INCREASING THE DIVERSITY OF THE HEALTH CARE PROFESSIONS

K-12 Networks of Support

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CONNECTING THE DOTS

Written by: Brightstar Ohlson, M.S., Gibson & Associates

Connecting the Dots

A Comprehensive Approach to Increase Health Professions Workforce Diversity in California

Inquiry 7: Increasing the Diversity of the Health Professions K-12 Networks of Support

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About the Initiative

The Connecting the Dots Initiative:
A Comprehensive Approach to Increase
Health Professions Workforce Diversity in California

This is one of seven reports that share findings from a coordinated set of inquiries commissioned by The California Endowment. The purpose is to foster a more comprehensive, evidenced-based understanding of the issues, challenges, and opportunities associated with efforts to increase health professions workforce diversity. Each report includes a set of targeted recommendations to increase health professions workforce diversity in California. The basic theme and title of the initiative is "Connecting the Dots," reflecting an understanding of the need for a thoughtful, deliberate, and sustained commitment by the full spectrum of educational institutions, health professions employers, businesses, community stakeholders, and other leaders in the public and private sectors. The Public Health Institute and UC Berkeley School of Public Health formed a partnership to conduct the research and take action as part of The Connecting the Dots Initiative, and worked in collaboration with UCSF Center for Health Professions, Gibson and Associates, and the Praxis Project.

Impetus for the Connecting the Dots (CTD) Initiative was provided by earlier reports from the Institute of Medicine, The Sullivan Commission, and The UCSF Center for Health Professions. These reports documented the dramatic under-representation of many racial and ethnic groups in the health professions and provided evidence that a more diverse health workforce can contribute to improved access and quality for health status for all Americans. They also made the case that increased representation is essential to our future health workforce and economy. The Connecting the Dots Initiative builds on those earlier reports by documenting the current state of affairs in California and developing an evidence-based, comprehensive strategy to increase health workforce diversity. The Connecting the Dots Initiative reports include:

- A quantitative assessment of the current level of diversity in CA health professions education institutions and among practicing professionals.
- A qualitative assessment of issues, challenges, and opportunities based on key informant interviews with the leadership of health professions education institutions, health professions employers, and state regulatory agencies.
- Profiles of over 30 exemplary practices to enhance health professions diversity
- An analysis of how the issue of diversity is framed in the California media, and strategies to reframe the public dialogue.
- Qualitative and quantitative research with health professions students, faculty and alumni to explore the benefits of diversity in the educational environment.

- A comprehensive annotated bibliography and literature review of diversity-related research to date.
- A qualitative assessment of K-12 networks of support to pursue health careers in four CA communities.

All seven reports can be found at http://www.calendow.org/Article.aspx?id=2290. The Connecting the Dots Initiative is in its next phase to support the implementation of the targeted recommendations. For more information, please contact Shelly Skillern at sskillern@phi.org

About the Author
Brightstar Ohlson, M.S. is a senior associate at Gibson & Associates, a research and evaluation firm located in Oakland, California. She conducts public health research and community planning to address issues of health disparities, poverty, and educational inequity.

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Background

As the population in California continues to become a more linguistically and culturally diverse one, the need for health professionals who reflect that diversity is ever more pressing. Minority health professionals are more likely to work in under-served communities, can facilitate better client-provider communication and are more likely to advocate for the interests of minority populations. Foundations, universities and government agencies have recognized the need for improving the diversity of the health professions for many years, investing in a range of efforts to address this issue.[1] Despite a number of privately and publicly funded ventures over the last two decades, there has been little progress made in the number of people from under-represented ethnic and cultural groups entering the health professions.[2] In a number of studies examining barriers to increasing health care diversity, researchers have identified social, economic and institutional factors which continue to limit the representation of minority students in colleges, universities and health professions schools. In order to increase the diversity of the applicant pool, researchers and stakeholders have argued, greater investment in the K-12 educational pipeline must be made.[3]

A number of privately and publicly funded programs and initiatives at the local, state and federal level have been implemented to strengthen the K-12 educational pipeline. In 1996, the Association of American Medical Colleges and the Robert Wood Johnson and Kellogg Foundations initiated the Health Professions Partnership Initiative (HPPI), which funded 26 partnerships between health professions schools and K-12 schools, districts and community-based organizations. [4] The University of California operates programs at all of its campuses designed to reform K-12 education at a school or district-wide level, expose students to higher education and the health professions and/or to improve academic achievement of under-represented students. Community colleges and state universities, as well as museums, non-profit organizations and school districts have also sponsored a number of programs and initiatives aimed at improving educational opportunities for minority students. Such initiatives have involved partnerships between non-profit institutions and organizations and schools or communities, with the majority targeting an individual cohort of minority students. While most have sought to improve academic achievement, expose students to the health professions and/or raise the aspirations of minority students, several have focused school or district-wide reform. Most K-12 programs aimed at preparing minority students to enter the health professions are concentrated at

1. Council on Graduate Medical Education (COGME). (2005). Seventeenth Report: Strengthening the Pipeline to Medical School.
2. Jan Carline and Davis Patterson. (2004). Learning from Others: A Literature Review and How-To Guide from the Health Professions Partnership Initiative. Association of American Medical Colleges.
3. Grumbach, K. et al. (2003). Strategies for Improving the Diversity of the Health Professions. The California Endowment; Carline and Patterson, Learning from Others Literature Review; Council on Graduate Medical Education. (2005). Seventeenth Report: Minorities in Medicine, an Ethnic and Cultural Challenge for Physician Training.
4. The Health Professions Partnership Initiative is an extension of the Project 3000 by 2000 initiative, which aimed to increase the number of minorities matriculating in medical school to 3000 by the year 2000. Three rounds of five-year grants were funded between 1996 and 2005. www.HPPI-2020.org

the high school level, though efforts to improve science literacy and expose students to the health professions are present at the K-8 as well. [5]

The approach most commonly employed among K-12 programs aimed at increasing the diversity of the health professions is the cultivation of individual cohorts of students, followed by the implementation of school-centered reforms. Several researchers have argued that student-centered programs (especially those delivering enrichment or career exposure activities) at the K-12 have been shown to have little impact on increasing the diversity of the applicant pool downstream (in higher education or graduate school). The notion that a group of students could be cultivated and followed throughout the educational pipeline from middle school through professional school has also been questioned. [6]Several researchers note that the search for model programs or best practices in individual programs sustains the focus on individual school and student-centered programs, rather than on exploring strategies for communities or regions to collectively tackle the issue of minority achievement. The lack of achievement is rooted in very complex social and educational issues- ones that cannot be solved through a single program, but rather through sustained, community-wide efforts.[7]

While studies have examined the characteristics, qualities and effectiveness of individual programs working towards the goals of increasing the diversity of the health professions across the educational pipeline, little research has been conducted on the ways that communities or regions are working across programs and institutions to create coordinated K-12 networks of support that support minority achievement. Previous studies have found that most K-12 programs and initiatives tend to operate in isolation from other efforts to improve minority achievement in their communities and that substantial opportunity for collaboration remains.[8] By pooling resources, developing local or regional strategies and developing systems of support across the pipeline, communities are better poised to strengthen the academic and educational outcomes of minority youth.

Building on the findings of Patterson and Carline, the purpose of this study is to develop a model for communities to work across programs and sectors to create networks of support at the K-12 that increase the academic achievement and educational attainment of under-represented youth. The model was developed through a review of existing literature on partnerships, minority achievement and K-12 efforts to increase the diversity of the health professions, as well as interviews with experts in the field of health care workforce diversity and K-12 education. This model was used to examine the ways in which communities are working across sectors and phases of the pipeline to implement local and regional efforts. The results of this study are presented in two sections: Section I: K-12 Network of Support Model and Section II: K-12 Network of Support: A Replication Guide. The purpose of this report (Section I) is to present relevant literature, methods for the study and a description of the networks of support model.

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5. Grumbach et al., Strategies for Improving the Diversity of the Health Professions.

6. Patterson and Carline, Literature Review and How to Guide from the HPPI

7. Ibid; Grumbach et al., Strategies for Increasing the Diversity of the Health Professions

8. Patterson and Carline, Literature Review

Section I is organized as follows:

- ❧ Relevant Literature
- ❧ Methods
- ❧ K-12 Network of Support Model
- ❧ Conclusion

Relevant Literature

Several excellent studies have examined major trends, issues and barriers along the K-12 pipeline, as well as the effectiveness of existing initiatives, strategies and partnerships. The Association of American Medical Colleges commissioned a literature review and how-to-guide for K-12 partnerships on increasing under-represented minorities in the health professions. This report outlined the lessons learned from the three rounds of grants funded through the Health Professions Partnership Initiative (HPPI), which ran from 1996-2005.[9]   In a separate report, Carline and Patterson conducted an extensive literature review of K-12 partnership programs and initiatives.[10]

The table below outlines key findings from the academic literature review:

Key Findings from the HPPI Literature Review

❧ Student-centered programs should address academic achievement, rather than career exposure and enrichment.

❧ Programs focused on academic achievement must start early, be intensive and be available throughout the educational pipeline.

❧ Systemic efforts, rather than those that are student-centered, offer greater opportunity for change, but require a greater commitment of resources.

❧ Efforts to improve minority representation in the health professions should be part of larger initiatives to improve minority achievement across communities. There is an overall lack of coordination among different programs within regions and across the educational pipeline.

Carline and Patterson describe the barriers to increasing health care diversity, outlining inequitable educational opportunities, social, cultural and economic barriers and institutional factors which negatively impact academic and social outcomes among minority students. Inequitable educational opportunities mean that minority youth are less academically prepared at all phases of the educational pipeline than their white peers. Social, cultural and economic factors in minority communities also contribute to poor academic achievement. Minority students enter Kindergarten significantly less prepared than their peers, are more likely to live in poverty and be exposed to violence and instability in their families and communities. Garnering the resources and supports necessary to overcome the tremendous disadvantages facing minority communities requires substantial commitment from educators, universities, local businesses, government and the communities themselves.

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9 Patterson and Carline, Literature Review and How to Guide from the HPPI.

10 Patterson and Carline. (2004). Literature Review on Partnerships Compiled of the Health Professions Partnership Initiative. Association of American Medical Colleges.

In a separate study, one of the few comprehensive evaluations of K-16 interventions and strategies to increase the diversity of the health care workforce, Grumbach and his colleagues outlined trends in the number of under-represented minorities in the educational pipeline from pre-school through college. [11]   The study also catalogued the major federal, state and regional initiatives, programs and strategies evaluated the evidence of effectiveness of a range of intervention strategies. Consistent with the findings of Carline and Patterson, as well as other researchers, Grumbach found that the problem of under-represented minorities in the health professions is rooted in societal inequities facing minority communities. Lack of educational opportunity and academic achievement is the source of minority under-representation in the health professions. Grumbach argues, "To address racial and ethnic disparities in the health professions means to confront fundamental social inequities in educational and life opportunities in the U.S."[12]

In regards to the effectiveness of current approaches to increase health care workforce diversity, Grumbach notes that current efforts appear to positively impact minority representation in the health care professions. However, he also notes that there are opportunities for better inter-agency coordination to improve educational success of under-represented minority students. There is insufficient evaluation of programs and intervention strategies to determine which components or approaches actually result in positive student or community outcomes. While funders are drawn to programs that target high school and college-age students because they can more easily integrate a career exposure component, they must also weigh the value of funding early education pipeline interventions. [13]

In addition to the research on K-12 approaches to increase health care workforce diversity, the research on effective partnerships is relevant to K-12 efforts and informed the design of the networks of support model. Partnerships are frequently at the center of efforts to strengthen the K-12 pipeline. Partnerships not only allow for the pooling of intellectual, human and financial resources, but also represent the best chance at making progress on the issue of educational inequity. [14] Partnerships may involve a variety of stakeholders, including, but not limited to university faculty, district leaders, parents, community leaders and local business and take on several different forms. Partnerships may sponsor a number of programs and strategies or focus on the implementation of a single strategy. The following is a framework for classifying K-12 partnerships: [15]

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11 Grumbach et al., Strategies for Improving the Diversity of the Health Professions.

12. Ibid.

13. Ibid.

14. Patterson and Carline, Literature Review for the HPPI. California Alliance of Pre-K-18 Partnerships, Literature Review. http://www.ced.csulb.edu/california-alliance/literature.html.

15. Wilbur, F. P., & Lambert, L. M. (1991). Linking America's Schools and Colleges: Guide to Partnerships & National Directory. Washington, D.C. American Association for Higher Education.

Partnership Type	Description
Student-Centered Programs and Services:	Services or programs that target an cohort of students. Programs may be within school (i.e. focused on improving individual student achievement) or after-school (i.e. enrichment activities such as science summer camps or mentoring programs).
Educator-Centered Programs and Services:	Services or programs aimed at teachers. Purpose is to improve teacher recruitment and retention, preparedness, or professional development programs within a school or across a district.
District or School-wide Reform Efforts:	Efforts that address district or school-wide reform, often focusing on reducing the achievement gap through innovations in curriculum and instruction or implementation of new accountability strategies.
Programs to Mobilize, Direct and Promote Sharing of Resources	Efforts may include advocacy, community organizing, networking and establishing new partners to garner and deploy resources (often to support school reform).

The role of partnerships in strengthening the K-12 educational pipeline has been substantially researched by researchers, foundations and universities alike. [16] The California Alliance of Pre-K-18 Partnerships, a university-based research group has analyzed a number of educational partnerships that are working to improve the academic achievement of minority students. The University of California, Office of Health Affairs prepared a report cataloguing that major partnerships and outreach activities geared toward increasing minority representation in the health professions, focusing on those sponsored by the system's schools of medicine, dentistry and optometry. The table below outlines the primary barriers to creating successful K-12 partnerships :[17]

Barriers to Partnership

- ❧ Lack of a shared vision
- ❧ Lack of trust between schools and universities
- ❧ Differing world views and organizational cultures
- ❧ Differing institutional practices, policies and procedures
- ❧ Inconsistent funding streams
- ❧ Regulatory environments that limit innovation
- ❧ Lack of institutionalization.

Despite these challenges, most agree that progress towards educational equity will only be achieved when multiple stakeholders work together. Partnerships can drive systemic change and by offering a forum for dialogue among their partners, they can renew a sense of hope and a desire to implement change among their members. Partnerships that have authentic buy-in from parents, students and community-leaders and stakeholders can achieve measurable gains and long-term sustainability.[18]

16. California Alliance of Pre-K-18 Partnerships. Literature Review. http://www.ced.csulb.edu/california-alliance/literature. html. Hamos, James. "Framing K-12 Partnerships in Order to Make a Difference." ed. Ella F. Cleveland and Ann Steinecke, June Supplement, Academic Medicine, Vol.81, No. 6 (2006): S11-S14. Patterson, Davis and Carline, Jan. "Promoting Minority Access to Health Careers through Health Profession-Public School Partnerships: A Review of the Literature." ed. Ella F. Cleveland and Ann Steinecke, June Supplement, Academic Medicine, Vol. 81, No.6 (2006): S5-S10.
17. California Alliance, Literature Review. Patterson and Carline. Literature Review of the HPPI. 2004.
18. California Alliance of Pre-K-18 Partnerships. Literature Review.

Methods

This study consisted of two phases of research. The first phase involved an extensive internet search of existing literature on K-12 efforts to strengthen the pipeline in California and key informant interviews with experts in the field, including funders, policymakers and advocacy organizations. Sixteen key informant interviews were completed with experts. The second phase of the research was a qualitative review of K-12 networks of support present in four to five communities across California. The goals of the study were: (1) to develop a model of a K-12 Network of Support, (2) to examine the type and level of networks of support present in four to five diverse communities in California and (3) to identify entry points for a range of stakeholders to support K-12 efforts to improve the pipeline. The study sought to answer the following questions:

❧ What would a coordinated network of support look like if it was fully developed? What are the key components and elements of such a network?

❧ Are efforts to increase workforce diversity primarily occurring at the programmatic level? What does partnership look like in the communities surveyed?

❧ To what extent have efforts to address the academic and social needs of under-represented minority students engaged stakeholders from diverse sectors, including health care delivery organizations, local health departments, businesses and universities? What are the opportunities for engagement?

❧ What are the barriers to creating community-wide efforts or networks of support that extend beyond a single program within a community or a region? What are the opportunities for improving the level of coordination at a community or regional level?

PHASE II: SELECTION OF COMMUNITIES

Five communities were selected to be included in this study, including: Imperial County, South Los Angeles, Oakland, Sacramento and Santa Cruz County. Researchers sought to identify communities with diverse ethnic populations, as well as at least one program that contributed to the overall goal of increasing the diversity of the health professions. Researchers used results of a review of the K-12 pipeline in California to identify communities with programs that demonstrated positive student and community outcomes, long term sustainability and the investment of multiple institutional partners. While many communities in California meet these criteria, the final selection was informed by a desire to achieve a regionally diverse sampling. Researchers also conducted online research to obtain demographic data and program information. Several communities with rich networks of support were not included either because they have been profiled and researched substantially elsewhere and/or they were included in a separate inquiry in the Increasing Health Professions Workforce Diversity in California Study.

Methods

Community Selection Criteria	
Criteria	**Description**
Ethnic diversity	A diverse ethnic population; under-represented minority populations constitute a significant percentage of the community's population.
K-12 Program or Initiative Present	Presence of a successful K-12 program or initiative that supports the overall goal of increasing the diversity of the health professions. Programs may do so by addressing one or more of the following objectives: a. Increase the academic achievement of minority students b. Provide health professions career exposure and advisement to minority students c. Improve science education/science literacy of minority students
Cross-institutional Collaboration and Two or More Areas of Programmatic Focus	Presence of multiple educational services and supports programs and/or cross sector collaboration. Communities should have programs that address two or more of the following areas of focus: a. Student Centered Services and Supports b. Parent and Family Centered Services and Supports c. K-12 Education System Services and Supports d. Formal partnerships or collaboratives that attempt to integrate and coordinate a. through c.
Additional Criteria	Other criteria that were weighed included: a. Investment of multiple institutional partners b. Evidence of long-term sustainability (i.e. the initiative has been institutionalized, sustainable funding exists and/or the program has been sustained for five or more years) c. Quantitative evidence that demonstrates positive outcomes (supplied by external evaluators, state agencies, or the program/initiative itself) d. Use of research based practices in programming e. Recommended in an interview with an expert during the first phase of the study

DATA COLLECTION

Research activities were conducted from October, 2006 through July, 2007 by Gibson & Associates and University of California, Berkeley School of Public Health staff. For Phase I key informant interviews, researchers developed a protocol and list of questions designed to elicit information about model programs and initiatives, as well as barriers to K-12 partnerships. Researchers interviewed experts over the phone, which lasted between thirty minutes and one hour. During Phase I researchers also conducted internet searches of existing literature.

For Phase II of the study, researchers developed a protocol for contacting participants and then phoned and emailed program administrators and directors from programs in each community to introduce the study and invite them to participate in a phone interview. Of the five communities contacted, four agreed to participate. Researchers were unable to establish contact with any of the identified programs in South Los Angeles. The four communities that were ultimately included in the review and profiled in the guidebook include:

1. **Imperial Valley:** El Centro Unified School District and the Valle Imperial Project in Science (VIPS)
2. **Oakland:** FACES of the Future
3. **Sacramento:** Math, Engineering and Health Sciences Academy at Sacramento High School
4. **Santa Cruz:** Educational Partnership Center (serving Monterey, San Benito and Santa Cruz Counties).

Researchers developed an interview protocol that included an introduction to the study, seven open-ended questions and five follow-up (open-ended) questions. The interview protocol was designed to address the research goals and was informed by the Network of Support model. Questions addressed individual program efforts, program and community impact, types of partnerships/networks of support, level of engagement of health professions schools and other stakeholders, and evaluation, as well as challenges and opportunities to creating networks of support. Interviews were conducted over the phone and lasted between half an hour and an hour. Program administrators were asked to identify additional stakeholders in their community to be interviewed for the study. Researchers followed up with additional contacts via email and phone and used the same protocol to conduct phone interviews. A total of twelve interviews were conducted with program administrators and other partners, with between two and four individuals interviewed in each community.

DATA ANALYSIS

For Phase I of the study, researchers used results of key informant interviews with experts, research on partnerships and existing reports on the K-12 pipeline to develop the network of support model and identify potential programs for Phase II. The interviews conducted for Phase II were used to develop the replication guide. Results were recorded on paper during the phone interview and sorted by region. In addition to the study parameters assigned to this inquiry, the Network of Support model described below was used as an organizing framework for analyzing data. Researchers coded and analyzed results by region and by study parameter, which included:

- Network of Support/Partnerships
- Entry Points for Health Professions Schools and Other Community Stakeholders
- Interventions
- Evaluation

LIMITATIONS

This study examined the ways that communities in several diverse geographic communities in California are addressing the academic and social needs of under-represented minority youth across the K-12 pipeline. Due to limited resources, the intent of this study was not evaluative. Rather, researchers sought to examine the level of partnership and collaboration, entry points for health care sector stakeholders and issues for further research. While program administrators provided much of the information reported here, the purpose of the study was not to assess or evaluate the effectiveness of individual programs. For each community surveyed, researchers interviewed between two and four informants and conducted extensive online research on community and program characteristics. Researchers limited their investigations to K-12 programs and efforts that contributed to the overall goal of increasing the diversity of the health professions. As a result, the profiles presented here represent the results of this research, but are not intended to serve as exhaustive or comprehensive descriptions of the K-12 efforts in each community. As the findings and recommendations clearly indicate, this study represents a first step in developing a framework for establishing effective K-12 networks of support in communities across California.

K-12 Network of Support Model:

The purpose of this section is to articulate a model for a comprehensive and sustained community-wide effort. The model outlined here is termed a "network of support" and is a desired end-state, rather than a process for improving the effectiveness of existing institutions, programs or partnerships. A network of support refers to a system of supports and services that spans the K-12 educational pipeline, involves stakeholders from diverse sectors and is integral to the way that a community meets the educational and social needs of under-represented minority youth. A community-wide effort involves the coordination of student-centered supports and services, family-centered supports and services and the K-12 public education system within a given community. Ideally, a community possesses each of these programmatic elements, as well as processes and structures that support both the impact and the sustainability of the network.

VISION AND SCOPE OF A K-12 NETWORK OF SUPPORT

Rather than being viewed as an external force or effort that aims to enact change on existing institutions or programs, a network of support encompasses the formal and informal institutions, systems, programs and initiatives that serve youth in a community. While educational partnerships share many of the same qualities and characteristics of a network of support, the partnership process is characterized here as a step in the process towards creating a network of support. A network of support represents an educational partnership that has become truly institutionalized within a community and includes as its partners institutions from a broader range of sectors. A network of support is comprised of public and private sector institutions from many disciplines, networks of community members and local business, each with the appropriate understanding of the scope and interconnectedness of the issue and the policies, procedures and other formalized commitments to ensure continuity of support. Through this shared understanding and ability to implement change on an institutional level, both the informal and formal systems that interact with youth will become more effective at achieving positive outcomes.

A network of support includes several programmatic areas, as well as multiple levels at which it operates. It must include a process or structure that is beyond the purview of an individual institution and facilitates ongoing collaboration. In community wide coalitions and collaboratives, this process is often referred to as partnership. Partnership is the coming together of multiple stakeholders around one or more issues. In regards to a network of support, this act of partnership is a process that facilitates a systems perspective around improving the educational and life outcomes of under-represented minority youth. It is also a process that moves a community towards defining a vision for youth and implementing programs and practices that support that vision, both in the youth-serving institutions and programs and throughout the community. The work of partnership is a defining aspect of a network of support and works on three levels, as outlined in the table below: [19]

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19. Ellen Foley, Amy Abreton and Karen Walker (2003). Case Studies in Community Partnerships No. 2: A Youth Development Partnership in San Francisco.

Levels of Partnership
- ✀ Site level/individual program level- direct service provision
- ✀ Intermediary- site support, facilitating multi-stakeholder involvement
- ✀ Initiative level- developing funding streams, accountability, strategic planning and long-term sustainability

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Networks of support share a common vision of improving the educational and life outcomes of under-represented minority students. By strengthening the network of K-12 educational services and supports, a community can prepare under-represented students to succeed in college and beyond. Because the lack of diversity in the health professions is rooted in educational inequities that begin early in life, a network of support must begin at the earliest point possible and span throughout the educational pipeline. With this end in mind, a network of support should include organizational partners, institutions and stakeholders that interface with each phase of the pipeline. Ideally, a network of support has a well developed strategy for addressing the academic and social needs of under-represented minority students at each phase of the K-12 pipeline.

HIGH SCHOOL LEVEL OBJECTIVES AND FEATURES OF A K-12 NETWORK OF SUPPORT

Because high school age students are close to entering college and potentially making career decisions, advocates for increasing the diversity of the health professions have invested significant effort and funds on programs targeting the 9th-12th grades. However, such programs generally operate independently and are not part of a larger network of supports and services. In a network of support, both student-centered and system-centered programs comprise integral components of a network of support. The table below outlines the primary high school level objectives of a network of support:

High School Level Objectives	
Student-Centered Objectives	System Centered Objectives
Improve academic achievement of under-represented students	Improve the academic rigor of all subjects, especially science and math education
Improve high school graduation rates	Improve the qualifications of teachers in core subject areas
Improve college entry rates	Retain highly qualified teachers in schools serving high numbers of under-represented students
Improve science and math literacy and achievement	Develop linkages with middle school and post-secondary institutions to ensure continuity of support
Expose students to health careers and professions	Create or support the use of research-based curriculum that provides hands-on and real life experiences for learning.
Expose students to research and college culture	Provide social and academic supports to under-represented students

High School Level Objectives	
Student-Centered Objectives	System Centered Objectives
	Develop opportunities to apply learning in health-related contexts.
	Improve the system's capacity to develop a high quality instructional program

K-8 LEVEL OBJECTIVES OF A K-12 NETWORK OF SUPPORT

While most of the investment in strengthening the K-12 pipeline has occurred at the high school level, early intervention is needed to significantly increase the applicant pool of under-represented students further down stream. While some middle school programs offer career exposure and internship opportunities, the K-8 is often left out of the conversation about increasing health care diversity. Researchers and practitioners agree that academic preparation beginning early in life is necessary for success in a health profession.[20]   The table below outlines the primary objectives of K-8 networks of support:

K-8 Level Objectives	
Student-Centered Objectives	System Centered Objectives
Improve academic achievement of under-represented students	Improve the academic rigor of all subjects, especially science and math education
Improve science and math literacy and achievement	Improve the qualifications of teachers, especially in math and science subject areas
Develop English language skills of Limited English Proficient students	Retain highly qualified teachers in schools serving high numbers of under-represented students
Ensure completion of gate-keeper mathematics courses (i.e. Algebra) at the middle school.	Develop linkages with pre-school, middle school and high schools to ensure continuity of support
Expose students to science and health professions	Create or support the use of research-based curriculum that provides hands-on and real life experiences for learning.
	Provide social and academic supports to under-represented students

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20. Grumbach et al., *Strategies for Improving the Diversity of the Health Professions.*

At the K-8 a network of support aims to provide under-represented students with sufficient academic preparation to succeed at middle school, high school and beyond. A great challenge faced by practitioners at each phase of the pipeline is the poor academic preparation among students entering each phase. At the high school level, for example, significant effort is dedicated to remediation among 9th and 10th graders, indicating the need for additional investment in the K-8. A network of support works to ensure articulation across each phase of the K-12 pipeline.

When multiple stakeholders in a community come together to build a network of support that addresses all levels and facets of the K-12 educational pipeline, communities experience greater and more long-lasting benefits. A network of support facilitates a shared vision, as well as common goals and objectives across institutions, sectors and stakeholders within a single community. By pooling human and financial resources, aligning programmatic objectives and goals and coordinating services and initiatives, a network of support maximizes the impact of services and supports that target under-represented minority youth. A fully developed network supports systemic change in each of the participating institutions, as well as the community at large. The table below outlines the essential components and programmatic elements of the network of support model:

Model of K-12 Network of Support

Model of a K-12 Network of Support

Objective	Definition
To strengthen the K-12 education pipeline in minority communities through partnership, collaboration and coordination of educational services and supports. By strengthening the K-12 educational supports and services more under-represented minority students will be academically and socially prepared to succeed in college and beyond.	**K-12 Network of Support:** A coordinated, community-wide effort to align and integrate K-12 education supports and services. A community wide effort involves the coordination of student-centered supports and services, family-centered supports and services and the K-12 public education system within a given community. Ideally, a community possesses each of these programmatic elements, as well as a partnership process that facilitates ongoing collaboration. Essential components such as leadership commitment and sustainable funding are essential to creating a network of support. Stakeholders may participate on a programmatic level, as well as in efforts to sustain and further the network.

Community Outcomes
A network of support allows communities to: • Improve efficacy of organizations and initiatives by pooling financial and human resources • Align programmatic objectives and goals and meet student needs through a range of approaches • Maximize impact of services and supports targeting under-represented minority youth • Improve the educational achievement and attainment of under-represented students throughout the educational pipeline

Essential Components

Component	Description
Vision and Scope	*A shared commitment to a sustainable, community-wide effort to create a K-12 network of educational supports and services for youth within a community, with the ultimate goal of enhancing the educational opportunities and attainment of under-represented minority youth.*
Forums for cross-system collaboration and implementation.	*Formal or informal processes that facilitate collaboration and alignment of goals, objectives and outcomes. May include formal community-wide partnerships, task forces and other groups that have consistent membership and meet regularly. An individual may coordinate these forums.*

Model of a K-12 Network of Support

Essential Components

Component	Description
Leadership	*Must have commitment and participation of institutional leaders and/or individuals who possess the power to implement change within their own organization or institution.*
Multi-stakeholder Participation	*Should have the participation of a range of stakeholders to maximize pooling of resources, alignment of objectives across programs and sectors and support on-going coordination of services. Stakeholders may include: colleges and universities (including health professions schools), local government, public health departments, universities, parents, local businesses, community leaders, schools, hospitals and health care delivery sectors, medical societies, organized labor and foundations.*
Sustainable Funding	*Sustainable funding sources to fund both the programmatic elements described below, as well as cross system collaboration and coordination. Funding includes federal, state, local and foundation (family and conversion) sources.*
Evaluation	*Mechanisms to evaluate the overall level of effectiveness of the K-12 network of support, as well as the effectiveness of individual programs within the network.*

Programmatic Elements

Program Type	Types of Services and Supports	Description
Student Centered Services and Supports	Academic Support	Academic support, tutoring, out-of-school time academic enrichment, academic counseling and guidance.
	Academies	Individual schools or academies (i.e. health professions and science academies) that serve a particular group of students and/or offer a specific curricular focus or theme
	Psychosocial Support	Counseling, mentoring, peer support and motivational programs
	Professional Opportunities	Career counseling, exposure, internships and advisement.
	Financial Support	Scholarships, stipends, financial incentives and other programs to encourage entry into the health professions.

Model of a K-12 Network of Support

Program Type	Types of Services and Supports	Description
Parent and Family Centered Services and Supports	Parent and Family Education	*Education to families about their children's education, academic achievement and potential career paths. Also includes programs that provide parents with opportunities for additional educational attainment.*
	Parent Leadership and Advocacy	*Efforts that focus on developing parent leadership, peer education (family to family), community organizing for families, culturally-specific parent leadership programs.*

Program Type	Types of Services and Supports	Description
System-centered Services and Supports	Curriculum and Instruction	*Efforts to reform or improve the quality of curriculum or instruction at an individual school or entire district; may focus on professional development of teachers and/or the implementation of research-based curriculum to enhance the academic achievement of under-represented minority students.*
	Workforce Preparedness and Recruitment	*Efforts to reform or improve the preparedness of teachers by addressing teacher education and/or recruitment.*
	Administration and Leadership	*Efforts to reform the overall effectiveness of leadership and administration within a school or district. Efforts may include efforts to reform organizational culture, financing, or administration. May also focus on strategic planning and implementation.*

Conclusion

California is home to a wealth of programs and initiatives working to improve the diversity of the health professions by strengthening the K-12 educational pipeline. Unfortunately, many such programs operate independently of one another, with little coordination across programs, sectors and phases of the pipeline. Researchers concur that the lack of progress in increasing the diversity of the health care workforce is rooted in enduring educational inequities and a lack of coordinated efforts to confront them. The challenge of improving the academic achievement of under-represented students is one that requires sustained and intensive commitment by stakeholders from a range of sectors, as well as the affected communities themselves. Communities must come together on a local and regional level to develop comprehensive networks of support so that under-represented minorities benefit from the educational, professional and life opportunities they deserve. The purpose of this report is to provide communities and stakeholders with a framework to take on this challenge.

Section II:

A Replication Guide to Creating K-12 Network of Support

Section II:Table of Contents

Introduction

California is home to a wealth of programs, initiatives and partnerships of varying scope that aim to improve the academic achievement, as well as the career and education goals of under-represented minority students at the K-12 level. While most programs and initiatives aimed at preparing minority students to enter the health professions are concentrated at the high school level, efforts to improve science literacy and expose students to the health professions are present at the K-8 as well. Previous research on the effectiveness of K-12 efforts to improve the diversity of the health professions has pointed to the need for greater coordination and integration of services and programs. [21] Researchers have also argued that in order to address the issue of academic achievement in under-represented minority communities, there is a need to create comprehensive and sustained efforts that involve multiple institutions and stakeholders at a regional or community level. Considerable opportunity remains for communities to improve the level of coordination across grade levels and institutions.[22] Institutions, stakeholders and communities themselves must change the way they do business and move from a focus on individual, programmatic efforts towards a community-wide focus on systemic change.

While substantial research has been conducted on the characteristics, qualities and effectiveness of individual programs working towards the goals of increasing the diversity of the health professions across the educational pipeline, little research has been conducted on the ways that communities are working across programs and institutions to create coordinated K-12 networks of support.[23] Building on the recommendations from the Health Professions Partnership Initiative evaluation and literature review, this study examines the type and level of K-12 networks of support in four diverse communities across California. This research also aims to identify strategies and entry points for health professions schools, health departments, health care service delivery organizations, local businesses and other community stakeholders to support K-12 efforts to increase the diversity of the health professions. This report outlines the successes and challenges faced by communities working towards that end, as well as opportunities to strengthen the K-12 pipeline.

This replication guide represents the second part of a two phase inquiry undertaken by Gibson & Associates as part of a larger collaboration between the Public Health Institute and the University of California, Berkeley School of Public Health, entitled Increasing Health Professions Workforce Diversity in California: A Comprehensive Strategy to Build on the IOM/Sullivan Commission Recommendations and Teaching Hospital Guidelines.

21. Jan Carline and Davis Patterson. (2004). Learning from Others: A Literature Review and How-To Guide from the Health Professions Partnership Initiative. Association of American Medical Colleges

22. Ibid; Grumbach, K. et al. (2003). Strategies for Improving the Diversity of the Health Professions. The California Endowment.

23. Ibid.

Introduction

The replication guide is organized into the following sections:

- Network of Support Model
- Community Profiles
- Key Findings
- Discussion
- Recommendations
- Conclusion

K-12 Network of Support Model:

The purpose of this section is to articulate a model of a comprehensive and sustained community-wide effort that addresses the academic and social needs of under-represented students throughout the K-12 educational pipeline. The model outlined here is termed a "network of support" and is a desired end-state, rather than a process for improving the effectiveness of existing institutions, programs or partnerships. A network of support refers to a system of supports and services that spans the entire K-12 educational pipeline, involves multiple stakeholders and is integral to the way that a community meets the educational and social needs of under-represented minority youth. A community wide effort involves the coordination of student-centered supports and services, family-centered supports and services and the K-12 public education system within a given community. Ideally, a community possesses each of these programmatic elements, as well as processes and key elements that support both the impact and the sustainability of the network.

Rather than being viewed as an external force or effort that aims to enact change on existing institutions or programs, a network of supports encompasses the formal and informal institutions, systems, programs and initiatives that serve youth in a community. While educational partnerships share many of the same qualities and characteristics of a network of support, the partnership process is characterized here as a step in the process towards creating a network of support. A network of support represents an educational partnership that has become truly institutionalized within a community and involves a greater cross section of stakeholders. It is comprised of public and private sector institutions from many disciplines and networks of community members and local business, each with the appropriate understanding of the scope and interconnectedness of the issue and the policies, procedures and other formalized commitments to ensure continuity of support. Through this shared understanding and ability to implement change on an institutional level, both the informal and formal systems that interact with youth will become more effective at achieving positive outcomes.

A network of support includes several programmatic areas, as well as multiple levels at which it operates. It must include a process or structure that is beyond the purview of an individual institution and one that facilitates ongoing collaboration. In community wide coalitions and collaboratives, this process is often referred to as partnership. Partnership is the coming together of multiple stakeholders around one or more issues. In regards to a network of support, this act of partnership is a process that facilitates a systems perspective around improving the educational and life outcomes of under-represented minority youth. It is also a process that moves a community towards defining a vision for youth and implementing programs and practices that support that vision, both in the youth-serving institutions and programs and throughout the community. The work of partnership is a defining aspect of a network of support and works on three levels, as outlined in the table below[24] :

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24. Ellen Foley, Amy Abreton and Karen Walker (2003). Case Studies in Community Partnerships No. 2: A Youth Development Partnership in San Francisco.

> Levels of Partnership
>
> � Site level/individual program level- direct service provision
> ✦ Intermediary- site support, facilitating multi-stakeholder involvement
> ✦ Initiative level- developing funding streams, accountability, strategic planning and long-term sustainability

There are opportunities for stakeholders to participate at one or more of these levels in a network of support. A range of governance and organizational models may exist and are well documented elsewhere in the literature.[25] Here, the concern is with the essential elements that allow a network to thrive. Networks of support share a common vision of improving the educational and life outcomes of under-represented minority students. By strengthening the network of K-12 educational services and supports, a community can prepare under-represented students to succeed in college and beyond. Because the lack of diversity in the health professions is rooted in educational inequities that begin early in life, networks of support must begin at the earliest point possible and span throughout the educational pipeline. With this end in mind, a network of support should include organizational partners, institutions, and stakeholders that interface with each phase of the pipeline. Ideally, a network of support has a well developed strategy for addressing the academic and social needs of under-represented minority students at each phase of the K-12 pipeline.

HIGH SCHOOL LEVEL OBJECTIVES AND FEATURES OF A K-12 NETWORK OF SUPPORT

Because high school age students are close to entering college and potentially making career decisions, advocates for increasing the diversity of the health professions have invested significant effort and funds on programs targeting the 9th-12th grades. However, such programs generally operate independently and are not part of a larger network of supports and services. In a network of support, both student-centered and system-centered programs comprise integral components of a network of support. The table below outlines the primary high school level objectives of a network of support:

High School Level Objectives	
Student-Centered Objectives	System Centered Objectives
Improve academic achievement of under-represented students	Improve the academic rigor of all subjects, especially science and math education
Improve high school graduation rates	Improve the qualifications of teachers in core subject areas
Improve college entry rates	Retain highly qualified teachers in schools serving high numbers of under-represented students

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25. California Alliance of Pre-K-18 Partnerships. Literature Review. http://www.ced.csulb.edu/california-alliance/literature.html.

High School Level Objectives	
Student-Centered Objectives	System Centered Objectives
Improve science and math literacy and achievement	Develop linkages with middle school and post-secondary institutions to ensure continuity of support
Expose students to health careers and professions	Create or support the use of research-based curriculum that provides hands-on and real life experiences for learning.
Expose students to research and college culture	Provide social and academic supports to under-represented students
	Develop opportunities to apply learning in health-related contexts.
	Improve the system's capacity to develop a high quality instructional program
	Support a college going culture in under-represented families and communities

Networks of support at the high school level include programs with an explicit focus on increasing health care workforce diversity (through career exposure or internship activities), as well as those that aim to more generally improve academic achievement through system's change.

K-8 LEVEL OBJECTIVES AND FEATURES OF A K-12 NETWORK OF SUPPORT

While most of the investment in strengthening the K-12 pipeline has occurred at the high school level, early intervention is needed to significantly increase the applicant pool of under-represented students further down stream. [26] While some middle school programs offer career exposure and internship opportunities, the K-8 is often left out of the conversation about increasing health care diversity. Researchers and practitioners agree that academic preparation beginning early in life is necessary for success in a health profession.[27] The table below outlines the primary K-8 objectives of K-12 Network of Support:

K-8 Level Objectives	
Student-Centered Objectives	System Centered Objectives
Improve academic achievement of under-represented students	Improve the academic rigor of all subjects, especially science and math education
Improve science and math literacy and achievement	Improve the qualifications of teachers, especially in math and science subject areas
Develop English language skills of Limited English Proficient students	Retain highly qualified teachers in schools serving high numbers of under-represented students

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26. Patterson and Carline, Literature Review and How to Guide from the HPPI.
27. Grumbach et al., Strategies for Improving the Diversity of the Health Professions.

K-8 Level Objectives	
Student-Centered Objectives	**System Centered Objectives**
Ensure completion of gate-keeper mathematics courses (i.e. Algebra) at the middle school.	Develop linkages with pre-school, middle school and high schools to ensure continuity of support
Expose students to science and health professions	Create or support the use of research-based curriculum that provides hands-on and real life experiences for learning.
	Provide social and academic supports to under-represented students

At the K-8 a network of support aims to provide under-represented students with sufficient academic preparation to succeed at middle school, high school and beyond. A great challenge faced by practitioners at each phase of the pipeline is the poor academic preparation among students entering each phase. At the high school level, for example, significant effort is dedicated to remediation among 9th and 10th graders, indicating the need for additional investment in the K-8. A network of support works to ensure articulation across each phase of the K-12 pipeline.

When multiple stakeholders in a community come together to build a network of support that addresses all levels and facets of the K-12 educational pipeline, communities experience greater and more long-lasting benefits. A network of support facilitates a shared vision, as well as common goals and objectives across institutions, sectors and stakeholders within a single community. By pooling human and financial resources, aligning programmatic objectives and goals and coordinating services and initiatives, a network of support maximizes the impact of services and supports that target under-represented minority youth. A fully developed network supports systemic change in each of the participating institutions, as well as the community at large. The table below outlines the essential components and programmatic elements of the network of support model:

Model of a K-12 Network of Support

Objective	Definition
To strengthen the K-12 education pipeline in minority communities through partnership, collaboration and coordination of educational services and supports. By strengthening the K-12 educational supports and services more under-represented minority students will be academically and socially prepared to succeed in college and beyond.	**K-12 Network of Support:** A coordinated, community-wide effort to align and integrate K-12 education supports and services. A community wide effort involves the coordination of student-centered supports and services, family-centered supports and services and the K-12 public education system within a given community. Ideally, a community possesses each of these programmatic elements, as well as a partnership process that facilitates ongoing collaboration. Essential components such as leadership commitment and sustainable funding are essential to creating a network of support. Stakeholders may participate on a programmatic level, as well as in efforts to sustain and further the network.

Community Outcomes

A network of support allows communities to:

- Improve efficacy of organizations and initiatives by pooling financial and human resources
- Align programmatic objectives and goals and meet student needs through a range of approaches
- Maximize impact of services and supports targeting under-represented minority youth
- Improve the educational achievement and attainment of under-represented students throughout the educational pipeline

Essential Components

Component	Description
Vision and Scope	*A shared commitment to a sustainable, community-wide effort to create a K-12 network of educational supports and services for youth within a community, with the ultimate goal of enhancing the educational opportunities and attainment of under-represented minority youth.*
Forums for cross-system collaboration and implementation.	*Formal or informal processes that facilitate collaboration and alignment of goals, objectives and outcomes. May include formal community-wide partnerships, task forces and other groups that have consistent membership and meet regularly. An individual may coordinate these forums.*

Model of a K-12 Network of Support

Essential Components

Component	Description
Leadership	*Must have commitment and participation of institutional leaders and/or individuals who possess the power to implement change within their own organization or institution.*
Multi-stakeholder Participation	*Should have the participation of a range of stakeholders to maximize pooling of resources, alignment of objectives across programs and sectors and support on-going coordination of services. Stakeholders may include: colleges and universities (including health professions schools), local government, public health departments, universities, parents, local businesses, community leaders, schools, hospitals and health care delivery sectors, medical societies, organized labor and foundations.*
Sustainable Funding	*Sustainable funding sources to fund both the programmatic elements described below, as well as cross system collaboration and coordination. Funding includes federal, state, local and foundation (family and conversion) sources.*
Evaluation	*Mechanisms to evaluate the overall level of effectiveness of the K-12 network of support, as well as the effectiveness of individual programs within the network.*

Programmatic Elements

Program Type	Types of Services and Supports	Description
Student Centered Services and Supports	Academic Support	Academic support, tutoring, out-of-school time academic enrichment, academic counseling and guidance.
	Academies	Individual schools or academies (i.e. health professions and science academies) that serve a particular group of students and/or offer a specific curricular focus or theme
	Psychosocial Support	Counseling, mentoring, peer support and motivational programs
	Professional Opportunities	Career counseling, exposure, internships and advisement.
	Financial Support	Scholarships, stipends, financial incentives and other programs to encourage entry into the health professions.

Model of a K-12 Network of Support

Program Type	Types of Services and Supports	Description
Parent and Family Centered Services and Supports	Parent and Family Education	*Education to families about their children's education, academic achievement and potential career paths. Also includes programs that provide parents with opportunities for additional educational attainment.*
	Parent Leadership and Advocacy	*Efforts that focus on developing parent leadership, peer education (family to family), community organizing for families, culturally-specific parent leadership programs.*
Program Type	**Types of Services and Supports**	**Description**
System-centered Services and Supports	Curriculum and Instruction	*Efforts to reform or improve the quality of curriculum or instruction at an individual school or entire district; may focus on professional development of teachers and/or the implementation of research-based curriculum to enhance the academic achievement of under-represented minority students.*
	Workforce Preparedness and Recruitment	*Efforts to reform or improve the preparedness of teachers by addressing teacher education and/or recruitment.*
	Administration and Leadership	*Efforts to reform the overall effectiveness of leadership and administration within a school or district. Efforts may include efforts to reform organizational culture, financing, or administration. May also focus on strategic planning and implementation.*

Community Profiles

Four communities are profiled in this guide, including: Imperial County, Oakland, the City of Sacramento and Santa Cruz County. [28]   Researchers sought to identify communities with diverse ethnic populations, as well as the presence of at least one program that contributes to the overall goal of increasing the diversity of the health professions. In this section, the demographic and geographical characteristics of each community surveyed are described. This section also includes a brief overview of the key programs and initiatives in each community, outlining key elements, strategies and partnerships. The information presented here was obtained through conversations with program administrators, organizational and local government websites and other relevant publications.

Imperial Valley, CA

A rural and extremely geographically isolated community, Imperial Valley lies as the southeast corner of California. Approximately 140,000 residents reside in Imperial Valley, dispersed among over 4,500 square miles. Because of its proximity to the border, the Valley is home to a large number of Latino residents, Mexican immigrants and migrant workers. The County is also home to a large number of English Language Learners (61%) and is ranked as the poorest of all of California's 58 counties. The population is 86% Latino and 9% white. The primary industries in the Valley are agriculture and tourism. The County lies several hours East of San Diego, the largest nearby city and borders Mexicali, a Mexican city with a population of one million.[29]

 San Diego State University operates a satellite campus in the Valley and the Imperial Valley College serves 7,000 students annually. Imperial Valley College provides the majority of health professions training in collaboration with San Diego State University and the regional hospital. Because the Valley lacks medical and dental schools, individuals wishing to pursue such degrees must receive their education elsewhere. According to participants, Imperial Valley is home to several tight knit, first, second and third generation Latino communities, which draws many health care professionals and educators back to the Valley upon completion of their studies. The Imperial Valley Regional Occupational Program (IVROP) provides career training, mentoring and internship programs to youth and adults, including several programs that promote career exposure to the health professions (primarily nursing).

The high school graduation rate is around 90% in Imperial Valley, significantly higher than the California average.[3] College entry rates were not available, but participants reported that entry and retention rates are especially low among Latino immigrants. The K-12 education system is comprised of 16 districts and over the past ten years has made significant progress towards improving the academic achievement of low-income, Latino and English Language Learner populations. Imperial Valley is

28. Researchers identified five communities, including South Los Angeles to include in the guide, but were unable to establish contact with South Los Angeles program administrators or community leaders. As a result, four communities were included in the guide. See Section I for more information on the methods.

29. US Census, American Community Survey. (2005); Imperial County official website. www.imperialcounty.com.

30. California Department of Education official website. (2005-2006). http://dq.cde.ca.gov/dataquest/Completion-Rate/CompRate2.asp?cChoice=CoGradRate&cYear=2005-06&TheCounty=13,IMPERIAL&level=Count

home to several well established K-12 programs and initiatives designed to improve the academic achievement of English learners, as well as increase the diversity of the health professions, including the Valle Imperial Project in Science (VIPS) and the Imperial Valley Regional Occupational Program (IVROP).

The Valle Imperial Project in Science is a collaborative between San Diego State University- Imperial Valley and fourteen Imperial County school districts. In the early 1990s, El Centro Elementary School District received a three year grant from the National Science Foundation to pilot a reform of their elementary science education program. VIPS uses a research-based science curriculum and a professional development model that puts teachers at the center of all reform. In the pre-planning phases, the district sought teacher input on strategies for addressing poor student achievement and used the results to develop a teacher-led professional development model. Teacher leaders receive training in research-based curriculum and instructional strategies and then train their peers in these strategies. The science curriculum, developed by a University, provides students with hands-on science investigations and lab experience starting at Kindergarten. This hands-on approach integrates significant literacy and English language development components and has proven to be especially effective at raising student achievement in writing, math and science.[31] The pilot program was so successful that El Centro quickly adopted the program district-wide and recently added a middle school program. VIPS also expanded to serve Imperial Valley elementary schools in all fourteen districts

VIPS is especially noteworthy because it has resulted in marked gains in student achievement, achieved through system-wide reform, rather than through a cohort approach. Dr. Michael Klentschy, superintendent of El Centro Unified School District, noted that the partnership with San Diego State University Imperial Valley Campus's Teacher Education Program has been an essential ingredient to the program's success. Dr. Olga Amaral, professor of Education, has served as an evaluator of the program and helped the program develop strategies for tracking program outcomes. This partnership also ensures that the district and School of Education remain in dialogue around district needs and ultimately aids with recruitment of new teachers.

Dr. Klentschy noted that the benefits of investing in science education at the elementary school level are being felt further downstream in middle school and high school. After between five and eight years of hands-on science education, many students feel very comfortable with lab science and are signing up for Biology, Chemistry and Physics in increasing numbers when they reach high school. As a result, Dr. Klentschy reports, increasing numbers of high school students have completed the A-G requirements and are eligible to apply to the University of California. Imperial High School has seen an increase in the number of Latino students graduating from high school and being eligible to apply to the UC system. Dr. Klentschy attributes this transformation to a very simple model, founded on the principals of organizational capacity building:

Teacher Outreach and Leadership ⟶ Teacher Learning ⟶ Student Learning

Student Outcomes

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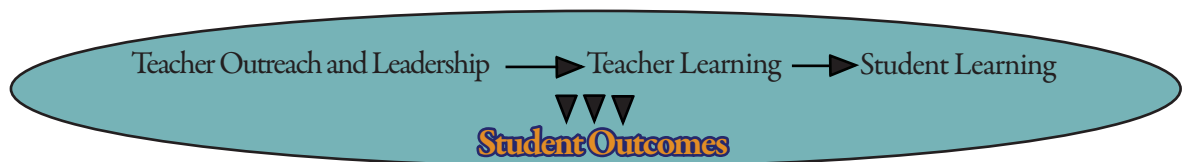
31. Leslie Garrison, and Olga Maia Amaral. 1999. "Valle Imperial Project in Science (VIPS): Four-Year Comparison of Student Achievement Data, 1995-1999."

The Imperial Valley Regional Occupational Program (IVROP) serves youth and adults and offers a range of programs aimed at preparing the regions diverse populations for careers in the health care field. IVROP operates programs that are designed to expose high school and community college students to the health care professions. The IVROP has received several grants to address workforce shortage needs in the Imperial Valley, including a recent California Endowment Grant to facilitate a community-wide planning process to address workforce diversity in the health professions. A separate grant funded a program aimed at introducing high school students to the nursing profession. A primary goal of this program is to increase the number of Imperial Valley residents entering the health professions. At the initial phases in the current community planning grant, the IVROP hopes to build a network of cross-sector partners, including local businesses, hospitals and educators to address health care workforce needs.

Sacramento, CA

Sacramento is the largest metropolitan area in the Central Valley, with a population of over two million in the four-county region, which includes El Dorado, Placer, Sacramento and Yolo counties. The primary industries are government, professional and business services, health and educational services and tourism. The unemployment rate has declined in recent years to 4.8%.[32] The City of Sacramento, the geographic community included in this study, is the seventh most populous in California, with a population of 467,343 as of 2007. The region has experienced rapid growth in the past decade and was recently identified as the most integrated city in the United States by Time magazine. A diverse community, Sacramento is 46% white, 16% African American, 20% Asian/Pacific Islander and 25% Latino. About a third of the city's population speaks a language other than English at home. And, approximately 20% of individuals live below poverty. [33]

The city of Sacramento has seen the birth of several initiatives designed to address education and workforce needs in recent years. In 2001 Sacramento City Unified School District partnered with Linking Education and Economic Development (LEED) and several other community partners to launch the Education for the 21st Century Initiative (E-21), a district-wide reform effort to create more personalized learning experiences for all high school students in the district. With funding from the Bill and Melinda Gates Foundation, the district successfully converted all its high schools to small schools or learning communities (small schools within a larger school) in 2004. Career academies, including a health professions academy were established as part of this effort. Health academies are designed to address workforce needs and prepare students academically for success in college and beyond. While academic programs vary significantly from one school to another, most include a health infused curriculum, health/science electives (such as anatomy and physiology), advanced placement courses and internship components.

In a separate effort, St. Hope, a non-profit organization working to revitalize the Oak Park neighborhood in Sacramento has also led educational reform, particularly for low-income and minority youth. St. Hope operates several educational programs from pre-school through high school, as well as overseeing economic re-development efforts in the Oak Park community. Spearheaded by Kevin Johnson, a former NBA star and graduate of Sacramento High, St. Hope is dedicated to improving the educational opportunity and attainment of low-income and minority youth. In 2003 St. Hope took over the floundering Sacramento High School, converting it to a charter school comprised of four academies, including a math, engineering and health sciences academy.

As a result of the E-21 initiative and St. Hope, Sacramento is currently home to two high school health academies, the Math, Engineering and Health Sciences Academy (MEHSA) at Sacramento

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32. California Employment Development Department, Sacramento County Economic Snapshot. http://www.labor-marketinfo.edd.ca.gov/cgi/databrowsing/?PageID=4&SubID=147.

33. US Census, American Community Survey. (2005). Totals do not equal 100% as Latino respondents may check any race

High School and Health Professions High. Both schools are designed to improve the educational opportunity and attainment of low-income and minority youth, while also addressing health care workforce needs. MEHSA currently serves 365 9th- 12th graders. Health Professions High currently serves 260 9th and 10th graders on a newly constructed campus (funded by a City bond measure, as well as school and private funds). Local businesses, Sutter Health, UC Davis Medical System and School of Medicine, educators, families and community-based organizations have served as integral partners in the development and operation of both academies.

 A St. Hope school, MEHSA is located in the economically disadvantaged Oak Park neighborhood and is part of St. Hope's larger community revitalization efforts. Because Sacramento High School is a charter school, MEHSA currently draws students from across the city of Sacramento and reflects the diversity of the greater community with approximately 46% African America, 24% Latino, 18% Asian, 7% White and 2% Native American. Fifteen percent are English Language learners and 62% qualify for free and reduced lunch. [34] Originally a math and engineering themed academy, MEHSA added a health science focus because of student interest. MEHSA's goal is to prepare students for college through a rigorous academic curriculum, social support and a health, science and math infused curriculum. MEHSA has developed strong and thriving partnerships with local businesses, as well as the UC Davis Health System and School of Medicine, where students participate in internship programs, career days and the Saturday Academy. A program founded and operated by UC Davis medical students, the Saturday Academy provides MEHSA's freshman and sophomore students with a taste of medicine through hands-on science classes taught by medical students, followed by "rotations." Classes are taught in a UC Davis Medical School building, which gives MEHSA's students continued exposure to the university and research setting. In addition, the vertical mentoring component benefits both medical students and high school students. The medical students say that giving back to high school students helps them reconnect with their initial motivation and sense of idealism that led them to pursue medical school. MEHSA's students are not only inspired by the accomplishments of their teachers, but through these classes have a chance to learn more about the journey to becoming a doctor.

MEHSA has an explicit focus on sending its graduates to four year colleges by creating a college going school culture and removing barriers to college entry. As PK Diffenbaugh, principal of the school noted, "One of our primary goals is to get students to apply and get accepted to a four year college or university. Without that, their options are limited." Students are required to take the SAT and beginning in 2008 will be required to complete the A-G course requirements. MEHSA recently hired a college counselor whose sole responsibility is to help students gain entrance and attend four year colleges. MEHSA's efforts have recently paid off. In 2007, the Academy graduated its first group of students to attend MEHSA all four years. Eighty percent of graduating seniors have been accepted to four-year colleges, including UC Davis, UC Los Angeles and Stanford University. Nearly all of the school's graduating seniors plan to continue their post-secondary education next fall. Seventy percent of Sacramento High's graduating seniors have been accepted to four-year colleges, compared to 20% five years ago.[35] MEHSA's principal, PK Diffenbaugh, notes that their success thus far lies in high expectations, a rigorous curriculum and a relentless focus on student achievement.

34. Great Schools Official Website, Sacramento High School student profile. http://www.greatschools.net/modperl/browse_school/ca/12574
35. Seth Sulka and Adrienne Hall. (2007) "4-year Graduation Rate Soars at Sac High." http://www.sthopepublic-schools.org/sachigh/docs/news/

Health Professions High, a district school, was the result of a multi-year planning process that commenced several years prior to its opening in 2005. The design and operation of Health Professions High was made possible by significant collaboration between health care delivery organizations, health professions schools, the local school district, educators and local businesses. This effort was unique in that it was designed to successfully address both the educational needs of low-income and minority students, as well as workforce needs of the health care sector in the greater Sacramento region. A coalition of health care delivery organizations, educators and UC Davis came together in 2000 to form the Healthy Community Forum and to develop strategies to address the region's health care workforce needs. The Healthy Community Forum decided to pool their institutions' community benefit dollars and use this as seed money for projects in the Sacramento region addressing health care workforce shortages. Sutter Health, one member of this coalition, became an integral partner in the development of the Health Professions High School. The school not only received financial support from Healthy Community Forum members, but has worked with health care delivery sector partners to obtain assistance with curriculum development, mentoring, internship programs and program planning. [36]

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36. Health Professions High has been profiled by other organizations, including ConnectEd California. See www.connectedcalifornia.org for more information.

Oakland, CA

Oakland is the largest and most diverse city in Alameda County, with a population of 373,000. The City is 31% African American, 32% White, 1% Native American and 17% Asian/Pacific Islander. Twenty-five percent of the city's residents are Latino (of any race). [37] A stone's throw from San Francisco, Oakland is a central player in the Bay Area economy, with a thriving port and international airport. Federal, local and state governments are major employers, as are the local port and international airport. Along with the rest of Alameda County, the city has experienced a loss of jobs over the past five years, particularly in manufacturing. The health care and educational services sectors recovered some of their losses in recent years. The city boasts the largest children's hospital in Northern California and several colleges and universities within the city and in neighboring communities.[38]

Oakland Unified School District serves 48,000 students and includes 138 schools. The district has been plagued by budgetary problems and poor student achievement for many years and is currently being run by a state appointed administrator. The high school graduation rate is 61%, the lowest in Alameda County. Latino, African American and South East Asian students are disproportionately represented among high school drop outs. [39] Several initiatives to reform K-12 instruction have been implemented over the past ten years. Recently the Bill and Melinda Gates Foundation provided $10 million in funding to the district to facilitate reform at the high school level.

For many years the health care delivery sector and the neighboring University of California, Berkeley have served as vital partners on a range of initiatives designed to improve the educational and vocational opportunities available to minority students. Unfortunately, many of these efforts have been funded by a single source for a limited term and have not achieved long-term sustainability. However, one program that has achieved longevity and generated substantial financial and community support is FACES for the Future, a program sponsored by Children's Hospital and Research Center, Oakland. FACES, as it is commonly referred to, is a unique internship program targeting low-income, minority and immigrant high school students in Oakland and Berkeley. FACES was founded by Dr. Tomas Magana and Dr. Barabara Staggers of Children's Hospital out of a desire to help low-income and minority students achieve their potential, as well as a recognition of the need to increase health care workforce diversity.

A three year program, students receive academic and career advising, exposure to the health professions and psychosocial interventions and mentoring. FACES is more than an internship program, as it successfully integrates a career exposure model with the comprehensive adolescent health care model. FACES serves approximately eighty students from six high schools beginning in their sophomore year. Students who participate receive course credit, including a letter grade. The program offers a robust internship program in which students get hands-on clinical experience at Children's

37. US Census, American Community Survey. (2005).

38. California Employment Development Department, Oakland, Hayward and Fremont County Economic Snapshot. http://www.labormarketinfo.edd.ca.gov/cgi/databrowsing/?PageID=4&SubID=147.

39. California Department of Education official website. http://dq.cde.ca.gov/dataquest/.

Hospital in Oakland, paid clerkships and training in peer education. Through the psychosocial support component, students also benefit from one-on-one case management, life skills support and training, tutoring, vertical mentoring and career and education counseling. While students must apply to participate, the program looks for overall potential and selects students with varying levels of academic preparation and achievement. The student population is approximately 86% minority, serving students of Latino, African-American, Pacific Islander, Southeast Asian, Native American and Caucasian heritage. Program retention rates throughout all three years have ranged from 75% to 88% over the past four years.[40] Graduation rates of program participants mirror the retention rate, which is significantly higher than the local or state graduation rate.

FACES has achieved significant success and has recently established partnerships with other institutions and begun to share its model with other communities in California. Recognizing the power of peer support, FACES has established vertical mentoring programs through partnerships with the UC Berkeley Biology Scholars Program, a model program serving minority under-graduates, as well as a program serving middle school students at Highland Hospital. Through these partnerships, FACES students receive mentoring from low-income and minority college students pursuing a pre-medical or science degree, while also providing peer mentorship to middle school students interested in the health professions. FACES has also participated in local, regional and statewide coalitions to improve the pipeline, including the Greenlining Institute's Bridges to Health/Increasing Health Care Industry Diversity Bay Area coalition. FACES is currently providing technical assistance to the Imperial Valley Regional Opportunity Program with their design of a similar program. FACES has also worked to build linkages with the middle school and college phases of the pipeline. The program has worked with a local nursing program, the California State University system and the University of California system to ensure that FACES graduates have the appropriate opportunity and support at the subsequent phases of the pipeline so that they may pursue a career in the health field.

40. FACES for the Future program website. http://www.facesforthefuture.org/faces_successes.html.

Santa Cruz, CA

S anta Cruz County lies on the northern side of the Monterey Bay and encompasses rural, urban and unincorporated communities. With a population of 264,000, the County covers about 440 square miles. Latino residents comprise about 30% of the population. Other ethnic groups make up less than 1% of the population each. The majority of the population is white (approximately 70%). A quarter of the population speaks a language other than English at home and twelve percent live below poverty. [41] The primary industries are agriculture, tourism and educational and government services.[42] The County is served by ten K-12 school districts, the University of California at Santa Cruz, Bethany College and Cabrillo College, the local community college. While Cabrillo College offers a nursing program, the closest health professions schools are in the Bay Area. The County has experienced a significant drop in its drop out rate over the past ten years, from 12% to 2.0%. While Latino students make up approximately 45% of the K-12 population, until 2005, only 15% of all students prepared to enter a four year college were Latino. In 2005, this percentage was 45%.[43]

Santa Cruz County is home to a number of community-based organizations working to improve the educational opportunity available to Latino and low-income youth in the County. The University of California at Santa Cruz has served as an integral partner in these efforts, driving school reform at the district level, as well as operating many successful educational programs in the greater community. The UC Santa Cruz Educational Partnership Center (EPC) is an umbrella organization for a number of programs and coalitions working to strengthen the K-12 educational pipeline. The EPC's mission is to increase the college going rate among traditionally under-represented populations in San Benito, Monterey and Santa Cruz Counties. The EPC is the first point of contact for organizations wishing to establish partnerships with UC Santa Cruz and serves as a coordinating body for a number of programs, initiatives and consortiums across the greater Monterey Bay Area. The EPC implements its mission of increasing college going rates among under-represented groups by supporting system change and educational reform at all levels of the K-12 pipeline, in addition to facilitating the development and implementation of high quality student and parent-centered services.

The table below outlines EPC programs:

EPC Program	Description
Early Academic Outreach Program	A year round program targeting middle school and high school students to increase their interest in and preparedness for college.

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41. US Census, American Community Survey. (2005). Totals do not equal 100% as Latino respondents may check any race.

42. California Employment Development Department, Santa Cruz County Economic Snapshot. http://www.labor-marketinfo.edd.ca.gov/cgi/databrowsing/?PageID=4&SubID=147.

43. Santa Cruz County Community Assessment Project. (2006). Summary Report 2006.

EPC Program	Description
Gear Up	A program geared at increasing college readiness by increasing the completion of gatekeeping courses at the middle school level (includes teacher prep, curriculum development and peer tutoring).
Kids Around the University	A program to increase awareness of college as an option, targeting elementary and middle school students.
Monterey Bay Educational Consortium	An alliance among the public educational institutes in the Monterey Bay Area to improve educational attainment of students in the region. The MBEC focuses on the improvement of curriculum, teaching and policy and guides the work of the EPC.
Students Achieving A-G Expectations (SAAGE)	A program that helps sophomores complete the A-G requirements and provides guidance with completing the steps to gain admittance to college.
Transfer Partnerships Program (TPP)	A program aimed at helping community college students transfer to the University of California.
Developing Effective Engineering Pathways Program (DEEP)	A program aimed at supporting under-represented community college students towards a degree and career in engineering.
California State Summer School for Mathematics and Science (COSMOS)	A summer program designed for talented and motivated high school students at several UC campuses, including UC Santa Cruz. COSMOS gives young scholars a hands-on, four week research experience.
ScienceShare Lending Library	This program facilitates sharing of scientific equipment and materials to teachers in the Monterey Bay Area.
Affiliated Programs	
Mathematics, Engineering and Science Achievement (MESA)	
CA Reading and Literature Project (CRLP)	
UC Gateways	
ACCESS	
Monterey Bay Regional Partnership	
PEERS	
UC College Preparatory Initiative (UCCP)	

While the EPC does not currently offer programs with an explicit goal of increasing health care workforce diversity, the COSMOS program operates an intensive summer math and science program aimed at talented and motivated high school students from across the state. During the residential program at the UC Santa Cruz campus, students benefit from the rigorous four-week research program with university scientists and professors. While the program serves students of all ethnicities, COSMOS has made targeted efforts to create more diverse cohorts of students in recent years. Relying on relationships with other EPC programs that serve under-represented populations throughout the greater Monterey Bay Area, COSMOS has conducted targeted outreach in the past few years to create a more diverse applicant pool. The program works with the local MESA program and high school counselors to identify under-represented minority applicants and closely monitors their applications. The program attempts to recruit a cohort of low-income and minority youth to ensure that students do not feel isolated or intimidated during the program, in addition to removing financial barriers to participation through its generous scholarship program. Participation in the program not only strengthens under-represented minority students' applications to college, but also provides them with the opportunity to build relationships with peers who share similar academic interests. Nafeesa Owens, program director, also notes that youth of color also have the opportunity to forge long-lasting friendships with students who share similar academic interests, goals and cultural backgrounds.

The EPC, its programs and affiliates have achieved substantial progress towards their goal of increasing college going rates among traditionally under-represented populations. Executive Director, Carol Moran, emphasized that the center and its programs work with individual communities, schools and districts to design programs that meet the unique needs of the diverse populations in the region. For example, in order to reach African American students in Seaside, the EPC conducts outreach through a network of churches. In Watsonville, the EPC has developed a parent leadership/promotora model with Latino parents in order to reduce cultural barriers to college. Through its work with over thirty high schools and middle schools, the EPC has seen the college going rate triple among under-represented minorities over the last several years.

The EPC is a patchwork of relatively autonomous programs designed to achieve specific student and community outcomes, brought together by a unifying vision, common goals and a shared understanding that no single program can meet the community's diverse and many needs. Executive Director, Carol Moran, emphasized that each EPC programs occupies a niche within the larger network, developing a very specialized service and approach. The responsibility for accomplishing the goal of creating college going communities is distributed throughout the network. EPC programs collaborate around recruitment of participants for student programs and services, planning processes and ongoing research and evaluation.

While the EPC represents perhaps the most developed network of support among efforts surveyed for this study, workforce diversity in the health professions was not identified as a goal of the partnership or its affiliates at this point in time. While participants certainly recognized this as an important area for growth, they noted several limiting factors. Because the Monterey Bay Area is not home to any health professions schools and UC Santa Cruz has a small pre-health program, an institutional partner pushing for health care workforce diversity has been lacking. New programs require funding, as well as an individual or institution to drive the start up, operations and collaboration, both of which have not been available.

Key Findings

The purpose of this inquiry was to identify the types of K-12 network of support present in the communities surveyed and to analyze the extent to which they mirrored the Network of Support model described below. The inquiry also aimed to determine opportunities for increased collaboration and engagement among health professions schools, health care delivery sector organizations, local businesses and other community stakeholders to strengthen the K-12 pipeline. The findings are presented in the following categories:

- Partnerships/Network of support
- Entry Points
- Interventions
- Evaluation

PARTNERSHIPS AND NETWORKS OF SUPPORT: KEY FINDINGS

Participants were asked questions about how they partnered with other organizations and efforts, whether or not they were part of a larger community effort to address the needs of under-represented minority youth and the roles of various stakeholders in these efforts. Researchers used the network of support model and other research on educational partnerships to determine the type and level of partnership present in the communities surveyed. The purpose of the analysis of data in this category was to examine the ways in which communities are partnering across sectors and programs to create coordinated networks of support.

Finding #1: Network of Support and Partnerships

In the communities surveyed, the K-12 networks of support designed to address health care workforce diversity did not mirror those described in the Network of Support model. However, communities are engaged in diverse forms of partnerships to strengthen the K-12 pipeline, including:

1. Neighborhood revitalization efforts focused on a single neighborhood or community within a city
2. Regional efforts to address workforce shortages and needs
3. Regional efforts to address educational needs of under-represented minorities or of an entire community
4. Informal networks built on personal and professional relationships in other sectors or stages of the K-12 pipeline
5. Formalized partnerships with other institutions and stakeholders, with collaboration focused on a single programmatic effort

The model for a network of support outlined the key strategies, programmatic components and elements for a community to develop a strong and effective K-12 network of support. This inquiry found that none of the communities surveyed possess all or most of the elements outlined in the model, either because efforts were focused on a single phase of the pipeline (i.e. High School), inter-sectoral collaboration was not present and/or there was not an explicit focus on increasing the diversity of the health professions. While all communities possess a number of programs that are aimed at improving the academic attainment of low-income and minority youth, providing career exposure to the health

professions or improving science literacy, there was little evidence that communities were working across sectors or programs to create a coordinated K-12 network of support.

Despite this finding, all participants reported working in partnership with other organizations and stakeholders, primarily to further their own program's goals. In most communities, community colleges, state universities and health professions schools are actively involved in efforts to strengthen the K-12 pipeline. The bulk of partnership activities involved the exchange of resources and information and rarely involved partners from multiple phases of the K-12 pipeline or sectors. For example, a high school health academy reported many strong and vibrant partnerships that afforded its students varied learning opportunities, but longed for a forum to develop greater articulation with the middle school and college phases of the pipeline.

The study found that communities are working to strengthen the K-12 pipeline by implementing system's change on a regional or community level. This has occurred through two types of coalitions: (1) those designed to address educational inequities and (2) those designed to address current and future healthcare workforce needs. In all communities surveyed, the education sector has implemented many initiatives and programs to improve the academic achievement of low-income and minority youth. In several communities, coalitions of health care delivery organizations, health professions schools and community colleges are working to address health care workforce needs. These efforts are dedicated to developing a community or regional agenda and plan for achieving short and long term goals. While both sectors share common goals, educators and health care delivery sector participants noted that each continue to operate relatively independently of each other and that considerable opportunity for collaboration remains.

> " We are working on a regional level to address health care work force needs and are beginning to make inroads around collaborating with the public education system in our community. We have been more successful at the community college level and less successful at the K-12. We in the business community feel that educators need to adopt more of a business sense. It's also very hard to penetrate the bureaucracy. "
> -Health Care Sector Stakeholder

In a few instances, such education and health care sector coalitions have come together to accomplish shared goals. The planning and operation of Health Professions High in Sacramento brought together a number of diverse sectors. Brokered by Leading Education and Economic Development (LEED), the Healthy Community Forum, a consortium of health care delivery organizations and E-21 (a school district initiative to reform the city's high schools) collaborated on the design and operation of Health Professions High, a school that would successfully address the health care sector's need for a diverse workforce, as well as improve the academic achievement of low-income and minority students.

Finding #2: Barriers to Creating a Network of Support

Because the majority of K-12 efforts in the communities surveyed involved the design and delivery of student-centered services and programs, the creation of coordinated networks of support has been limited for several reasons:

- Public and private funds tend to be available for student-centered programs, rather than building the infrastructure of a community-wide pipeline or network;
- The lack of an individual, institution, or initiative to drive inter-sectoral collaboration, capacity building and system's change means that this task is often left to over-extended program staff;
- A programmatic focus means that activities tend to be limited to a single phase of the pipeline (i.e. middle school or high school). Articulation across different phases of the K-12 pipeline are undeveloped.
- A programmatic focus also means that transitions between phases of the K-12 pipeline (i.e. 5th grade to middle school, middle school to high school and high school to college) are not fully developed.

Several respondents noted that because the majority of funding at the K-12 is for the development of student-centered programs, rather than for cross-sector collaboration, strategic planning, or capacity building, student-centered services continue to proliferate. One informant noted that as long as funding is allocated for programmatic efforts, stakeholders will continue to work in isolation- on their individual program, within their phase of the pipeline. He reasoned that funders are often more comfortable funding student-centered services and programs because they feel that they are more likely to see a return on their investment. One stakeholder expressed frustration around this reality, exclaiming "More programs are not needed. Support the expansion, networking and collaboration within the communities that are already doing this work."

Others argued that the responsibility of inter-sectoral and inter-phasal networking often falls to program administrators and educators because other mechanisms are not in place. This poses an additional barrier, as many practitioners simply do not have the time, money or human resources to drive such a process because they are concerned with the day-to-day operations of their own program. According to several participants, networks of support are not present in their communities because a lack of time and resources prevent program administrators from reaching out beyond their phase of the pipeline or program area. One stakeholder noted that while his program serves a cohort of students very well at the high school level, he relies primarily on personal relationships with college administrators to help his students advance to the next phase.

> "We are getting our students to stay in school and graduate. We can even get them into four year colleges. But, my big concern is about how they will fare once they get there. These kids need major support once they make it to college and I'm not sure that it's there. And, right now there isn't any forum for advocating for that support, other than through my own personal contacts at different universities and colleges. "
> -School Administrator

Finding #3: Barriers to Collaboration and Partnership

While many exemplary programs and initiatives are working towards similar goals in the communities surveyed, participants reported that ongoing collaboration and partnership in student centered programs, as well as community initiatives is limited by several factors:

1. Collaboration fatigue
2. Lack of resources for coordination and collaboration functions
3. Personal and institutional politics
4. Lack of knowledge about potential partners or work of other sectors or organizations in the community
5. Differences in organizational culture, priorities and resources among different sectors
6. Lack of a forum, institution, or individual to drive and coordinate ongoing collaboration
7. A programmatic, rather than community-wide or systems focus or perspective

Barriers to collaboration and partnership that have been well documented elsewhere and were also present in the communities surveyed.[1] An important finding among these barriers is the cultural disconnect between educational stakeholders and their counterparts in the health care and business sectors. This appeared to be an issue especially with regard to those efforts involving partnerships with K-12 public schools. Virtually all programs and initiatives operating at the K-12 interface with the schools, their staff and/or the administration of the public education system. Some educators noted that successful partnerships with businesses and universities have been formed when they take time to learn about the priorities, challenges and limitations facing public schools. One educator noted that a lack of funding of the public schools means that principals are often wearing many hats, juggling human resource issues, parent relations, mandatory state testing and discipline, in addition to any partnership activities. They may not be able to dedicate enough time to developing and sustaining partnerships.

> "We tried to partner more extensively with the schools, but soon realized that if we wanted to get something done, we would need to do it ourselves. The schools are under-resourced and in many instances dysfunctional- which has created the need for our programs. We would love to create a more effective partnership with the public schools, but there is not anyone available to drive it and there are many barriers. "
> - Program Administrator

The business and health care delivery sector participants reported frustration with the often bureaucratic public education system. One partner noted that they are often frustrated and surprised by "educators lack of business sense," stating that "schools need more support around figuring out how to market their successes, manage their employees and bring more resources to their efforts. Many wonderful things are happening, but they don't know how to publicize them or take advantage of new opportunities." Stakeholders from all sectors concurred that there was a need to learn about the organizational culture of their potential partners in order to develop more successful partnerships.

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44. Patterson and Carline, Literature Review and How to Guide from the HPPI; California Alliance of Pre-K-18 Partnerships. Literature Review.

KEY FINDINGS: ENTRY POINTS

Participants were asked about the types of partnerships their organization participated in, the role of health professions schools and other community stakeholders in their efforts, barriers to partnerships and potential opportunities for expanding participation of health care sector stakeholders. The purpose of this analysis was to identify the ways in which health care sector stakeholders contribute to the K-12 pipeline, as well as additional opportunities for their meaningful participation.

Finding #1: Types of Support Provided by Health Care Sector Stakeholders

In the communities surveyed, health professions schools, health care service delivery organizations and local businesses have participated as vital partners in strengthening the K-12 pipeline, primarily as partners in health academies, enrichment programs (career exposure, internships and mentoring) and science education reform.

- Financial support was most often cited by participants as the type of support received.
- Collaboration on student-centered programs, such as enrichment, internship and mentoring programs was also frequently noted.
- Less frequently cited, but noted by many as a need, was support around planning, program development, curricular design (science), professional development, cross-sector networking and collaboration and teacher recruitment.

Support from a range of health care sector stakeholders was reported in all of the communities surveyed, with financial support most frequently cited. Financial support came from a variety of partners and ranged from sponsorship of events to large scale grants funding the entire operating budget of a program. Practitioners emphasized that there were many small, but meaningful opportunities for local businesses to participate. A local bank and health care delivery organization sponsored a community outreach and health fair for a health academy, paying for all refreshments. More importantly, noted the principal, was their presence at the event- when families saw their signs, banners and booths it lent credibility to the school.

Several health care sector stakeholders also lent support around program planning, collaboration, technical assistance and fund development. A university partnership with a school helped them secure funding from other partners. In another community, a partnership with a university ensured ongoing evaluation. Many health care delivery sector and health professions school partners assisted with the design of health and science curriculum. The Discussion Section outline the types of support currently provided, as well as additional opportunities.

Finding #2: Health Care Sector Engagement across the K-12 Pipeline

Health professions schools' and other institutional partners' involvement in K-12 efforts and initiatives was not evenly distributed across the K-12 pipeline or across geographic areas in the communities surveyed. Their presence as partners was most frequently noted in efforts targeting high schools students. Their involvement as partners in K-8 efforts was less frequently noted.

- Educators and practitioners working at the high school level were more likely to identify health care workforce diversity as relevant to their program or initiative and were more likely to view health professions schools or health care service delivery organizations as natural partners in their efforts.
- Educators and practitioners working at the K-8 phase of the pipeline were less likely to identify workforce shortage issues or the need for increased diversity of the health professions as a high priority and did not tend to view health professions schools or health departments as natural partners.
- Educators in rural communities reported that geographic location of health professions schools is a barrier to their participation as partners, especially in rural communities. Nursing schools, community colleges and health care delivery organizations were more likely to be identified as partners in those communities lacking dental or medical schools.

Health care sector stakeholders have participated primarily in efforts targeting the 9th-12th grade phase of the pipeline, in a number of ways (outlined further in the discussion section). Educators reasoned that because high school students are closer to making career decisions, programs dedicated to career exposure, advising and preparation make more sense at the high school level. Health care sector participants noted it was easier to gain buy in from their boards and employees for a program serving high school students at a health academy than it was to support a K-8 science program. The former was more clearly connected to health sector needs and priorities.

Many practitioners at the K-8 phase of the pipeline recognized the goal of increasing the diversity of the health professions as a valuable one, but viewed it as a lower priority, especially when it came to developing new partnerships or programs for students. Some questioned the impact of career exposure or enrichment programs at the elementary or even the middle school, reasoning that students are too young to commit themselves to a career path. Others emphasized that stakeholders wishing to strengthen the K-8 pipeline should focus on developing schools' and communities' capacity to prepare students academically at the earliest point possible. Practitioners at the high school level also concurred on the need for greater investment in the K-8 phases of the pipeline. One informant noted that because so many minority students fail to receive a rigorous K-8 education in math and science, a great deal of resources must be dedicated to their remediation at the high school level.

> " We have not had the opportunity to partner with the health care sector. I'm not really sure why. We haven't been approached and I'm not really sure how they would fit in. Perhaps they could support an after school program or mentoring program. But, it's not something we've ever considered. "
> - Middle School Administrator

Rural regions and those communities lacking a dental or medical school were less likely to identify health professions schools as partners and were more likely to rely on health care delivery sector organizations, community colleges and local universities as partners. As a result, efforts to increase the diversity of the health professions were sometimes limited to nursing or allied health pathways. In other communities, the absence of a health professions school meant that health care workforce diversity was not a primary focus of community efforts.

> "There is not a medical school or health profession school in our community, other than the nursing programs at the community college. So, health care diversity has not been a priority for our community. We recognize it as an important issue, but there hasn't been an organization or institution advocating for it."
>   -Program Administrator

Finding #3: Opportunities for Engagement of Additional Stakeholders

In the communities surveyed, K-12 partnerships to address work force diversity were not developed with the local health department or school health centers.

- While many schools have school health centers or clinics, several participants noted that opportunities to incorporate student learning activities should be further explored.
- Though health departments were not mentioned as current partners, participants suggested that opportunities for them to provide vertical mentorship and exposure to public health and health care management careers should be explored.

When asked about their current partners within the health care sector, participants did not tend to view the health department as a natural partner. Several administrators mentioned that conversations had been initiated, but that a partnership had not yet been established. Others noted that they had never been approached, but that it was important to expose students to public health and healthcare management professionals, especially those with similar cultural backgrounds. School health centers were mentioned as potential partners to expand health career exposure to more schools and grade levels.

INTERVENTIONS: KEY FINDINGS

Participants were asked to describe their programs and other community efforts to address the academic needs of under-represented youth in their community. They were asked to describe their successes and biggest impact, as well as to identify additional community needs. The purpose of this analysis was to examine gaps and needs in the K-12 pipeline and to identify the strategies used to address the academic and social needs of under-represented minority youth.

Finding #1: Understanding Inequity within the K-12 Public Education

According to participants, a primary challenge to strengthening the K-12 pipeline is the deep social, economic and educational inequity afflicting minority communities. Educators concurred that developing appropriate academic and social interventions to reduce these inequities is both the greatest challenge and highest priority of any effort to strengthen the pipeline.

• Educators reported a need for health care sector stakeholders to promote and involve themselves in programs and initiatives that improve academic outcomes for minority students at all stages of the pipeline, while also achieving secondary outcomes related to exposure, enrichment and scientific literacy.

• Many educators welcomed health care sector stakeholders as potential partners, with the caveat that efforts be aligned to existing school, community and student needs.

• The academic needs of students educated by the public education system should be incorporated into program design.

At all phases of the K-12 educational pipeline, educators are struggling to improve the academic achievement of minority students. For many educators, even those actively involved in efforts to increase health care workforce diversity, exposure to the health professions and enrichment activities are viewed as secondary goals. One practitioner reported that without appropriate academic preparation, exposure and enrichment will do little for the low-income and minority students in his community. Another noted that one cannot work on strengthening the K-12 pipeline for under-represented minority youth without addressing the deficits of the public education system.

> "I got into this work because I was angry. My colleagues felt that minority students weren't succeeding because they didn't care, were lazy or just didn't have the ability to do the work. I wanted to prove them wrong. Anyone who has worked in an urban school knows the type of educational inequities facing minority students. Unfortunately, this is often left out of the conversation. We need to do a better job communicating this reality to legislators, the public and policy makers."
> -Program Administrator

Finding #2: Addressing the Academic and Psychosocial Needs of Under-Represented Minority Youth

In the communities surveyed, many stakeholders noted that under-represented minority students have a range of psychosocial and academic needs that few programs are currently addressing, including:

• The need for students to learn about the culture of college, research and science. There is a need for internships and academic courses where students have the opportunity to conduct research, present and defend findings and apply learning to real life contexts.

• The need for under-represented minority students who excel academically to have opportunities to be with a peer group which values and supports academic achievement, inquiry and a college-going culture.

- The need for vertical mentoring between minority students in the K-12 pipeline and their counterparts who are further on down the pipeline (in college, medical school, other health profession schools, or those practicing in the field).
- The need to incorporate effective academic remediation strategies at the middle school and high school level.

While several programs surveyed in the study include components designed to address the above areas, most target high school students and are not sufficiently available to meet current demand, according to participants. Stakeholders also concurred on the need to initiate such supports at the middle school level or earlier, noting that unless psychosocial and academic supports in the K-8 are significantly strengthened, under-represented minority students will continue to face substantial academic and personal barriers at high school and beyond. Educators wanted assistance with identifying and implementing appropriate remediation strategies, especially for students who possessed the motivation to enter the health professions, but lacked the academic preparation.

> "Our ninth graders are significantly behind when they get here. We need support in integrating best practices in remediation. All the internships in the world are not going to help if our students don't have a handle on the academics. This is perhaps our greatest challenge- addressing the lack of academic preparation."
> -School Administrator

Finding #3: Building System Capacity throughout the Pipeline

While student-centered programs and services comprised the majority of K-12 efforts to strengthen the academic achievement and preparation of minority students, efforts to build system capacity throughout the K-12 pipeline were also present in several communities surveyed, including:
- Curriculum development in math, health and sciences across a district or school
- Professional development in math and sciences for teachers across a district
- Whole school reform and career academies

As discussed above, student-centered programs and initiatives constitute the majority of K-12 efforts to increase the diversity of the health professions. In a few of the communities surveyed, stakeholders from a variety of sectors and/or phases of the pipeline are working to improve the capacity of the K-12 educational system to provide a more equitable education to low-income and minority youth. Rather than serving an individual cohort of under-represented minority students, these efforts focus on improving the effectiveness of the institutions that serve them. The Valle Imperial Project in Science is one initiative that has achieved positive student outcomes by building the long-term capacity of the teaching staff through science education reform. Teachers, rather than students are the target audience of the program, though students certainly benefit from the program. While VIPS has received

several National Science Foundation grants to operate, evaluate and expand the program, it also benefits from substantial buy-in from district leadership and staff.

> "We used a model that was really built on the principles of capacity building. Our model is very simple, by building teacher capacity to provide instruction we achieve student learning and ultimately, student outcomes. We went to the teachers and said, 'Look at our data. Our students are failing. What do we as a district want to do about it?' The teachers came up with the strategy and it has worked."
> -Educational Administrator

EVALUATION: KEY FINDINGS

Participants were asked about the ways that they measure their impact and progress towards their goals. They were also asked about the most effective ways to evaluate community wide efforts and partnerships and the barriers to successful evaluation. The purpose of this analysis was to identify promising practices and strategies for communities to successfully integrate evaluation.

Finding #1: The Use of Research Based Strategies

In the communities surveyed, the use of research-based strategies (developed and evaluated by academic researchers) was valued and implemented by several successful programs.

- The use of research based strategies and approaches was noted most frequently in relation to curricular and instructional design and implementation (science and health education, as well as remediation at the high school level);
- Educators were particularly interested in receiving additional support around best practices in remediation and psychosocial support strategies.

Practitioners involved in efforts with a relatively narrow focus (i.e. science education reform or enrichment) were more likely to report the use of research based strategies, than were schools, academies, or programs offering a number of services. However, many educators identified support with evaluation and best practices in regards to remediation and academic support for under-represented minority youth as a need.

Finding # 2: Evaluation Practices and Barriers

Programs that include strong and substantial partnerships with universities were more likely to have incorporated evaluation measures.

Those efforts with well established partnerships with universities were more likely to have incorporated ongoing evaluation into their programming and used the results to further fund development efforts and to inform programming decisions.

Schools and academies were likely to report quantitative data to the state as mandated.

Few participants indicated that process evaluations or qualitative data was used to evaluate partnerships, collaborations or student outcomes. Time and limited resources were reported as major barriers to evaluation.

Finding #3: Additional Research and Evaluation Needs

Participants noted that there is a lack of research on what activities and approaches at the K-12 level most effectively contribute to the overall goal of increasing the diversity of the health professions and noted the following barriers:

- Lack of available funding means that few K-12 interventions or approaches have been rigorously evaluated;
- Limited time and resources prevent program staff from investigating and integrating best practices in education into their programs;
- The programmatic, student and community outcomes for each phase of the pipeline are not clearly developed.

Participants reported barriers to evaluating their own programs, as well as community wide efforts to strengthen the pipeline. Many concurred that little research has been conducted on the types of approaches and activities at the K-12 that actually contribute to health care workforce diversity in the later stages of the pipeline. Others noted that more clarity on the student, programmatic and community outcomes at each phase (elementary, middle and high school) would result in greater coordination between phases.

> "Rigorous academic evaluations are incredibly expensive. As a result, we don't really know definitively what strategies work at the K-12 in terms of increasing health care diversity. This means that we are lacking the data to effectively promote this as a priority. We also haven't done a very good job at framing investment in the K-12, in the health care sector nor in the society at large. We really need to spend more time marketing diversity and equity as an economic issue and priority."
> - Program Administrator

DISCUSSION

The inquiry set out to examine the types of partnership and overall level of coordination in several diverse communities in California. It also aimed to identify opportunities to strengthen the pipeline and entry points for health care sector stakeholders. The findings of the study suggest that the communities surveyed are engaged in a variety of kinds of partnerships to strengthen the K-12 pipeline for under-represented minority youth. There is evidence that health care sector stakeholders, local businesses and educators are making meaningful contributions in efforts to prepare low-income and minority youth for higher education and careers in the health professions. The findings suggest that the high school phase of the pipeline is the most developed and has secured the greatest level of participation from health care sector stakeholders, with high school health academies, internship, career exposure and mentoring programs well established in several communities.

The inquiry also identified some important needs and areas for further inquiry. In particular, the study found the need for greater investment in the K-8 phases of the educational pipeline. Stakeholders

from diverse sectors frequently mentioned the need for expanded academic and social supports at the K-8. However, the study also found that health care sector stakeholders must be convinced of the value of investing at the elementary and middle school levels. Because K-8 educators have not viewed the health care sector as traditional partners, strategies for building successful partnerships and initiatives at this level should be further explored. Additional research is also needed on the most effective strategies for meeting the academic and psychosocial needs of under-represented elementary and middle school students.

The study found that health care stakeholders are working through consortiums to address regional health care workforce needs, while educators have worked with a number of stakeholders to drive educational reform of the public schools. In each of these initiatives, coalitions of diverse stakeholders are working to develop a common agenda to meet their sector's needs. Considerable opportunity remains for the health care and education sectors to collaborate on common goals in their regions and communities. On a programmatic level, opportunities to enhance the effectiveness of partnerships between health care and business sector stakeholders and their counterparts in education remain. While there are many thriving partnerships involving all three sectors, the study found that a lack of understanding about diverse sector's organizational cultures can be a barrier to partnership.

Finally, the study found that there are many opportunities for universities, health professions schools, health care delivery organizations, local businesses, health departments and community based organizations to participate meaningfully in creating strong and effective K-12 pipelines for under-represented minority youth. Stakeholders may support student centered programs, participate in community-wide efforts to create a common agenda or develop the long term capacity of organizations and institutions that serve minority youth. The tables below outline in more detail the ways that stakeholders are participating, as well as additional opportunities at the K-8 and high school levels.

Tables and Charts

Type of Support Currently Provided	Current Roles and Examples	Engaged Stakeholders	Additional Opportunities
Financial Support	Provided for the following purposes: • Seed money for a new program or initiative • Funds to leverage additional financial support • Funding of an event (i.e. a career day) • Partial or complete sponsorship of an entire program or a component of a program • General operating funds • Planning funds • Funds to facilitate collaboration • Evaluation • Student scholarships • Facility and equipment purchases and upgrades	Health Profession Schools Local Businesses Health Care Delivery Sector Foundations Individual Donors Local Government School Districts Universities Community Colleges	• Funding to expand or enhance existing programs or initiatives • Funding to facilitate collaboration and long term planning • Funding to facilitate evaluation • Funding to identify best practices at the K-12 • Funding to upgrade equipment and/or facilities • Funding to strengthen linkages between the phases of the pipeline • Funding to identify student and community outcomes at each phase of the pipeline
Facility	Space is most commonly donated by institutional partners to house programs or events serving under-represented minority youth. Partners have also assisted with the acquisition, design and development of a new facility for a program or initiative.	Health Professions Schools Local Businesses Health Care Delivery Sector School Districts Local Government Universities Community Colleges	Additional opportunities were not identified by participants

Type of Support Currently Provided	Current Roles and Examples	Engaged Stakeholders	Additional Opportunities
Human Resources/ Volunteers	Stakeholders support K-12 efforts by providing volunteers, staffing and/or human resources, for the following types of activities: • Providing a public speaker or booth at outreach events for student programs, initiatives or planning processes • Providing mentors at all phases of the pipeline (professional to student and student to student) • Providing instructors for health and science courses or internship programs • Providing volunteers for facility upgrades or program work days • Funding a position to enhance program effectiveness	Health Professions Schools Local Businesses Health Care Delivery Sector School Districts Universities Community-based Organizations Churches	Because of under-funding of K-12 education, most practitioners identified human resources as the most valuable way stakeholders could provide support. There are additional opportunities for public health and health care management professionals to participate in mentoring and internship programs.
Student Services and Programs	Stakeholders are responsible for the operation of a program or initiative targeting under-represented minority youth or may share this responsibility with other partners. Note: See charts below for more details.	Health Professions Schools School Districts Universities Community Based Organizations Community Colleges	Many practitioners felt that resources should be designated to enhance programs and initiatives with existing infrastructure, rather than to fund new student centered programs.

Type of Support Currently Provided	Current Roles and Examples	Engaged Stakeholders	Additional Opportunities
Planning and Program	Stakeholders have participated in developing, enhancing or modifying programs and initiatives designed to address health care workforce needs and/or educational opportunity, including: • Design of health/science career academies, internship and mentoring programs • Participation in community-wide planning to address student achievement • Linkages with other phases of the K-16 pipeline • Design of school reform initiatives, including those that address teacher preparation and recruitment • Development of science and health curriculum	Health Professions Schools School Districts Universities Community Based Organizations Local Businesses Health Care Delivery Sector Community Colleges	Expanded participation of stakeholders in current roles was identified by educators and practitioners as a high priority need.
Technical Assistance	Stakeholders have provided their support through a range of technical assistance activities, including: • Facilitating inter-sectoral networking and collaboration • Assisting with fund development plans and activities • Evaluation of program activities	Health Care Delivery Sector Community Based Organizations Universities School Districts Local Businesses	This was identified as an area of great need by many practitioners.

The following chart outlines the current points of entry for stakeholders working to strengthen the K-12 pipeline, as well as additional entry points which have not been fully developed.

Type of Support Currently Provided	Current Roles and Examples	Engaged Stakeholders	Additional Opportunities
Marketing, Publicity and Community Engagement	Stakeholders provide the following types of support: • Assistance with developing publicity and marketing strategies • Sponsorship, presence and participation at events to engage communities or recruit students • Serving as cultural intermediaries to reach under-served or hard to reach communities and families • Serving as a partner to obtain funding	Health Care Delivery Sector Community Based Organization Health Professions Schools Universities Churches and Faith Based Organizations Local Businesses	Practitioners indicated that marketing, publicity and community engagement is an invaluable form of assistance and current roles should be expanded.

K-8 Entry Points and Strategies to Increase Health Care Work force Diversity		
Programs or Initiatives	Engaged Stakeholders	Opportunities
Science Education Reform	Universities School Districts Staff and teachers Science Foundations	Fully developed in one community, but not in the remainder. Identified as a need by many participants.
Teacher Recruitment, Education and Professional Development	Teacher Education and Certification Programs at Universities School Districts Educational Foundations State and Federal Education Agencies	Developed in several communities, but a need to train, recruit and retain highly qualified math and science teachers at the elementary and middle school was identified as a need.
Development and Operation of Health/Science Academies	School districts Foundations Community Based Organizations Science Foundations Bio-technology Industry	Undeveloped in the communities surveyed, but present in other California communities. Several participants noted that the success of high school health academies could be replicated in the elementary and middle school grades. A feeder relationship between the K-8 and 9-12 could strengthen the pipeline.
Enrichment, Mentoring and Career Exposure	School Districts Community Based Organizations Schools Universities Health Professions Schools	Mentoring and enrichment programs are present in many schools, but additional research is needed on their effectiveness and appropriate strategies for developing exposure to the health professions in the K-8. In the communities surveyed, these types of programs at the K-8 were not reported.
Psychosocial and Academic Supports	Not reported in this inquiry	Participants noted that there is significant need to create psychosocial supports for under-represented minority and low-income you at all phases of the pipeline. Additional research is needed on the most effective strategies to support elementary and middle school students.

K-8 Entry Points and Strategies to Increase Health Care Work force Diversity		
Programs or Initiatives	Engaged Stakeholders	Opportunities
Science Education Reform	Universities School Districts Staff and teachers Science Foundations	System wide reform of science education was not developed at the high school level in the communities surveyed, but identified by many as an opportunity. Science and health curriculum design and instruction (i.e. by medical students and/or professors) at individual schools is a strategy many partners have used. Other partners have participated in the design of science courses that incorporate mastery of scientific concepts with hands on learning opportunities (i.e. internships)
Teacher Recruitment, Education and Professional Development	Teacher Education and Certification Programs at Universities School Districts Educational Foundations State and Federal Education Agencies	Identified as a need by practitioners at the high school level. Training, recruitment, professional development and retention of highly qualified math and science teachers would help build the long term capacity of urban schools.
Development and Operation of Health/Science Academies	School districts Foundations Community Based Organizations Science Foundations Bio-technology Industry Health Care Delivery Sector Health Professions Schools	Strongly developed in several communities at the high school level. Significant research has been conducted on the effectiveness of career academies at the high school level. Opportunities to support their design and operation remain, specifically around incorporating best practices in regards to instruction, integrating enrichment activities, such as internships, with classroom learning, family engagement, long-term planning and better coordination with the middle schools and higher education.

Recommendations

LOCAL / REGIONAL COLLABORATION

Recommendation #1: There is considerable opportunity for increased collaboration and coordination in each of the communities surveyed. **A sustainable funding mechanism** is necessary to achieve this. Local stakeholders explore local, state and private options to finance networks of support in their communities on an ongoing basis.

Recommendation #2: Funders direct funding towards **cross-sector planning and collaboration** to strengthen the K-12 pipeline.

Recommendation #3: Health professions schools and other stakeholders explore **incentives and strategies to establish a network of support** (for example, funding and participating in planning and implementation of cross sector collaborations).

- Bring stakeholders in education (especially local school districts) and health care sector stakeholders together to work on developing and sustaining a strong K-12 educational pipeline.
- Identify and prioritize strategies to enhance the transition between different phases of the pipeline in funding decisions.
- Give priority to efforts that build long term capacity of the K-12 system in funding decisions.

> "We continue to work on a programmatic level because there is no incentive to do otherwise. There is a need for funders, be it state or private, to fund linkages, transitions and collaboration across the phases of the pipeline. Right now there is no infrastructure that supports a network."
>
> -Program Administrator

ENTRY POINTS

Recommendation #1: Health professions schools and universities **establish partnerships with communities that move beyond financial support or coordination** of an enrichment activity (such as a career fair), and towards **technical support** in planning, program development, curricular design, cross-sector networking and/or evaluation.

Recommendation #2: Stakeholders concur on the need to strengthen the K-8 stages of the educational pipeline, and must convince funders, health professions schools and other institutional partners that **upstream capacity building will reap significant downstream benefits**. Additional research on the value of early intervention and investment in the K-8 pipeline is needed.

Recommendation #3: Additional **research is needed on effective strategies to develop the K-8 pipeline**. Include K-8 educators in conversations about how to develop effective partnerships with the health care sector.

> "Our program initially targeted students at the elementary level and recently expanded to the middle school. We have seen the value of investing at the K-8. Because students are competent in science, we have seen more and more students completing the A-G requirements for UC entry. They are less intimidated by science when they get to high school. By investing early on, we are reaping the benefits further down stream."
> -Educational Administrator

INTERVENTIONS

Recommendation #1: Health care sector stakeholders partner with K-12 schools or districts **develop a shared vision of goals and outcomes. Increase understanding of the current realities of public education in California** (lack of funding, high stakes testing, No Child Left Behind legislation etc.).

Recommendation #2: Health care sector stakeholders should consider partnering Health care sector stakeholders move beyond student –centered programs to **build the capacity of the pipeline through planning, evaluation, curricular design and professional development design**. Because each community is different and one program cannot accomplish everything, stakeholders should work closely with educators to determine student and community needs and to design new initiatives.

> "We welcome university partners and any one else who wants to help us realize our vision of sending disadvantaged students to college. But, we also want people to be cognizant of what we are up against and what our needs and priorities are as a school. There are many ways to provide authentic support in ways that further both our goals and those of our health care and university partners."
> - School Administrator

RESEARCH AND EVALUATION

Recommendation #1: Universities, colleges and health professions schools explore and develop opportunities to **partner with existing efforts in their communities as evaluators.**
- Funders prioritize programs with an evaluation plan in grantmaking activities and encourage university partnerships in the programs they fund.
- Provide technical assistance in the use of available data for current K-12 efforts.

Recommendation #2: Additional research is needed on **best practices and desired outcomes for psychosocial and academic support strategies** for UR students **at each phase** of the K–12 pipeline.
- Considerable opportunities exist for vertical mentorship between under-represented minority students (K-12) and minority professionals, medical and dental students and college students.
- Benefits and approaches to remediation (especially in middle school and high school) should be more thoroughly researched and disseminated.
- There is a need for students to learn more about the cultures of research and academia and have an opportunity to practice research skills in real life contexts.

> "There is a cultural piece that presents an additional obstacle to getting minority students into college and into the health professions. Minority students often do not understand the university culture or the research culture and feel very intimidated as a result. They need reality checks and support around learning about higher education and research and how it all works. They need to have the opportunity at the high school level to learn about this culture, to practice research, to share and defend their results. They also need to have the opportunity to be in a peer environment where academic rigor and debate are valued."
> -Program Administrator

Recommendation #3: Additional research is needed (including cost-benefit analyses) into **strategies to improve the academic preparation of students during the K-8 phases** of the educational pipeline.

Conclusion

This study found that the communities included in this study are home to a number of efforts designed to improve the academic, vocational and social opportunities available to under-represented minority students. Some efforts focus explicitly on increasing the diversity of the health care workforce, whereas others are dedicated more generally to improving the educational opportunity and attainment of minority students. This inquiry found that stakeholders from a number of sectors are making meaningful contributions to strengthen the K-12 pipeline and engaging in diverse forms of partnerships. This replication guide outlines many of the ways that health care sector partners are currently engaged in K-12 efforts and identifies additional opportunities for stakeholder participation, as well as recommendations to further develop the pipeline. As other researchers and participants in this study have stated, an individual program cannot solve the social inequities afflicting minority communities alone. The participation and engagement of multiple stakeholders is required to develop strong and effective networks of support that span the educational pipeline and provide minority youth with the skills and abilities to succeed in college and beyond.