



NCRR: A Catalyst for Discovery

National Center for Research Resources
National Institutes of Health

NCRR Reporter

R E P R I N T

Bringing Life Sciences to Life

SAY THE WORD EPIDEMIOLOGY IN A PRE-TEEN CLASSROOM AND YOU'RE LIKELY TO DRAW BLANK STARES. But talk about super sleuths and

disease detectives, deadly ailments and backpack pain—and engage students in seeking clues and solving mysteries—then you've got a recipe for motivating fledgling scientists in middle school. The new “Detectives in the Classroom” curriculum, developed by researchers at Montclair State University in New Jersey, introduces students to epidemiology and, indirectly, to the science of making evidence-based decisions about important health issues.

The Montclair educators' efforts to take epidemiology off of its graduate school pedestal were made possible by funding from the Science Education Partnership Award (SEPA) program, which seeks to improve life science literacy throughout the United States. SEPA's approach is straightforward: support the development, implementation, and evaluation of innovative K-12 and community-wide life-science education programs. Since its inception in 1991, SEPA has supported more than 130 projects, and NCRR anticipates awarding approximately 12 to 15 new SEPA grants over the next two years. SEPA projects are generally collaborative, involving biomedical scientists and educators, as well as representatives of community groups, science centers, or museums.

“SEPA is an important part of NIH's public outreach efforts,” says Dr. Tony Beck, who oversees the SEPA program for NCRR's Division for Clinical Research Resources. “The key to the SEPA program is its ability to engage and excite minority and underrepresented students about medical science and the inquiry-based scientific method. In doing so, the goal is to increase the number of these students who will



Charlyne Jean jump-started her pre-med college career with a summer internship in 2001 at the University of Miami School of Medicine, where she studied the role of proteins in muscle contractions.

(Photo by Mickael Charles, Miami Museum of Science)


**B** EYOND THE SCHOOLYARD,

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pursue biomedical careers,” he says.

The mission of SEPA has become more important over the years, as minority representation in science education has declined. The U.S. Department of Education’s 2000 *National Assessment of Educational Progress* found that only 3 percent of African Americans and 7 percent of Hispanics scored at or above proficiency in science by 12th grade, and minority students remain underrepresented in engineering and science baccalaureate programs. To rectify such disparities, Montclair and other SEPA programs are involving minority and underrepresented students and their teachers in programs that create the excitement and challenge of biomedical research.

“We want to teach kids how epidemiologists ask questions and get answers,” says Dr. Mark A. Kaelin, an associate professor in Montclair’s College of Education and Human Services. He and his colleague Dr. Wendy Huebner, an epidemiologist for ExxonMobil Biomedical Sciences, Inc., developed their curriculum for middle school students in collaboration with teachers and a multidisciplinary advisory board. In 2002, they trained 10 middle school science teachers to teach the 30-hour curriculum, test it in their classrooms, and provide feedback on how to improve the course.

Each of the curriculum’s five modules addresses a key question in epidemiology: During a disease outbreak, why do some people get sick while others remain healthy? Is there an association between the hypothesized cause and the disease? Is this association causal? What should be done when preventable causes of disease are found? Did the disease prevention strategy work?

To explore these questions, students participate in group discussions and experiments. In one lesson, students assess the results of a hypothetical study of an acne medication by compiling data on exposed vs. unexposed individuals. Students create their own experiments as well, such as measuring the effects of backpacks on back pain. The curriculum avoids the “finger wagging” typical of health classes that focus on changing behaviors, and instead focuses on educating students about health sciences that underlie much of the health-related advice they hear, says Dr. Kaelin.

Last year, the Montclair team began to disseminate the curriculum to different venues, such as after-school and weekend programs, summer camps, and high schools. The entire curriculum is available on the Web at www.montclair.edu/detectives.

An important goal of the national SEPA program is to help science centers and museums teach inquiry-based thinking on health-related subjects. About one-fourth of SEPA-funded programs are based at science centers or museums, and Dr. Beck would like this number to grow. “Museum- and science-center-based programs reach a broad pool of the general public and complement the formal K-12 SEPA programs,” he notes. One award-winning SEPA program—overseen by Dr. Judy Brown, senior vice president of programs at the Miami Museum of Science—has successfully enhanced science education among high school students for more than three years. Called Biomedical Training, Research, and College Prep (BioTrac), the program provides academic enrichment, hands-on

activities, and mentoring to encourage underserved high school students to pursue careers in biomedicine. The museum staff partnered with the University of Miami and Miami-Dade County Public Schools to design and implement BioTrac.

As part of BioTrac's academic enrichment component, students conduct a community research project and meet weekly at the museum's laboratory to perform experiments and receive technology training. Students also participate in a six-week research internship in a laboratory at the University of Miami's School of Medicine. This experience—coupled with BioTrac's career awareness component, which offers college visits and meetings with college students majoring in the life sciences, as well as professionals working in the field—is key to the program's success. A recent survey of BioTrac participants attests to the program's effectiveness: Of the 43 BioTrac graduates,

42 entered college and more than half of them have gone into science, primarily biomedicine. This fall, BioTrac staff will offer the first three-day course on how to replicate the program at science museums, extracurricular science clubs, and elsewhere.

Beyond the schoolyard, the national SEPA program also seeks to educate the general public about clinical research. Of all the SEPA grantees, the record for covering the broadest terrain—literally—in reaching the general public may belong to the Imaginarium Science Discovery Center in Anchorage, Alaska. The SEPA project, overseen by Imaginarium Executive Director Mr. Christopher Cable, includes a Health Outreach Caravan that brings a dose of hands-on, interactive, and culturally relevant education to remote villagers.

In 2001, the first year of its SEPA grant, Imaginarium staff met with residents of seven rural



The Health Outreach Caravan provides children in remote Alaskan communities with opportunities to learn about the health-related sciences. (Photo by Greg Danner; The Imaginarium)

Alaskan communities to discuss their needs for health information, explains Mr. Greg Danner, director of the Imaginarium's programs and exhibits. The following year, the Caravan traveled to eight remote communities, offering classes targeted to four different grade levels, a school-wide assembly, an evening festival for the local community, exhibits, hands-on activities, and science demonstrations. Future programs will focus on diseases and their causes, as well as lifestyles and health. After one year of field-testing, the programs are now available upon request to any Alaskan community. "We say we go anywhere, anytime," says Mr. Danner.

With projects in 31 states including Puerto Rico and Hawaii, NCRR's SEPA program provides a valuable science education tool for K-12 and for the general public via the SEPA science centers and museums. Moreover, "SEPA's scope of activity and eligibility requirements are flexible enough to make the program a valuable tool for supporting NIH initiatives, now and in the future," Dr. Beck says.

—*Tina Adler*

The Science Education Partnership Awards are provided by NCRR's Division for Clinical Research Resources. For more information about the SEPA program, see www.ncrr.nih.gov/clinical/cr_sepa.asp.



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