Addressing health disparities and environmental justice: the National Library of Medicine’s Environmental Health Information Outreach Program

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DOI: 10.3163/1536-5050.95.3.330

Purpose: Disparities in health between minority and majority populations have become a topic of high interest in the health care and information communities. This paper describes the National Library of Medicine’s (NLM’s) oldest outreach program to a minority population, a project that has been going on for over fifteen years.

Setting/Participants/Resources: The overview is based on internal documentation and reports, interviews, personal communications, and project reports.

Brief Description: This is a historical overview of the Environmental Health Information Outreach Program, from its beginnings in 1991 as the Toxicology Information Outreach Project. The initial collaboration began with nine historically black colleges and universities (HBCUs) that had graduate programs in biomedicine. The current program includes representation from HBCUs, institutions serving Hispanic students, and tribal colleges. In addition to working with these institutions to promote the use of and access to electronic health information and related technology, this program brings attention to scientific research related to health issues that disproportionately affect minorities.

Results/Outcome: The program expanded due to its perceived success by the initial participants and NLM’s management. Not only have faculty, staff, and students at the participating institutions received training in using NLM’s toxicology, environmental health, and other electronic resources, but the participants ascribe other successes to their collaboration with NLM.

INTRODUCTION

Diversity, health disparities, and environmental justice are all important aspects of public health. While the National Library of Medicine’s (NLM’s) current outreach portfolio includes working with diverse communities and their institutions, NLM has not always focused its attention on issues of diversity. For many years, NLM primarily developed information resources to serve health professionals and biomedical researchers. In addition to the MEDLINE database, NLM began a program that included the development of factual, scientific, and technical databases in toxicology and chemical information in 1967 [1]. NLM worked with medical libraries to make this information available to professional audiences. Starting in 1989 with the publication of its first long-range plan focused on outreach, NLM and its National Network of Libraries of Medicine started training health professionals to use the library’s online databases [2, 3]. While these efforts met with substantial success in mainstream medical schools and larger hospital centers, many institutions, particularly those that were largely minority, were struggling to keep up with access to online databases and the required technology. To help broaden access, NLM undertook a one-year pilot project to strengthen the capacity of historically black colleges and universities (HBCUs) to use NLM’s toxicological and chemical databases. This pilot project was intended to have an impact not only on the institutions themselves, but also on their surrounding communities.
BACKGROUND AND HISTORICAL PERSPECTIVE

Minority-serving educational institutions

The Higher Education Act of 1965 defines an HBCU as “any historically black college or university that was established prior to 1964, whose principal mission was, and is, the education of black Americans” [4]. HBCUs enroll 14% of all African Americans in higher education, although they constitute only 3% of America’s 4,000 plus institutions of higher education [5]. In 1980, President Jimmy Carter signed executive order 12232, which established a federal program “to overcome the effects of discriminatory treatment and to strengthen and expand the capacity of historically black colleges and universities to provide quality education” [6]. Subsequently in 1981, President Ronald Reagan issued executive order 12320 establishing the White House Initiative on HBCUs [7]. This order set into motion a government-wide effort to strengthen the HBCUs. Presidents George H. W. Bush, William Clinton, and George W. Bush issued additional executive orders that expanded or further specified the interaction between government agencies and HBCUs [4].

President Carter’s executive order and additional executive orders by subsequent presidents laid the groundwork for NLM’s focus on working with HBCUs. However, it is also important to recognize that while the education of African Americans is their primary mission, HBCUs often play many other important roles, such as serving as economic and social anchors to their surrounding communities [8]. This is also true for other types of institutions serving minorities. Many students who receive their education at such institutions go on to work in their communities, thus further contributing to the large impact these institutions have [9].

Environmental exposure

As early as 1971 in its second annual report to the president, the Council on Environmental Quality acknowledged that racial discrimination adversely affected the ability of the urban poor to control the quality of their environments [10]. Environmental equity did not become a national issue, however, until 1982, when national attention was focused by a protest against the proposed siting of a landfill for polychlorinated biphenyls (PCBs) in a predominantly black county in North Carolina. It was then that the phrase “environmental racism” was coined to refer to those policies and activities that, whether intentionally or unintentionally result in the disproportionate exposure of racial minorities to environmental hazards [11]. The general observation that racial and ethnic minorities in the United States might be disproportionately exposed to toxic substances in their residential environments prompted congressional study of the issue. The US General Accounting Office further found that, in the southeastern United States, three of the four commercial hazardous waste landfills were in communities with more blacks than whites [12].

Starting in 1980, legislation acknowledged that exposure to hazardous substances might affect health. The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as the Superfund Act, was enacted by Congress on December 11, 1980 [13]. This law created a tax on the chemical and petroleum industries and provided broad federal authority to respond directly to releases or threatened releases of hazardous substances that might endanger public health or the environment. In 1980, Congress also created the Agency for Toxic Substances and Disease Registry (ATSDR) to implement the health-related sections of CERCLA [13]. ATSDR is charged under the Superfund Act to assess the presence and nature of health hazards at specific Superfund sites, to help prevent or reduce further exposure and illnesses that result from such exposures, and to expand the knowledgebase about health effects from exposure to hazardous substances.

The Emergency Planning and Community Right to Know Act, also known as title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA), was enacted by Congress as national legislation on community safety [14]. This law was designed to help local communities protect public health, safety, and the environment from chemical hazards.

These laws provided tools that communities could use to demand government action on issues of possible environmental contamination. Also during the 1980s, community activists started questioning inequities in the distribution of toxic waste dumps [15, 16]. This was the beginning of the environmental justice movement in the United States. The underlying contention of this movement is that minorities are disproportionately affected by hazardous materials because waste sites and other sources of hazardous chemicals are disproportionately located in these communities. In 1987, the United Church of Christ published a seminal study, which included the thesis that, regardless of income, toxic waste dumps were disproportionately located in minority communities [17]. The study reported that while economic status played a role in the location of commercial waste sites, the race of the residents of a community was a much more significant predictor. Additional work, including books by Robert Bullard [11, 18], supported this contention.

THE TOXICOLOGY INFORMATION OUTREACH PROJECT

NLM realized that its toxicological and chemical databases, if brought to the attention of health professionals and scientists working in minority communities, could play a significant role in improving the health in these communities. One potentially effective way to do this was to work with HBCUs.

Because health professionals were the primary target audience for NLM’s efforts to increase the use of the toxicological and chemical databases in minority populations, working with those HBCUs with schools or significant programs in medicine and pharmacy was indicated. The HBCUs with major programs in
these areas had formed an association in 1976, and members of this Association of Minority Health Professions Schools and the Minority Health Professions Foundation were logical partners for NLM. According to the Association of Minority Health Professions Schools, their 12 member colleges and universities educate and train 50% of African American physicians, 50% of African American dentists, 50% of African American pharmacists, and 75% of African American veterinarians in the United States [19]. Most of these HBCUs also see their mission as working with their surrounding communities.

In 1991, NLM created the Toxicology Information Outreach Project (TIOP) with the main purpose of increasing the capacity of HBCUs to use NLM's toxicological, chemical, environmental, and occupational resources. Nine institutions identified as having significant programs in medicine, pharmacy, or veterinary medicine were invited to participate in TIOP (Table 1). In addition to representatives from these nine universities, TIOP included representation from the National Science Foundation, National Institute of Occupational Safety and Health, Occupational Safety and Health Administration, and several consultants. Unlike most NLM programs, which generally involved working with libraries or librarians, this panel consisted of administrators, deans, and faculty members in departments relevant to toxicology, pharmaceutical science, or environmental health.

Each of the participating schools received customized personal computer workstations with multimedia capabilities from NLM. It is important to recognize that personal computers (PCs) were not in common use at that time and were quite expensive. Indeed, during a later assessment of the program, several schools reported that these computers might have been the first ones in specific departments at the colleges [20]. Each school was given free access to NLM's online databases and extensive training in their use. The first classes were three days in length and included detailed training in the use of the complex command language that was used at that time for online searching. (Although Grateful Med, an easy-to-use, PC-based search interface, was introduced by NLM in 1986, it initially only helped with searching MEDLINE, not the toxicology or chemical databases.) The students in these online training courses were generally faculty members and staff. NLM also provided extensive manuals and documentation that the faculty members were able to use to prepare training sessions for their own students as this was intended to be a train-the-trainers activity. The schools were also given access to several self-instructional tutorials: CHEMLEARN, TOXLEARN, MEDTUTOR, and ELHILLLEARN. The initial tutorials were mainframe computer tools, while the subsequent tutorials were PC based and multimedia. The historical context is important because, in 1991, there was a fee for searching the NLM databases and the command line searching required extensive training to perform.

Although TIOP was originally planned as a one-year pilot project, the initial success was sufficient to persuade NLM to continue the project. Not long after the commencement of TIOP, the Agency for Toxic Substances and Disease Registry (ATSDR) provided NLM funding to support training faculty and staff from additional HBCUs that were not specifically part of NLM's program. In addition, the Environmental Protection Agency's Office of Environmental Justice specifically supported training faculty and staff from institutions that were members of the United Negro College Fund. As with the courses for the TIOP members, the training used a train-the-trainers model so that the faculty who were trained would be able to implement training on their campuses as well as incorporate the use of these databases into their courses—an important factor because the goal of the TIOP pilot project was to train current and future minority health pro-

### Table 1

| Name of institution | Original 1991 panel member | Member 2000 EnHIOP member |
|---------------------|---------------------------|---------------------------|
| Charles R. Drew University of Medicine and Science, Los Angeles, CA* | X | X | X |
| Florida A&M University, Tallahassee, FL | X | X | X |
| Howard University, Washington, DC | X | X | X |
| Meharry Medical College, Nashville, TN | X | X | X |
| Morehouse School of Medicine, Atlanta, GA | X | X | X |
| Texas Southern University, Houston, TX | X | X | X |
| Tuskegee University, Tuskegee, AL | X | X | X |
| University of Arkansas at Pine Bluff, Pine Bluff, AR | X | X | X |
| Xavier University, New Orleans, LA | X | X | X |
| Hampton University, Hampton, VA | X | X | X |
| Oglala Lakota Tribal College, Pine Ridge, SD | X | X | X |
| University of Puerto Rico Medical Sciences Campus, San Juan, PR | X | X | X |
| Benedict College, Columbia, SC | X | X | X |
| California State University, Northridge, CA | X | X | X |
| Diné College, Tsaile, AZ | X | X | X |
| Haskell Indian Nations University, Lawrence, KS | X | X | X |
| Jackson State University, Jackson, MS | X | X | X |
| Medgar Evers College, New York, NY | X | X | X |
| Morgan State University, Baltimore, MD | X | X | X |
| Southern University, Baton Rouge, LA | X | X | X |
| University of Texas, El Paso, TX | X | X | X |

* Not officially an HBCU, but a minority-serving medical school.
fessionals. In addition, ATSDR provided funding to develop the research capacities of these institutions and enable them to conduct research in environmental health to help fill data gaps in this area.

TIOP's first ten years focused on training HBCUs in the use of NLM's databases. During that timeframe, NLM provided training to more than eighty HBCUs. The TIOP panel itself met annually and provided NLM with feedback about the content of the databases and the ways they were being used. NLM also provided updates to the panel members about new programs and services, both from the library and from other National Institutes of Health institutes and centers, including grants programs and the grants application process. NLM created opportunities for participation in other types of activities such as telemedicine and informatics meetings to help involve the HBCUs in cutting edge areas. The training activities also changed substantially as NLM expanded its database offerings, moved from its original custom-designed retrieval systems to Web-based interfaces, and provided free access to its databases starting in 1997 [21]. During this period, the participating schools changed (Table 1) so that, at the time of the tenth year anniversary, the roster of participating schools included two schools with their primary focus on other minorities besides African Americans.

ASSESSMENT

In 2001, NLM commissioned an assessment of this “pilot project” to examine the question of whether TIOP did indeed help strengthen the capacity of the participating institutions to use NLM's electronic information resources, as well as what, if any, impact that had on those institutions. The assessment was carried out by a consultant using structured, in-person interviews with representatives of participating institutions. All the current and prior representatives of the TIOP participating institutions were invited to a meeting in Atlanta in which the assessment questions were presented. Both as a group and individually, the members were asked to respond to a series of questions. The narrative responses were then analyzed. The findings showed that, not only did this small NLM program help strengthen the capacity of these institutions to use online toxicology information, it helped them in other unanticipated ways [21].

The representatives of TIOP member institutions identified changes in their institutions that they or their administrations could attribute to institutional participation in TIOP. The following specific examples were cited:

- creating both the public health program and the doctoral program in Environmental Toxicology Sciences at Florida A&M University
- creating the master’s degree program in public health and the Division of Information Technology at Morehouse University (with an institutional investment of over $2 million covering personnel, computers, Internet connectivity, and other information infrastructure)
- developing Xavier University’s Deep South Center for Environmental Justice
- selecting, by the governor of the State of Florida, of Florida A&M University as the site for the state’s birth registry
- establishing President’s Advisory Panel for Community Outreach at Drew University of Medicine and Science
- creating the doctoral program in Public Policy, Toxicology and Environmental Health Management at Texas Southern University
- creating the doctoral program in toxicology at Meharry Medical College
- establishing new libraries at Xavier, Florida A&M, and Howard Universities
- creating a bachelor’s degree program in regulatory science at University of Arkansas at Pine Bluff

Though TIOP cannot claim the entire responsibility for creating a library or a doctoral program, the institutional representatives of participating HBCUs traced the lineage of these significant achievements to their participation in the TIOP program. It was evident in their stories that NLM had made a major contribution to these institutions, beyond simply training faculty to use toxicology and environmental health databases. NLM supplied the computer workstations and training, but the institutions determined how to use these tools and how to leverage them to develop their capacity in ways beyond any that NLM might have anticipated.

From NLM's perspective, the relationship with TIOP has been a positive and successful experience. Prior to TIOP, NLM had limited experience working with African American and other minority communities. This activity increased visibility of NLM and its databases in these communities. In addition, this project opened opportunities for NLM to participate in other programs such as the Mississippi Delta Project [22], a regional environmental protection and economic development project, and in high-level government committees. Further, as the significance of the health disparities in minority communities became recognized by the medical and health communities, NLM's ten-year effort with HBCUs served as a model for expanded efforts to eliminate health disparities through improved access to health information and technology.

PATHWAYS TO EXPANSION: CREATION OF THE ENVIRONMENTAL HEALTH INFORMATION OUTREACH PROGRAM

In addition to examining the impact of participation in TIOP on the member HBCUs, the assessment interviews were used to elicit recommendations for the future of the program. NLM used these recommendations to expand the program, building on its strengths and taking advantage of new opportunities available due to changes in both technology and policy. Specific recommendations to NLM were:

1. expand the program’s scope to include health disparities to more closely align with the concerns of the participating institutions with environmental health and related health disparities
2. expand the participating institutions to include representation from other institutions serving minorities, including institutions serving Hispanic students and tribal colleges and universities to make the panel more relevant and effective
3. institutionalize TIOP as an NLM program by increasing the contact between the institutions and NLM and enhancing the collaborations

NLM recognized that implementing these recommendations would help the library achieve its goals in helping eliminate health disparities [23]. As a result, with the assistance of the current TIOP representatives, in 2004 the library reconstituted the Toxicology Information Outreach Project as the Environmental Health Information Outreach Program (EnHIOP) with significantly revised membership, organizational structure, operations, and mission.

The new mission of EnHIOP was defined as the following: to enhance the capacity of minority-serving academic institutions to reduce health disparities through the access, use, and delivery of environmental health information on their campuses and in their communities. To ensure understanding of the terminology, environmental health was defined as referring to the impact of chemical, microbial, physical, and radiological agents on the health of living organisms.

Membership of the group is now much broader than that of the original TIOP and includes HBCUs with medical, veterinary, pharmacy, and nursing schools as well as a number of other HBCUs of various sizes from more geographic locations, tribal colleges, and institutions serving Hispanics (Table 1). The presidents of each institution were invited to nominate representatives and alternates who work with NLM and their institutions to institutionalize use of NLM’s electronic health information resources in their curricula as well as in surrounding communities. Institutional representatives are deans or other administrators, faculty members, or librarians. The expansion of the participants has brought real diversity to the program, not only in types of institutions, but in education, health care, geography, and community perspectives.

Once the new EnHIOP was initiated, the representatives committed to work with NLM on institutionalizing training and use of NLM resources through incorporation into courses, seminars, and other events. They also recognized the need to share the knowledge gained through their relationship with NLM through developing or strengthening relationships with community and faith-based organizations to extend health-related outreach beyond their campuses. EnHIOP meetings are held twice yearly to ensure a close collaboration between the schools and NLM. The content of the meetings ranges from science and medicine to curriculum development and NLM’s programs and policies. The goal of these meetings is to give the institutional representatives tools, information, and connections that they can take back to their institutions for implementation in their specific settings. One such example was a session on forensic science that included presentations by a high school teacher who developed a course in forensic science and a faculty member at another minority college who was developing a program in forensic science for undergraduates. Both came with lessons learned that EnHIOP members could use if they wished to create such programs in their own communities.

COMMUNITY OUTREACH

In addition to the information exchange and discussions at the semi-annual EnHIOP meetings, NLM sought opportunities for supporting local outreach efforts by the participating institutions. Many of the representatives or their colleagues were already involved in efforts to improve health on their campuses or in the local communities, were involved in efforts to improve academic offerings, or were conducting research. NLM believed that there was an opportunity for supporting an information-related component to many of these activities. Such an element could provide opportunities for academic enrichment, research, and community service. EnHIOP members were offered modest funding ($5,000) to enable them to develop and implement information-related activities that would be most relevant to their particular settings. Approximately three-quarters of the group have availed themselves of the opportunity, resulting in a diverse group of activities.

Some examples of these activities include: The Charles R. Drew University of Medicine and Science is training postgraduate students in emergency and family medicine in the use of NLM’s environmental health and toxicology information resources. A goal of the affiliated King Drew Medical Center is to make hazardous material training a mandatory in-service requirement, and the use of NLM resources is being incorporated into this.

Medgar Evers College, City University of New York, is implementing a program called “Using NLM Online Resources to Promote Knowledge of Human Genomics and Related Minority Health Issues: An Education and Outreach Program for Students, Faculty, and the Community.” The program has included presentations to community members on the human genome and health disparities, including using the surgeon general’s “My Family Health Portrait” to understand the relationship between disease and the environment and showing how to search for online health information. Such techniques help make the online health information immediately relevant to the community.

The Nursing Program of Southern University is working with the Family Health Care Center’s Mobile Health Unit (Jag Mobile) to provide health screenings, primary health care services, and other services for the residents affected by Hurricane Katrina of the Renaissance Village trailer park, built by the Federal Emergency Management and Assistance (FEMA). A key issue for this population is environmental health due to their difficult situation. Critical issues as determined by data collected by the mobile health unit will be used as the basis for developing tutorials and training.
sessions in the use of health information resources for the residents.

The College of Pharmacy and Pharmaceutical Sciences at Florida A&M University is developing a model community-based health literacy improvement program incorporating NLM’s online resources. They will focus their efforts on patients in two community health centers in Tallahassee.

CONCLUSION

The initial pilot project, TIOP, was one of NLM’s first steps in minority and community-based outreach. Environmental health has always been important to public health, but its significance in minority communities was generally overlooked. TIOP not only brought attention to the subject, but brought new resources and tools to the HBCUs.

From NLM’s perspective, the relationship with TIOP has been a positive and successful experience. Because of NLM’s limited experience working with African American and other minority communities before the program began, TIOP enabled opportunities for community outreach that had not previously existed for NLM.

Due to the overall success of the initial pilot project, NLM extended the initiative in several ways, ultimately reconstituting TIOP as EnHIOP. Now with greater diversity of representation and mission, EnHIOP is well positioned to have further impact on educational institutions serving minorities and in minority communities. Raising awareness of and increasing the use of electronic health information is playing a vital role in community awareness and health.

EnHIOP has proved to be a unique opportunity for NLM to combine outreach to health professionals and scientists with outreach to consumers. The longevity of this program has enabled NLM to follow the progress of information access and use at HBCUs and should continue to benefit both the NLM’s outreach efforts and those of the institutions involved. As NLM works with the group to align the work of EnHIOP with NLM’s new long-range plan [24], the EnHIOP program will continue to provide opportunities for institutional development and collaborations.

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Received January 2007; accepted February 2007