

35. Dinges N, Yazzie M, Tollefson G. Developmental intervention for Navajo families in mental health. *Personnel Guidance J.* 1974;52:390–395.
36. Manson SM, Shore JH, Bloom JD, Keepers G, Neligh G. Alcohol abuse and major affective disorders: advances in epidemiologic research among American Indians. In: Spiegler DL, Tate DA, Aitken SS, Christian CM, eds. *Alcohol Use and Abuse Among US Ethnic Minorities*. NIAAA Monograph Series, no. 18 (ADM 89-1435). Washington, DC: US Government Printing Office; 1989: 291–300.
37. Ewart C. Social action theory for a public health psychology. *Am Psychol.* 1991;46:931–946.
38. LaFrance J. Culturally competent evaluation in Indian country. *New Directions for Evaluation.* 2004;102:39–50.
39. Legaspi A, Orr E. Disseminating research on community health and well-being: a collaboration between Alaska Native villages and the academe. *Am Indian Alaska Native Ment Health Res.* 2007;24–43. Available at: www.uchsc.edu/ai. Accessed May 27, 2007.
40. Pentz MA. Alternative models of community prevention research in ethnically and culturally diverse communities. In: Langton PA, Epstein LG, Orlandi MA. *The Challenge of Participatory Research: Preventing Alcohol-Related Problems in Ethnic Communities*. DHHS publication no. (SMA) 95-3042. Rockville, MD: US Dept of Health and Human Services; 1995:69–104.
41. Tervalon M, Murray-Garcia J. Cultural humility vs. cultural competence: a critical distinction in defining physician training outcomes in medical education. *J Health Care Poor Underserved.* 1998; 9:117–125.

Building Infrastructure for HIV/AIDS and Mental Health Research at Institutions Serving Minorities

The National Institutes of Health and other funding agencies have initiated various programs aimed at enhancing diversity in the workforces for health care delivery and biomedical research. These programs have resulted in improvements in research infrastructure and moderate successes in increasing, retaining, and strengthening the pool of underrepresented minority students and junior faculty at resource-poor institutions serving minorities.

We discuss some of the barriers and obstacles confronting such institutions, and the enablers and facilitators that may ameliorate or overcome such barriers. Although our analysis is drawn from lessons learned at an institution serving a largely Asian and Pacific Islander population, analogous situations may be found for other institutions serving minorities. (*Am J Public Health.* 2009;99:S82–S86. doi:10.2105/AJPH.2008.136903)

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THE UNIVERSITY OF HAWAII AT Manoa, the westernmost grantee of the National Center for Research Resources' Research Centers in Minority Institutions (RCMI) program, serves mostly Asians and Pacific Islanders. It is also the sole US institution of higher education designated by the Carnegie Institute as actively engaged in biomedical and biobehavioral research and training in the Pacific Basin region. Because of the distance separating the university from research-intensive universities on the US mainland, it faces unique challenges. At the same time, Hawaii's comparatively small size, its ethnically diverse population, and limited out-migration provide unparalleled opportunities for conducting prospective, population-based, longitudinal-cohort, and clinical and translational studies on a wide array of ethnic and racial disparities in health.

Historically, low numbers of minority students in medical schools and bioscience graduate programs, insufficient awareness of research career opportunities, lack of culturally appropriate mentors, and a paucity of successful role models

have contributed to the underrepresentation of ethnic minorities in medical research faculties.¹ In an effort to expand the capacity for biomedical and biobehavioral research at institutions serving minorities and to enhance the diversity of the health professions' workforce, the National Institutes of Health (NIH) and other funding agencies (such as the Robert Wood Johnson Foundation and the Howard Hughes Medical Institute) have initiated programs aimed at increasing, retaining, and strengthening the pool of underrepresented minority students and supporting junior faculty. These programs have also provided general counseling and curricula that enhance premedical students' chances of being admitted to medical school, as well as funds to improve the research infrastructure.²

Here, we discuss some of the barriers and obstacles confronting institutions serving minorities and the various enablers and facilitators that may ameliorate and overcome such barriers. We place primary emphasis on factors relating to the institution, faculty, mentoring, training, local community, and local economy. Although

our analysis is drawn from lessons learned at the University of Hawaii, many of these insights may be pertinent to other institutions serving minorities.

A CHANGING UNITED STATES DEMOGRAPHY

As the fastest-growing racial/ethnic group in the United States, Asian Americans and Pacific Islanders (AAPIs) are expected to grow from 5.1% to 9.2% of the US population (from 15.5 million to 40.6 million) by 2050.³ Because AAPIs have diverse backgrounds and national origins and because some, as recent immigrants to the United States, have a poor command of English, they experience significant health disparities, barriers to health care, and poor access to mental health services. In addition, their rank in terms of higher education and incomes varies considerably (Table 1).⁴ While AAPIs represent less than 1% of all HIV/AIDS cases in the United States, they have the highest estimated annual percentage increase in HIV/AIDS diagnosis rates of all races/ethnicities (8.1% for males, 14.3% for females)

TABLE 1—Socioeconomic Characteristics of Selected Asian and Other Racial/Ethnic Groups: United States, 2008

	Whites	Blacks	Hispanics	American Indians	Asians							
					Asian Indians	Cambodian, Hmong, or Laotian	Chinese	Filipinos	Japanese	Koreans	Pacific Islanders	Vietnamese
Not proficient in English, %	0.7	0.8	30.3	2.6	8.4	44.3	31.3	7.0	10.0	32.9	7.1	40.4
Education, %												
Less than high school	15.3	29.1	48.5	27.4	12.6	52.7	23.6	13.1	9.5	13.8	21.7	37.8
College degree	25.3	13.6	9.9	10.8	64.4	9.2	46.3	42.8	40.8	43.6	13.6	13.8
Advanced degree	3.0	1.2	1.6	0.9	12.5	0.4	8.5	4.3	4.6	5.6	1.6	2.5
Income, \$, median												
Personal income	23 640	16 300	14 400	14 500	26 000	16 000	20 000	23 000	26 000	16 300	19 100	16 000
Family income	48 500	33 300	36 000	32 240	69 470	43 850	58 300	65 400	61 630	48 500	50 000	51 500
Living in poverty, %	9.4	24.9	21.4	25.1	8.2	22.5						
In labor force, %	63.6	59.8	61.5	61.2	71.0	58.8	65.1	68.3	58.0	62.0	67.4	63.5
High-skill occupation, %	21.4	12.3	9.6	11.9	51.6	9.8	41.9	29.7	32.0	27.0	13.8	22.6

Source. Data are from Le.⁴

between 2004 and 2005.⁵ Underreporting and misclassification of race and ethnicity also contribute to the apparent low percentage of diagnosis of HIV/AIDS among AAPIs. For example, the Hawaii State Department of Health only reports AIDS diagnosis but the incidence of HIV is not reported and is unknown.

INFRASTRUCTURE FOR HIV/AIDS RESEARCH

In anticipation of an unbridled epidemic of HIV/AIDS in Hawaii and the Asia–Pacific region, retrovirology research was proposed as a new RCMI initiative at the University of Hawaii in 1989. Supplemental RCMI funding initially allowed the development of expertise in community-based clinical trials for the treatment of HIV/AIDS and opportunistic infections; it subsequently led to the establishment of the Hawaii AIDS Clinical Trials Unit. From this fledgling beginning, significant improvements in the research environment for HIV/AIDS have been leveraged into an expanded

junior investigator pool supported through several NIH programs. Notably, collaborative partnerships with prominent investigators from research-intensive universities have resulted in research project grants to an increasing number of faculty members. In addition, the enhanced research infrastructure for HIV/AIDS at the university has resulted in the recruitment of extramurally funded “magnet” investigators, which, besides encouraging general HIV/AIDS research, has bolstered research on neurodegeneration caused by HIV/AIDS and research on drug abuse.

Despite these recent successes, vast challenges lie ahead. In particular, various infrastructure-development programs and those aimed at increasing workforce diversity are in jeopardy of being curtailed or discontinued by recent federal budget cuts. For example, the Hawaii AIDS Clinical Trial Unit, which was established in 1990 and competed successfully with other schools for renewal of grant support for more than 15 years, has been a recent casualty.

As a result of the extremely competitive climate for NIH funding, individual institutions will need to play a far more proactive role in increasing the recruitment of underrepresented minority faculty⁶; they must also be willing to commit institutional and state resources to enhance these faculty members’ career development and ensure their retention,^{7,8} as well as to institutionalize programs initiated with federal funding. To expand the capacity for HIV/AIDS and mental health research, enhance the clinical and translational science enterprises at institutions serving minorities, and increase the ethnic diversity of the workforce, the institutions must provide strong leadership and their upper administrations need to work with program sponsors.

BARRIERS TO RESEARCH

There are multiple barriers to conducting HIV/AIDS and mental health research at a comparatively small, geographically isolated institution serving minorities (Table 2). Smaller institutions

typically have fewer resources, fewer faculty members, higher teaching loads per faculty member, and less research talent than larger, well-endowed universities. Each of these factors alone can be a barrier to high-quality research, and their combined effect virtually precludes the formation of a “critical mass.”

Limited Physical Resources

Faculty members at smaller universities are often hampered from conducting cutting-edge translational research by not having access to specialized equipment and other support services. Examples might include high-end instrumentation for proteomics and imaging tools for animal or translational research (e.g., high-field magnetic resonance imaging scanners, micropositron emission tomography scanners, and optical imaging systems).

A potential solution to gaining access to necessary equipment or skilled personnel is to form collaborative partnerships with strong research groups at majority institutions. Another solution is to acquire

TABLE 2—Barriers to Conducting Research in HIV/AIDS and Mental Health at Institutions Serving Minorities and Potential Solutions

Focus	Barriers	Potential Solutions
Institution and resources	<p>Small medical school class size.</p> <p>Low ranking of medical school based on extramural funding.</p> <p>Medical school part of larger general undergraduate campus.</p> <p>Lack of strong culture for biomedical research.</p> <p>Limited availability of cutting-edge scientific equipment.</p> <p>Lack of follow-through on institutional commitments; broken promises.</p>	<p>Increase medical school class size.</p> <p>Target recruitment of extramurally funded research faculty.</p> <p>Designate separate campus for biomedical and health sciences.</p> <p>Integrate biomedical research training in curriculum.</p> <p>Consolidate and improve access to core facilities with high-end equipment.</p> <p>Increase accountability of institutional leadership.</p>
Faculty	<p>Few tenure-track positions for basic and clinical science faculty.</p> <p>Inability to recruit and retain first-tier research faculty.</p> <p>No or limited protected research time for clinical faculty.</p> <p>Lack of collaboration among research faculty.</p> <p>No internal review mechanism of grant applications.</p> <p>Inadequate mechanism to support faculty while they are awaiting funding decision.</p> <p>Lack of knowledge about funding opportunities and grantsmanship.</p>	<p>Increase tenure-track positions for basic and clinical science faculty.</p> <p>Implement cluster recruitment to build critical mass in specific research disciplines.</p> <p>Structure protected research time for clinical faculty.</p> <p>Create incentives for collaborative research.</p> <p>Provide internal review mechanism to increase funding.</p> <p>Provide bridging funds to faculty awaiting funding decisions on applications for research project grants.</p> <p>Sponsor attendance at funding tutorials and grantsmanship workshops.</p>
Mentoring	<p>Insufficient exposure to first-tier researchers.</p> <p>Lack of knowledge about ongoing research at institution.</p> <p>Few qualified senior faculty to mentor young investigators.</p> <p>Too few senior faculty with time to mentor.</p> <p>Few role models of ethnic- and gender-appropriate NIH-funded senior faculty.</p> <p>Rigid one-size-fits-all mentoring philosophy.</p>	<p>Invite world-class scholars to meet with young faculty.</p> <p>Open faculty and program retreats to all young faculty.</p> <p>Recruit magnet investigators.</p> <p>Cultivate mentoring skills in more senior faculty.</p> <p>Assign best-match senior faculty mentor to junior faculty.</p> <p>Individualize best-fit mentoring philosophy.</p>
Training	<p>Inadequate well-trained senior faculty to provide technical training in specific areas.</p> <p>Lack of knowledge about research design and methods.</p> <p>Limited research training opportunities.</p> <p>Rigid one-size-fits-all training philosophy.</p>	<p>Form partnership with majority institution to obtain targeted training in specific areas.</p> <p>Provide degree or certificate in clinical research.</p> <p>Provide targeted training programs.</p> <p>Individualize best-fit training philosophy.</p>
Local economy and health care	<p>High cost of housing.</p> <p>Comparatively low remuneration for medical services.</p> <p>Critical shortage of physicians.</p> <p>Critical shortage of clinical specialists.</p>	<p>Provide faculty housing and loan assistance for mortgage.</p> <p>Provide competitive compensation packages.</p> <p>Investment in medical school by state legislature.</p> <p>Provide additional incentives to specialists.</p>
Local community	<p>Stigmatization of HIV/AIDS.</p> <p>Stigmatization of mental health disorders.</p> <p>Cultural reluctance to seek medical care for mental health disorders.</p> <p>Inadequate community infrastructure for mental health services.</p>	<p>Heighten culturally sensitive educational programs.</p> <p>Train more ethnic-appropriate mental health professionals.</p> <p>Improve outreach and access to mental health care.</p> <p>Improve community infrastructure.</p>

specialized equipment through grant awards. However, institutions without ongoing active research and investigators who possess the expertise and track records in the use of high-end instruments are usually not competitive for such awards. Typically, at least 3 R01

level-funded investigators (i.e., with research project grants or Program Project Grants from NIH) with expertise and track records in the proposed research are required to demonstrate a genuine need for such equipment. At the same time, without such state-of-the-art

equipment, it is often difficult to attract talented individuals, at both the senior and junior levels, to institutions serving minorities.

Limited Human Resources

Senior faculties with strong funding records are essential for

building high-quality research programs. Because institutions serving minorities typically have small faculties, however, few senior investigators are available to conduct research and to mentor young faculty members. In addition, because the number of courses or

curricula in the biomedical sciences for medical and graduate students does not differ greatly between small and large institutions, the few senior faculty members can easily be overburdened with higher teaching loads and mentoring commitments (as well as administrative duties). Surprisingly, this fact is commonly overlooked in certain specialized funding mechanisms, which specifically do not allow salary support for senior faculty. Providing partial salary support for senior faculty members would create additional incentives for mentoring and allow them to negotiate reduced teaching or administrative loads.

Another major difficulty for institutions serving minorities is their general lack of prestige for attracting outstanding junior faculty to pursue careers in biomedical and biobehavioral research (Table 2). In addition to having very few well-trained scientists to collaborate on research projects, the lack of high-end instrumentation and the lower salaries discourage potential applicants. In the case of Hawaii, many of its brightest students, who graduate from prestigious universities on the US mainland, are unable or unwilling to return because of the few tenure-track faculty positions and the lack of resources.

In the past, the medical school at the University of Hawaii at Manoa and affiliated teaching hospitals devoted nearly all of their limited resources to the education and training of clinicians and primary care providers. Although recent strides have been made to redirect precious resources toward training future physician-scientists in Hawaii, much more needs to be done to further develop research excellence in biomedicine and health, by linking the basic and clinical sciences,

integrating research discoveries with innovative medical applications, and developing improved patient-care practices through community engagement.

Because biomedical research has traditionally not been viewed as a high priority in Hawaii, and given the relatively low ranking of the state's medical school, a career in research is not considered desirable by many of its promising young physicians. The most talented Hawaii-born residents therefore often seek training opportunities and faculty positions on the US mainland and elsewhere, creating a brain drain that further depletes the state's human resources. Similar outcomes are experienced at other comparably ranked institutions serving minorities.

Lack of Mentors and a Weak Research Culture

For the few junior faculty members in minority institutions who embark on a biomedical research career, the availability of outstanding mentors and role models, as well as an institutionwide commitment to improve cultural competence,^{8,9} are vital to their short-term success and long-term retention. Moreover, a thriving research culture in selected disciplines must exist for junior investigators to be properly nurtured and mentored. However, as previously noted, smaller institutions often have few experienced senior mentors. Also, the research culture at resource-challenged institutions is often fragmented and dispersed, rather than being centralized, highly integrated, and well coordinated. This fragmentation further contributes to reduced competitiveness for extramural funding and suboptimal recruitment of nationally recognized senior scientists and of exceptional students.

Despite specialized NIH programs to assist in the creation of graduate programs in clinical research, many junior investigators at institutions serving minorities are unable to find appropriate role models and well-funded senior mentors to provide scientific guidance and life-skills support toward successful career development. The problem of mentoring cannot be resolved entirely by "distance mentoring," such as through collaborations between local researchers and senior faculty at distant research-intensive universities. This situation is particularly acute for junior faculty at the University of Hawaii, which is located more than 2500 miles from the closest major research institutions on the US mainland. Videoconferencing does not substitute for effective on-site mentoring, which consists of day-to-day and frequent face-to-face interactions and research oversight. Ultimately, the small numbers of junior and senior research faculty members create substantial challenges to the building of research capability.

Scarce Resources for Faculty Development

Although faculty members belonging to underrepresented minorities bring rich perspectives and alternative approaches to cross-cultural research, they are, by definition, scarce in most medical schools and graduate programs, particularly at the higher academic ranks. In addition, the proportion of underrepresented minority women in academic research has not kept pace with the significant increases in the number of women graduates of medical schools during the past two decades.¹⁰ Lack of individualized mentoring and the poor integration of professional skills acquisition with mentoring contribute to

difficulties in recruiting and retaining underrepresented minority women—and ethnic minority faculty in general—into academic careers in mental health research.^{11–13}

Another barrier to career development and enhancement has been the lack of formal degree- or certificate-granting educational programs in clinical research. Such comprehensive programs, consisting of structured curricula in research design and methods, as well as assistance in identifying suitable mentors and role models, are essential for creating an environment conducive to the professional development and retention of underrepresented minority faculty.^{14,15} To this end, through the Clinical Research Education and Career Development program of the National Center for Research Resources and the PhD in Clinical Research program of the National Institute of General Medical Sciences, the University of Hawaii has developed innovative curricula for training multidisciplinary faculty for careers in clinical and translational science.

POTENTIAL SOLUTIONS

Improving the research standing of small institutions serving minorities requires sustained institutional investment in research infrastructure and human resources. One model might thus aim at creating comprehensive research programs directed by well-funded senior research faculty who can provide high-quality mentoring to a cadre of promising junior faculty. To successfully implement such programs, targeted and "cluster-type" recruitment of senior faculty with specific fields of expertise that complement existing programs are needed. If strategically planned, these research programs

will lead to a “critical mass” of investigators in the long term that can compete more effectively for mainstream extramural funding.

As previously noted, however, some specialized funding mechanisms emphasize support for junior investigators, sometimes at the expense of senior investigators and mentors. The all-too-common consequence is that junior investigators perform research in the protected environment of a specialized program, only to ultimately fail because of inadequate infrastructure and senior mentorship. Policy changes at the funding agency are warranted.

The Clinical and Translational Science Award, a bold initiative to transform the clinical research enterprise, offers possibilities for accelerated change at resource-poor institutions. The award mandates a Mentored Clinical Research Scholar Program, which will ensure continued training of junior investigators to become clinician-scientists engaged in translational research. The award will also provide the much-needed infrastructure and support to organize the fractured research entities that commonly exist in small institutions. However, successful competition for such an award demands unprecedented institutional commitment, new investments in biomedical informatics and biostatistics, and bold upper-administration leadership across several local institutions engaged in research, training, and patient care. Furthermore, for programs to pass the award’s peer review process for funding, a well-documented record of success in clinical and translational science—both from basic to clinical research (called “T1 translation”) and from clinical research to community implementation (called “T2 translation”)—and an established research culture to

provide training of clinician-scientists are crucial. Because this transformation, or paradigm shift, is not easily achieved even within large research-intensive institutions, to what extent resource-constrained institutions serving minorities will be able to compete successfully for the Clinical and Translational Science Award remains unclear.

CONCLUSIONS

The initial career choices of junior investigators and their long-term commitment to those careers are greatly influenced by the attitudes of senior faculty mentors and the availability of family and community support. At each stage of their career development, appropriate and effective interventions can mean the difference between success and failure. Although certain skill sets or behavioral traits may be predictors of future success, many institutions serving minorities do not have a sufficiently large pool of promising junior faculty candidates.

An important balance must be struck between the availability of funding through career-development programs and the need to monitor and evaluate performance and productivity at regular intervals. Continued support for junior investigators must be based on performance. It is also important to establish structured and unstructured time for peer interaction to provide a non-threatening environment in which junior faculty can seek and gain help and support from their peers.

Finally, strong leadership, strategic planning and institutional commitment, and state support are required to maximize, focus, and leverage limited resources toward enhancing

research infrastructures at smaller institutions. ■

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References

1. Cregler LL, Clark LT, Jackson EB. Careers in academic medicine and clinical practice for minorities: opportunities and barriers. *J Assoc Acad Minor Phys.* 1994;5:68–73.
2. Pechura CM. Programs of the Robert Wood Johnson Foundation to develop minority medical careers. *Am J Med Sci.* 2001;322:290–292.
3. US Census Bureau. An older and more diverse nation by midcentury [news release]. August 14, 2008. Available at <http://www.census.gov/Press-Release/www/releases/archives/population/012496.html>. Accessed September 23, 2008.
4. Le CN. Socioeconomic statistics & demographics. Asian-Nation. 2008. Available at: <http://www.asian-nation.org/demographics.shtml>. Accessed September 16, 2008.

org/demographics.shtml. Accessed September 16, 2008.

5. Racial/ethnic disparities in diagnoses of HIV/AIDS: 33 states, 2001–2004. *Morb Mortal Wkly Rep.* 2006;55:121–125.
6. Potts JT. Recruitment of minority physicians into careers in internal medicine. *Ann Intern Med.* 1992;116:1099–1102.
7. Rust G, Taylor V, Morrow R, et al. The Morehouse Faculty Development Program: methods and 3-year outcomes. *Fam Med.* 1998;30:162–167.
8. Acosta D, Olsen P. Meeting the needs of regional minority groups: the University of Washington’s programs to increase the American Indian and Alaskan Native physician workforce. *Acad Med.* 2006;81:863–870.
9. Odom KL, Roberts LM, Johnson RL, et al. Exploring obstacles to and opportunities for professional success among ethnic minority medical students. *Acad Med.* 2007;82:146–153.
10. Wong EY, Bigby J, Kleinpeter M, et al. Promoting the advancement of minority women faculty in academic medicine: the National Centers of Excellence in Women’s Health. *J Womens Health Gen Based Med.* 2001;10:541–550.
11. Daley S, Wingard DL, Reznik V. Improving the retention of underrepresented minority faculty in academic medicine. *J Natl Med Assoc.* 2006;98:1435–1440.
12. Kosoko-Lasaki O, Sonnino RE, Voytko ML. Mentoring for women and underrepresented minority faculty and students: experience at two institutions of higher education. *J Natl Med Assoc.* 2006;98:1449–1459.
13. Yager J, Waitzkin H, Parker T, et al. Educating, training, and mentoring minority faculty and other trainees in mental health services research. *Acad Psychiatry.* 2007;31:146–151.
14. Johnson JC, Jayadevappa R, Taylor L, et al. Extending the pipeline for minority physicians: a comprehensive program for minority faculty development. *Acad Med.* 1998;73:237–244.
15. Johnson JC, Williams B, Jayadevappa R. Mentoring program for minority faculty at the University of Pennsylvania School of Medicine. *Acad Med.* 1999;74:376–379.