Stanford Medical Youth Science Program (SMYSP)

Institute of Medicine

Producing Future Providers from Underrepresented Groups to Address Diversity Workforce Needs: A Pipeline Program Approach

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Stanford University School of Medicine
Urgent Need: Diverse Science and Health Professions Workforce

Despite decades of implementing precollege science education programs, African Americans, Latinos, and Native Americans remain critically underrepresented in college and science/health professions.

Low income populations equally underrepresented.

Results in large disparities in science education and workforce diversity.
Who Goes to College?
Students at the Top 146 U.S. Colleges by Family Income

90% of students from families in top half
7% from families in next-to-bottom quarter
3% from families in bottom quarter
10% from families in bottom half

The movement to maintain diversity in healthcare professions expands well beyond U.S. hospitals and medical schools. The movement begins with fostering student interest in science and health early in their academic careers. This interest is fostered more earnestly during their collegiate years.
K-12 Science Education Crisis

70% of African American and 64% of Latino students in California score below basic proficiency in algebra and geometry by 8th-11th grades, (compared with 30% of Whites and Asians).

Class sizes soaring, schools in disrepair, teachers lacking credentials, poorly equipped labs, outdated science textbooks, schools with duck tape on light switches to conserve energy.

Survey of 923 California elementary schools: 80% teachers spend <1 hour/week teaching science.
President Obama’s Educate to Innovate Campaign

President promoting science education.

Focus on activities outside public school classrooms.

Enlists broad sector to champion science education.

Campaign will be limited if private and public universities/medical schools not included.

Stanford Medical Youth Science Program: The Organization

Mission:
- Increase knowledge about the sciences and health professions.
- Offer guidance about college admissions.

Framework:
- Offers both university- and school-based programs,
- Reaches very low-income and underrepresented minority (URM) high school students, and
- Serves rural and inner city communities in Northern California.

Medical student Elizabeth Zambricki teaching high school students
University-Based Program
Overview:
University-Based Program

5-week Summer Residential Program on campus

Priority to students who are not on track for college and first generation college students

24 students annually from Northern California from over 300 applicants (524 to date)

Led by staff of 10 Stanford undergraduates
Components: University-Based Program

**Hands-on, participatory science:** anatomy labs and simulations.

**Research experience:** teach scientific process and learn “health literacy.”

**Hospital internships:** exposure to health careers and hands-on medicine.

**Academic Lectures:** faculty lectures on basic sciences to public health.

**SAT Preparation/College Guidance:** select appropriate college choices, enhance test taking skills and financial aid opportunities.

**Mentorship/role models:** health professionals, undergraduate/graduate students reinforce student development.

**Long-term support:** provides college and career guidance beyond program.
Potential Into Purpose

“The SMYSP experience is a multidimensional one, developing potential into purpose.”

Tiffany C. Anaebere, Counselor and Director (2004, 2006) Second year medical student at Duke University School of Medicine
Undergraduate Staff Profile

Stanford Undergraduates (usually sophomores, juniors, and seniors)

To date, 157 undergraduates have served as Summer Residential Program staff (directors, counselors)

Live with 24 high school students in a residential house

Various majors, primarily pre-meds and usually of similar ethnic backgrounds as the high school participants

Participate in professional development training and academic courses
Undergraduate Training

Skill Enhancement:
- Delegation
- Decision Making
- Goal Setting
- Time Management
- Conflict Mediation
- Meeting Facilitation
- Project Planning
- Public Speaking
- Teamwork
- Relationship Building
- Evaluation
Academic Course Work to Prepare Undergraduate Staff

Three quarter long undergraduate course that combines:

- Power and Privilege
- Service Learning
- Health Disparities
- Social Advocacy

Student staff:

- **Explore** and reflect upon three levels of identity.
- **Apply** skills learned or enhanced to aid in implementing SRP activities.
- **Act** as a change agent for the communities they serve.
22-Year Evaluation Results of SMYSP High School Participants

- 524 graduates of SMYSP since its inception in 1988, all low income.
- 99% of college-aged participants admitted to college.

Characteristics of Program Participants, 
n= 524

**Gender (%)**
- Male: 49
- Female: 51

**Ethnicity (%)**
- African-American: 22
- Latino: 33
- Native American: 5
- Southeast and East Asian: 28
- White, non-Latino: 7
- Other ethnicity: 7

**Low Family Income (%)**: 100
Type of College
Students Who have Attended or are Attending College

Community Colleges 12%
State Universities 12%
Other Private Colleges 20%
Stanford or Ivy Leagues 10%
University of California* 46%

* Attending or attended UC Berkeley 38%, UC Davis 29%, UCLA 19%.
Majors in College

Biomedical Sciences/ Physical Sciences - 58%

Social/Sciences/Liberal Arts - 42%
4-Year College Graduation Rates by Ethnicity

84% have graduated from 4-year colleges*

**SMYSP graduation rates** from 4-year colleges*

- 78% African-American
- 81% Latino
- 82% Native American
- 73% White
- 96% Asian

**U.S. graduation rates** from 4-year colleges, 25-34 year old adults

- 15% African-American
- 10% Latino
- 10% Native American
- 31% White
- 55% Asian

* Of age-eligible alumni.

Work and School Status of 4-year College Graduates

- 48% attend or have graduated from medical or graduate school
  - 34% graduate school
  - 14% medical school
- 46% are or are becoming health professionals
## Educational Outcomes:
Undergraduate Staff, 1988-2010, n=157

<table>
<thead>
<tr>
<th>Degree Type</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science majors</td>
<td>84</td>
</tr>
<tr>
<td>Still completing Stanford</td>
<td>5</td>
</tr>
<tr>
<td>4-year degree completed at Stanford (B.A. or B.S.)</td>
<td>32</td>
</tr>
<tr>
<td>Master’s level degree (M.S., M.A., M.B.A., M.P.H.)</td>
<td>17</td>
</tr>
<tr>
<td>Ph.D., J.D. completed</td>
<td>5</td>
</tr>
<tr>
<td>M.D. in process or completed</td>
<td>42</td>
</tr>
</tbody>
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Future Outlook

Based on SMYSP outcomes, if one university in each state would support such a program, in 20 years more than 10,000 diverse low-income students would enter science and health professions.

SMYSP Costs, Funding and In-Kind Support

University-Based Program/Summer Residential Program Costs $250,000 annually

Program supported entirely by Faculty Director and Executive Director writing grants and seeking private donors

Implementing sustainability model

In-Kind support is provided by the School of Medicine, Stanford and Veteran’s Hospitals and Stanford University
2-Day Non-Residential Workshop

Current sophomores, juniors, or seniors, preparing for a 4-year college

Interest in pursuing a health or medical career

Priority given to those who have a B average or higher in the sciences

Participate in:

– Anatomy and surgery simulations
– Genetics lab demonstrations
– Medical ethics discussions
– One-on-One essay writing sessions with Stanford Admissions Officers
SMYSP Resources

*Healing Journeys: Teaching Medicine, Nurturing Hope* by Marilyn Winkleby and Julia Steele

Life stories of 16 SMYSP alumni and program vignettes

**Health Disparities Curriculum**

The health of an individual is embedded within a social context

The health of a community is shaped by resources (goods and services) and policies which can create disparities when distributed unequally

Students can address health disparities by advocating for changes in their schools and communities
Opportunity of a Lifetime and Health Careers: Make it Happen!

**Opportunity of a Lifetime**

30-minute documentary of Summer Residential Program

Documents the life-changing experiences of 24 high school students and their families

**Health Careers: Make it Happen!**

Showcases a “day in the life” of five ethnically diverse health and medical professionals who discuss their jobs and commitment to health equity
Value Added:
Stanford and the School of Medicine

• *Supports Stanford’s outreach efforts* to academically talented low-income and ethnic minority high school students, raising the awareness of Stanford in diverse communities.

• *Brings local, state, national, and international recognition* to Stanford and the School of Medicine through documented excellence and success.

• *Provides multi-disciplinary and cross-departmental teaching, leadership, public service, and learning opportunities* for undergraduate, graduate, and medical students as well as faculty.
A Diversified Workforce

This program changed my life. When I got to Stanford I found that I could do it after all.
It was the best experience I ever had.

*German Hernandez, M.D., 1989 Participant*

*Graduate of Stanford University and Harvard Medical School*
*Nephrologist, El Paso, TX*

SMYSP was the catalyst in my decision to pursue public health.

*Juan Ibarra, DrPh., 1990 Participant, 1996 Co-Director*

*University of California, Berkeley, Public Health Analyst*
A Diversified Workforce

We don't just sit and listen like in school.  
*Pamona Purdy, 1994 Participant*  
*Physician Assistant, Lassen Medical Group*

My horizons were broadened by exposure to this program and the remnants of its influence still hold strong today.  
*Estell Williams, 2003 Participant*  
*Second year medical student, University of Washington School of Medicine*
A Diversified Workforce

My experience with SMYSP sparked my desire to be an advocate for people striving for success in the midst of underserved opposition.

Jasmine Smith, Co-Director 2004
Resident, Internal Medicine-Pediatrics, Phoenix, AZ
Wake Forest University School of Medicine and School of Business

SMYSP is the single best melding of education and medicine I have seen.

Leo J. Hindery, Jr., Donor
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