health professions career pathways.

- **Improve coordination of STEM efforts to enhance efforts to build premedical student pathways.**
  Although participants discussed many examples of current and planned STEM programs, some with a targeted diversity element, concerns were raised that these efforts are fragmented, and compartmentalization into jurisdictions. There is little evidence of a broad vision for increasing STEM programs and diversity in the health professions. Participants discussed what is needed is a national center, funded by government and multiple foundations, with the role of a neutral convener and clearinghouse to advance scholarship through collaboration and shared responsibility to advance this effort patterned after the National Center for Inter-professional Practice and Education at the University of Minnesota supported by HRSA and private foundations, including the Josiah Macy Jr. Foundation.

- **Increase collaboration across institutions of higher education.**
  It was noted that there is a generalized lack of collaboration among institutions that serve a larger number of minority or underrepresented students. Participants called for more collaborative efforts to link HSIs, HBCUs, and other higher education institutions and health professions schools. Although there are some models, there need to be more intentional associations through programming or requirements.

- **Increase awareness of the HSI two year institution STEM students pathways to become applicants to medical schools.**
  The HSI two year institutions should have programs to educate their STEM faculty and advisors on the premedical requirements and preparation for students to continue on their premedical pathway to four year institutions. In addition, programs are needed to increase awareness of financial aid, academic preparation through collaborative learning programs for two year STEM programs at HSI schools.

- **Post-baccalaureate programs for STEM premedical students.**
  The value of post-baccalaureate programs in preparing minority students for medical school was also discussed, and it was suggested that such programs could fall under the funding for graduate fellowships outlined in the President's budget for STEM education. The recommendation was for increased support for the Master's degree programs linked to the HSIs and HBCUs STEM programs.

- **Increase awareness of research diversity needed for new knowledge for future health equity.**
  Participants noted that there is an artificial distinction between STEM biomedical versus health professional career tracks. Biomedical research careers and the health professions are both part of STEM, and efforts to enhance science education and to expand the health professions workforce are linked. Health professionals play an important role in the research enterprise. There is a shortage of physician clinicians, and many physicians also have an interest in biomedical research, and translational research requires the expertise and contribution of both laboratory and clinical researchers.

- **Participants also called for the articulation agreements between community colleges and four-year colleges to be expanded to include medical schools.**

Expanding Public Private Partnerships for Diversity in STEM Programs

- **Support Federal agencies with greater authority to enter into public private partnerships.**
  It was noted that not all federal agencies have the authority to, or have limited authority to enter into public-private partnerships. Congress should develop the effort to expand this authority in order to build collaborations with STEM programs in education with the healthcare industry, technology and biotech corporations and others, especially in highly populated Hispanic and African American areas.

- **Look beyond corporate foundations for support of STEM programs.**
  Corporate foundations are often engaged in funding educational programs in poor communities, but participants noted the importance of engaging the parent corporations as well. Participants highlighted the valuable role of corporation units as resources for expertise to support STEM programs (e.g., for curriculum development or science programs), for research and development to collaborate with healthcare professionals and students, and for marketing campaigns to consumers as partners with healthcare patient advocates.

- **Increase the availability of STEM student internships**.
  Corporations can play a significant role in giving premedical STEM students hands-on career experiences through internships. Participants saw the need for more opportunities at the community level, and to reach students as early as possible.

- **Engage the health information technology sector.**
  The use of technology in health care is expanding rapidly, from telemedicine, to electronic health records, to health data analytics. As noted above, there is an opportunity for the technology sector to partner on curriculum development to ensure that health professions graduates have the tech savvy to succeed in the health workforce.

- **Develop alliances at the local and regional levels**.
  Participants stressed the importance of thinking beyond government-industry partnerships to include community-level alliances. Academic institutions, local businesses, local foundations, community agencies, and social agencies must all come together to focus on creating the pathways to opportunity for children in the community. One model that was mentioned was the STRIVE Initiative in Columbus, Ohio where a hospital system partners with private industry.

- **Provide incentives for industry involvement.**
  Participants discussed a role for states in providing incentives for more industry involvement in STEM programs, for example, tax incentives for companies for their engagement with STEM programs have been proposed in California. There are also incentives for biotechnology companies to cluster in areas near academic health centers across the nation, where there are increased opportunities for educational curriculum and collaboration with STEM programs.

- **Prioritize impact spending – community outcomes and improvement that decrease poverty and have social impact.** Participants discussed the importance of federal education policies being linked to administration priorities. There is a need to develop public-private partnerships that should be focused on community-based or social determinants in order to have a social impact. The participants were supportive of reducing poverty in our communities in order to impact the opportunities for STEM programs to be more effective with underrepresented students.

Closing Remarks

As tens of millions of Americans gain health insurance coverage under the Affordable Care Act, there will be a significant increase in demand for health care services. The nation needs a qualified health care workforce at all levels, from physicians, nurses, and other primary care providers, to allied health technicians, technologists, therapists, and others, to health IT and health care management professionals. To be able to provide high quality, culturally competent, accessible care to meet this growing demand, we must leverage the potential of the whole of society, and bring the diversity of the country into the health care workforce. As we respond to the President's call to action to improve the STEM achievement of America's students over the next decade, we must ensure that medicine and other healthcare professions are recognized as STEM disciplines, that programs and initiatives reach those groups that are underrepresented in the health professions,

and that best practices in broadening STEM participation are identified, shared, and institutionalized.

The National Hispanic Health Foundation will work with the National Hispanic Medical Association to discuss these recommendations as well as best practices in underserved communities at its Annual Conference and at a Congressional Briefing in spring 2014. Subsequently, the results will be presented to Congress and White House officials to develop the Federal support for underrepresented students to become physicians for the next generation, given the Affordable Care Act and the increased demand for healthcare services as more Americans become insured. Federal and private sector collaboration is needed to build the STEM participation from underrepresented students across the nation. Finally, NHMA will lead an advocacy campaign with healthcare advocacy leaders and researchers to increase diversity in medicine by expansion of the HBCU and HSI STEM Programs across the nation.

Appendix A: Summit Participants

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Appendix B: Summit Agenda

National Hispanic Health Foundation
&
Josiah Macy Jr. Foundation

"The President's STEM Initiative: Expanding Health Professions Workforce and Diversity"

Department of Education – LBJ Building
400 Maryland Ave. SW
Room 1W105/108
Washington, DC

November 25, 2013

Agenda

8:00 am Registration/Check-in & Continental Breakfast

8:30 am Opening Remarks

George E. Thibault, MD
President, Josiah Macy Jr. Foundation

Elena Rios, MD
President & CEO
National Hispanic Health Foundation
& National Hispanic Medical Association

8:40 am "President Obama's STEM Initiative and a Diverse Workforce"

Mary Cassell, MPP
Education Branch Chief
Office of Management and Budget

Alexandra Ceja, MPA
Director
White House Initiative on Educational Excellence for Hispanics

Ronald E. Blakely
Associate Director
White House Initiative on Historically Black Colleges and Universities

9:20 am "Current and Planned STEM Programs: Challenges and Opportunities for Diversity in Health Professions Workforce"

Cora B. Marrett, MA, PhD
Acting Director
National Science Foundation

Lawrence Tabak, DDS, PhD
Deputy Director
National Institutes of Health

Mary Wakefield, PhD, RN
Administrator
Health Resources & Services Administration
U.S. Department of Health and Human Services

10:20 am Break

10:30 am "Private Sector Efforts to Increase STEM Students for Health Professions Workforce"

Antonia M. Villarruel, PhD, RN, FAAN
Associate Dean for Research and Global Affairs
University of Michigan School of Nursing
Institute of Medicine of the National Academies

Shirley Malcom, PhD
Director, Education and Human Resources Programs
American Association for the Advancement of Science

Marc Nivet, EdD
Chief Diversity Officer
Association of American Medical Colleges

11:15 am General Discussion

12:00 pm Working Lunch

Group Discussions Session 1 – Major Barriers

Group 1: STEM Pipeline and Diversity in Higher Education
Group 2: STEM Pipeline and Diversity in Medical Schools
Group 3: Building Public - Private Partnerships

1:30 pm Group Discussions Session 2: Recommendations

3:00 pm Group Discussions Session 3: Rank Priority Recommendations

3:30 pm Group Reports

4:45 pm Closing Remarks and Next Steps

5:00 pm Adjourn

Appendix C: Resources

The following materials were provided to participants in preparation for the summit:

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The National Hispanic Health Foundation (NHHF) is a 501c3 nonprofit organization with the mission to improve the health of Hispanic populations and other underserved. NHHF is the policy and education arm of the National Hispanic Medical Association (NHMA), an advocacy organization representing over 50,000 licensed Hispanic physicians in the U.S. For more information visit http://www.nhmafoundation.org