

We're everywhere.
That makes us
uniquely qualified.
We're in people's
homes, schools,
work sites,
in hospitals
and the community.

—Patricia Butterfield
Montana State University College of Nursing

In the 1850s, Florence Nightingale advocated fresh air and clean water as a primary treatment for soldiers in British military hospitals. Nightingale's writings are often credited with introducing environmental health into the practice of nursing. The advent in the 1900s of public health nursing—a term coined by Lillian Wald to describe her efforts to improve environmental conditions through nursing, communication, and even cultural enrichment among immigrant populations in New York City—also contributed to today's understanding of this field of nursing. In 1893 Wald, a nurse and social worker, founded the Visiting Nurse Service of New York with 10 nurses. By 1916 the group had 250 nurses visiting 1,300 patients a day, funded through private donations of \$600,000 a year. "[Wald] gave us a wonderful example of utilizing a wide network of colleagues and acquaintances and persuasive communication of data to affect change in public policy and the lives of an

the inception of task-based medical reimbursement health systems helped further compartmentalize nursing. And technology has also changed how nursing is practiced. "Nursing has evolved in some ways into a high-tech enterprise, and the foundational environmental aspects are underemphasized," says Hollie Shaner, president of the Nightingale Institute for Health and the Environment in Burlington, Vermont, which works to educate health care professionals about the environmental effects of human activity in the world and particularly the environmental effects of health care delivery. "Sure, there is the need for direct care for patients," Shaner admits. However, she says, if nurses are to be truly effective in their interventions, a thorough understanding of environmental factors and conditions, many of which may need modification, is essential.

"We started out doing it, and then we lost it," says Barbara Sattler, director of the Environmental Health Education Center at

ENVIRONMENTAL FLORENCE NURSING'S NEW

entire community," says Lillian Mood, community liaison for the South Carolina Department of Health and Environmental Control in Columbia.

As a result of the efforts of Nightingale, Wald, and others like them, environmental health became integral to nursing during the first half of the twentieth century. During this period, nurses were instrumental in the success of public health campaigns that curbed enteric diseases through sanitation reforms, eradicated childhood polio through immunization, reduced infant mortality through water quality advances, and improved occupational health through child labor and workplace safety legislation.

However, changes in the practice of nursing after the end of World War II and a confluence of other factors gradually led nursing away from an emphasis on environmental health. Medicine in general became more specialized, focusing on treatment of diseases rather than prevention. Moreover,

Baltimore's University of Maryland School of Nursing, referring to the use of environmental health practices in nursing. However, there has been a resurgence of interest in environment-related medical practices such as toxic exposure assessment, community education on environmental hazards, and preventive care, and many nurses today are trying to regain the emphasis on environmental health through a variety of community nursing projects, nursing education training programs, and a wide network of nurses sharing their expertise and vision.

Special Forces

In September 2000, a bizarre series of maladies beset the Boehle-Satterfield family of Baltimore. Tami Boehle-Satterfield, an artist, and her 8-year-old daughter Carson developed headaches, nasal congestion, and coughs. Timothy Satterfield, a 40-year-old business executive, began to tire faster than usual and experienced sinus pain. Dizzy

spells plagued the 11-year-old son, Dylan. The diagnoses from myriad doctors and specialists ranged from allergies to migraines to anxiety. But the family's health problems, though sporadic, persisted for months and seemed to intensify.

In November 2000, after several episodes of passing out on the playground, Carson became a regular in the office of school nurse Jan Brant. Brant surmised that the mysterious illnesses plaguing the girl's family were the result of carbon monoxide poisoning. A check of the Boehle-Satterfield home by a power company technician found carbon monoxide concentrations as high as 300 parts per million—10 times the level at which many carbon monoxide detectors sound the alarm. In retrospect, the family believes their improperly installed furnace had been leaking at moderate levels for the past seven years, causing mild but chronic symptoms, with the leak suddenly becoming worse in the fall of 2000, resulting in an eruption of ailments among the family.

Adds Mood, "We have the opportunity to identify and intervene with a wide range of people and problems. Nurses have earned the trust of people, so we are likely to learn of possible environmental threats to health as we listen to the stories of the people we serve."

Nurses are also key translators and communicators of health information for patients. "We're already explaining how to do dressing changes and follow medication regimens," Butterfield says. "Expanding to focus on how to create a healthier living environment and [helping patients to] understand risk is a logical extension."

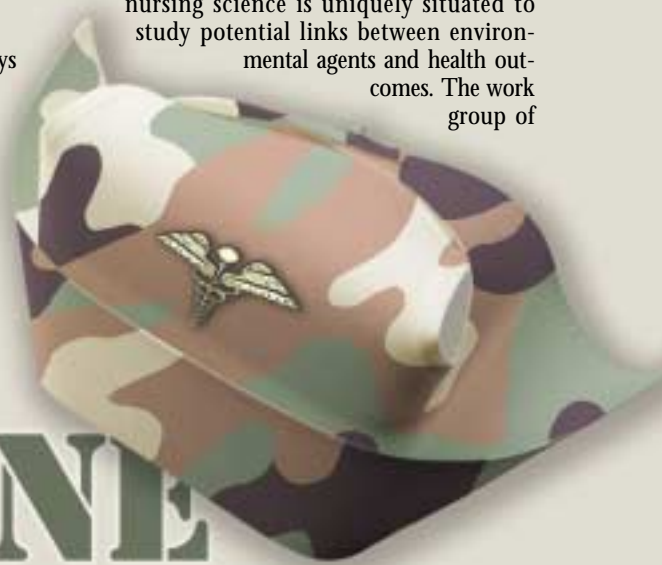
Ready for Battle

To a large extent, nursing has always considered the environment part of what it does, says Dorothy Powell, associate dean for nursing at Howard University in Washington, D.C. But how environmental health nursing is being defined is expanding.

environment, successfully take an environmental health history, and make appropriate referrals. In addition, nurses should demonstrate knowledge of the role of advocacy, ethics, and risk communication in patient care and community intervention, and understand the policy framework of related legislation and regulations. The report also outlined recommendations for enhancing nursing practice, education, and research.

Two years later the National Institute of Nursing Research published a report in the March–April 1997 issue of *Nursing Outlook* identifying environmental health areas where nursing science is uniquely situated to study potential links between environmental agents and health outcomes. The work group of

NIGHTINGALES: FRONT LINE



In fact, carbon monoxide poisoning causes more than 500 unintentional deaths per year in the United States, according to the Centers for Disease Control and Prevention in Atlanta, Georgia, making it the nation's leading cause of accidental poisoning. So how could specialists miss the diagnosis of such a common environmental illness when it seemed obvious to a school nurse? According to Brant, her familiarity with the students, their families, and the community enabled her to piece together the information needed to solve the mystery and illustrates why nurses are the new foot soldiers on the front lines of environmental health. "We're everywhere," says Patricia Butterfield, a professor at the Montana State University College of Nursing in Bozeman. "That makes us uniquely qualified. We're in people's homes, schools, work sites, in hospitals and the community. In fact, one in every hundred Americans is a nurse, and nurses make up the largest health professional group."

Shaner defines it as such: "Environmental health nursing is a broadening of routine clinical practice to factor in such items as air quality, water quality, environmental conditions as they influence [health] in virtually all settings. Its practice recognizes that many environmental factors that determine health status are beyond the control of individuals but must be considered when evaluating their health condition."

The drive to reemphasize environmental health in nursing was based on the framework of a 1995 Institute of Medicine report titled *Nursing, Health, & the Environment: Strengthening the Relationship to Improve the Public's Health*. The multidisciplinary panel that issued the report called for basic environmental health competencies for all registered nurses, emphasizing exposure assessment and risk reduction activities. It concluded that all nurses should be able to understand the scientific underpinnings of the relationship between individuals or populations and the

nursing scholars recommended research to examine risk communication strategies, etiologies of diseases such as asthma and Parkinson disease, and environmental justice issues such as the location of point source polluters in poor and minority communities.

Using this framework, the Agency for Toxic Substances and Disease Registry (ATSDR) of the U.S. Department of Health and Human Services, whose mission is to prevent or mitigate adverse human health effects resulting from exposure to hazardous substances in the environment, developed the Environmental Health Nursing Initiative. The initiative reaches out to all specialties of nurses with programs to encourage the inclusion of environmental health topics in nursing school curricula and to provide continuing education to practicing nurses. The initiative makes available resources such as distance learning tools and a national teleconference, an environmental health and nursing list server to promote the exchange of information,

and a laminated card printed with the mnemonic I PREPARE checklist [see graphic below] to remind nurses to incorporate environmental exposures into health assessments. The ATSDR is also developing an informational toolbox for nurses that will take a multidisciplinary approach and incorporate regional perspectives into the practice of environmental health nursing.

The ATSDR's Division of Health Education and Promotion has been working on a national strategic plan to broaden the role of nurses as active participants in environmental health practice. The strategic plan will act as a mechanism for the coordination, promotion, and support of ongoing efforts nationwide, says Cherryll Ranger, a health education specialist in the division. "We can no longer afford to have a hit-and-miss strategy," she says.

Training Exercises

Although most nursing schools now routinely incorporate training on environmental health topics such as asthma, lead and mercury exposure, and smoking cessation, few require nurses to take environmental

studies specifically. Working environmental health education into nursing curricula poses many challenges. For one thing, environmental health information is perceived as new information, and educators grapple with trying to find space and time for the information in already overcrowded curricula. One way around this is to emphasize incorporating environmental health into existing curricula rather than developing new courses. When teaching about pediatric asthma, for example, faculty could also talk about exposure issues. "Nursing faculty are very receptive to incorporating environmental health into their curricula," says Sattler, perhaps because nursing faculty have a strong realization that if they fail to teach environmental health, there is a risk of misdiagnosis. For example, she says, if environmental exposures such as lead are ignored, a misdiagnosis could be made, and a child could possibly be sent to the wrong specialist. A similar situation could hold true for adults in the workplace. However, this realization raises another difficulty: "Right now, we don't have a lot of nursing faculty educated about environmental health," Butterfield says.

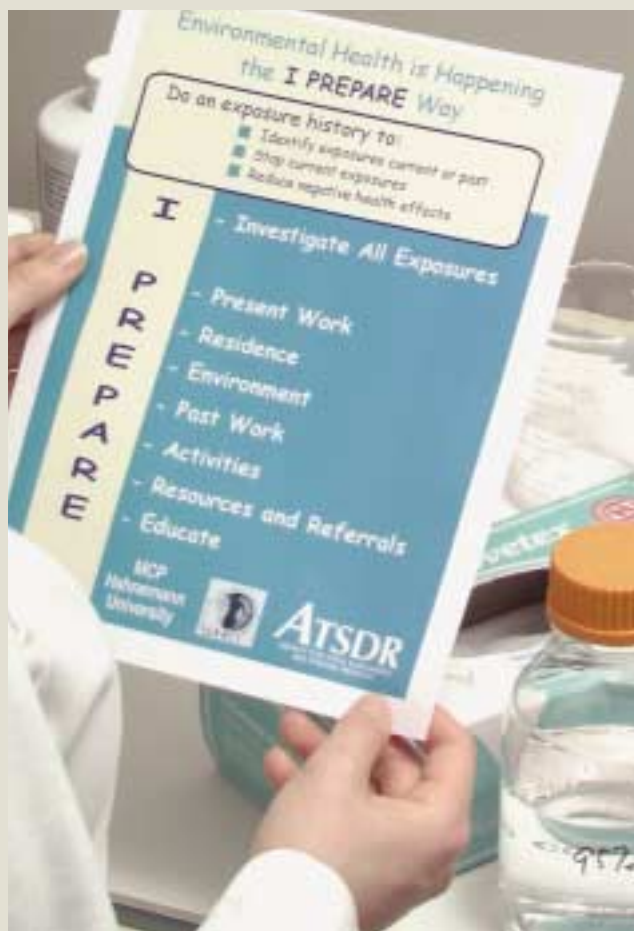
To address these issues, a growing number of nursing education programs are reexamining curricula and choosing to include environmental health content in both undergraduate and graduate educational programs, in large part with support from federal agencies and private foundations. Specialty programs such as community nursing and occupational health nursing have already incorporated environmental material into their curricula and practice. For example, community health nursing teaches the concepts of natural history of disease, which include health promotion and prevention, early diagnosis and treatment, and rehabilitation. "Teaching of environmental health fits easily into this framework," says Rita Lourie, director of academic and community outreach at Temple University in Philadelphia. And many

community health textbooks already contain chapters on environmental health, including such topics as surveillance and prevention, screening, and treatment. "We also talk about access-to-care issues and the impact of political and legislative interventions," she says. "All nurses should incorporate an awareness about environmental health into their approach to patients on a daily basis."

The University of Maryland School of Nursing has developed an informational resource to advance curricular changes on a national level through a Web site called EnviRN [see EHPnet, p. A115]. EnviRN is set up as a virtual nursing village to share teaching strategies, practice guidance, and build a consensus on future research needs so nurses can help prevent environmental disease. The site aims to support nursing professionals seeking accurate, timely, credible scientific information on environmental health and nursing. Howard University and the National League for Nursing are partners in the EnviRN site, which is funded through a grant from the W. K. Kellogg Foundation. EnviRN offers faculty development workshops, assessment tools, teaching materials, hazard information, bibliographic sources, and Internet links, among other resources.

The University of Maryland School of Nursing is also home to one of the first master's programs with an emphasis in environmental health in the United States. The program offers workshops for nursing faculty to identify nursing activities related to environmental health and to prepare community nurses to work in a variety of settings. As part of this degree program the school is launching a pilot program to educate nurses in Maryland and New Jersey about the provisions of the Safe Drinking Water Act.

Howard University is another leader in environmental health nursing education. The Howard University Division of Nursing, partnering with the Minority Health Professionals Foundation and the ATSDR, has created a six-module curriculum on environmental health nursing, largely derived from lessons learned from nurses' experiences working with patients throughout the Mississippi Delta region, a 219-county strip along the Mississippi River that stretches from Illinois to Louisiana. The health of poor communities in the region has been disproportionately adversely affected by the location of industrial plants and increased development in the area. The new curriculum, called the Mississippi Delta Project, stems from a 1994 nursing initiative spearheaded by Howard University to improve environmental health care education of professionals in the region. The modules cover such topics as the role of culture,



Mnurse's mnemonic. A laminated card prepared by the ATSDR offers a mnemonic device to help nurses incorporate environmental health factors into patient assessments.

poverty, race, and economic development on environmental health, toxicology, and community responses to toxic substances. The training materials for each module are now available online and in hard copy. To date, the university has distributed 2,200 copies of the curriculum.

The university is moving ahead to integrate environmental health into its undergraduate nursing curriculum and plans to expand at the graduate level in the next couple of years by offering a joint master's degree in community health and environmental health nursing. Howard University is also associated with an effort by the Mid-Atlantic Center for Children's Health and the Environment to create Pediatric Environmental Health Specialty Units. (George Washington University Medical Center and Children's National Medical Center launched the Washington, D.C.-based Mid-Atlantic Center in October 2000.) The special training units include an interdisciplinary, community-based practicum in environmental health.

Further west, Montana State University in Bozeman, which has incorporated environmental health into existing undergraduate and graduate nursing programs, offered a five-day course on environmental health to nurses in July 2000. The continuing education course, which will be offered again in May 2001, includes four days of classroom lecturing and a full-day bus tour of Yellowstone National Park. Topics include acute and chronic disease consequences, asbestos contamination in rural settings, hazardous materials incidents, drinking water and public health, dioxin exposure, and asthma triggers.

Continuing education initiatives for nurses are being launched by government and health groups as well as academia. In 2000, the U.S. Environmental Protection Agency's (EPA) Office of Children's Health Protection launched a \$200,000 continuing education initiative in conjunction with the American Nurses Association called "Protecting Children from Environmental Threats: A Nursing Education Program." Through this initiative, an Environmental Health Expert Task Force was set up to develop both print and online versions of an independent study course for nurses and a program for nurses to educate others. The first course, which will be available later this year and published in *The American Nurse*, will target nurses in the elementary school environment. Later courses will tackle environmental health nursing in community health centers and hospitals. "We're targeting the more than 2 million nurses already practicing because they are not going to go back to school," says Liz Blackburn, coordinator

for community affairs and outreach in the Office of Children's Health Protection.

The Health Resources and Services Administration's Division of Nursing has also played a supportive role in educating nurses in environmental health. The administration funds grants for activities ranging from developing curricula to continuing education to starting field practicums, according to Irene Sandvold, a nurse consultant with the division. Many related programs piggyback on existing programs that already have a strong nursing infrastructure, such as the Head Start program and programs run through the administration's Community and Migrant Health Centers, she says.

As a result of these and other efforts, thousands of nurses have been educated in environmental nursing, faculty have advanced curricula to include environmental health content, and many health department nurses are promoting a holistic approach to health and the environment. But there is still a long way to go.

Without environmental health knowledge, nurses risk exclusion from policy-making forums. "Nurses will never sit at the tables where environmental health policies are made unless they take ownership of the issues through education," Sattler says. A place at the table will be more critical in the future as nurses become more involved in combating environmental health threats and advocating for communities.

On the Front Lines

Following the lead of community health and public health nurses, nurses in other settings

are incorporating a strong environmental understanding and awareness into their practices. "Nurses in any practice setting should consider the possibilities of environmental influences when they take health histories, evaluate symptoms, and conduct community assessments," says Mood. Nursing actions may, and should, include working to change environmental conditions of affected individuals or populations through direct care and teaching as well as through advocacy and public policy initiatives, she says.

One example of this kind of nursing has taken place through the Lead Hazard Reduction Program at Temple University. The program was started with a \$5,000 contract from the City Department of Public Health Childhood Lead Poisoning Prevention Program, and it entails student nurses and outreach workers going to the homes of families with young children at risk for low-level lead poisoning. The nurses distribute information about how to eliminate lead dust in the home along with gift buckets full of cleaning supplies.

The success of this program prompted the city public health department to invite Temple's Department of Nursing to partner with them in a grant proposal to the NIEHS to combat lead exposure. The result was "Lead Awareness: North Philly Style," now a five-year-old community-based initiative that consists of educating block captains and other community leaders on the hazards of lead through community dinners, where nurses hand out wash buckets and T-shirts bearing slogans such as "lead



Eye to eye combat. Nurses are frequently the health professional most familiar with a patient's exposure history and living situation and thus are often uniquely qualified to uncover and help combat environmental causes of diseases such as asthma and lead poisoning.

dust is everywhere” and “wipe hands, wash feet, don’t bring that lead from off the street.” Messages printed on the T-shirts tell how to prevent lead poisoning. The community leaders are then encouraged to invite neighbors and community members to similar dinners, says Nancy Rothman, Temple University Independence Foundation Professor of Urban Community Nursing, who heads the initiative. “The strength of [the program] is the ability to combine clinical practice with the didactic material,” Rothman says. According to her, the program reaches hundreds of children each year and has had great success in reducing blood lead concentrations in area children. Other groups such as the Massachusetts Nurses Association also target lead.

In 1999, the EPA’s Indoor Environments Division started a program to develop a curriculum with the National Association of School Nurses to address asthma triggers in schools. More than 5.6 million American children under the age of 18 suffer from asthma, which is the leading serious chronic disease among children. Environmental trig-

gers may include allergens, airborne viruses, and chemical particles in the air. This year, 15 training seminars on managing asthma triggers will be conducted nationwide. Participating nurses will then share the information with their schools.

Under its Environmental Health Nursing Initiative, the ATSDR actively supports nurses by encouraging participation in research projects. Age-span issues, health communication, and community-level research activities are among the areas best suited to nursing skills, according to Ranger.

Some of the initiative’s more successful projects to date have been in collaboration with the Association of State and Territorial Directors of Nursing to educate nursing personnel and to develop policies to address environmental health issues in the populations they serve, says Ranger. For example, Ranger says, work at Kelly Air Force Base in San Antonio, Texas, has given the community a voice that they did not have previously. There, community groups were expressing concerns about potential exposure

to environmental contaminants such as benzene and trichloroethylene related to industrial processes on the base including aircraft maintenance. In response, a Texas senator petitioned the ATSDR to assess possible contamination issues. The ATSDR worked with a nurse hired by the local health department to examine contamination issues and coordinate clinical assessment services that included taking environmental exposure histories. The nurse listened to concerns by the largely Hispanic community surrounding the base, which felt it had received little response to its complaints in the past. In fact, the ATSDR discovered that a plume of contaminated groundwater had extended beyond the base to beneath as many as 20,000 homes. In its assessment, which is ongoing, the ATSDR also found elevated rates of some cancers, including leukemia and kidney, lung, and liver cancers, as well as elevated birth defect rates in at least one ZIP code area.

Work in Montana with the University of Montana School of Nursing in Missoula, Salish Kootenai College in Pablo, the Indian

FOR MORE INFORMATION ON ENVIRONMENTAL HEALTH NURSING INITIATIVES:

-  **ATSDR Environmental Health and Nursing Home Page**
<http://www.atsdr.cdc.gov/EHN/>
-  **EnviRN Home Page**
<http://envirn.umaryland.edu/>
-  **Health Care Without Harm Home Page**
<http://noharm.org/>
-  **National Academy Press, publisher of Institute of Medicine Report Nursing, Health, & the Environment: Strengthening the Relationship to Improve the Public's Health**
<http://www.nap.edu/>
-  **Mississippi Delta Project Modular Curriculum**
http://138.238.167.42/Nursing/MDP_Curriculum.htm
-  **Montana State University Short Course**
<http://www.montana.edu/upstream/>
-  **National Environmental Education & Training Foundation Nursing & Environmental Health Initiative**
<http://www.neetf.org/health/Nursing.htm>
-  **Nightingale Institute for Health and the Environment**
<http://www.nihe.org/>
-  **University of Texas at El Paso Border Basket Lead Contamination Study**
<http://borderbasket.utep.edu/>

Health Service, and the state Department of Public Health and Human Services have all resulted in ongoing and sustainable projects, Ranger says. For example, in 1997 the agency organized a day-long environmental health training session for public health nurses from each of these affiliates. The ATSDR also has an ongoing collaboration taking exposure assessments with community health nurses in Libby, Montana, where a mining community has been exposed to asbestos.

“The most successful [environmental health nursing] programs are those that have established a trusting relationship with a community,” says Lourie. Federal grant-making agencies such as the NIEHS and the EPA look for organizations that are working on a community level. For instance, the NIEHS requires demonstration of strong community relationships in grant proposals. “Establishing trusting relationships takes time,” Rothman says, but nurses are often in a position to see community members over time.

In addition to community health nurses, occupational health nurses are also engaged in improving environmental health conditions in workplaces by reducing exposure to toxicants and other environmental stressors. The Massachusetts Nurses Association, for example, has a full-time occupational nurse on staff to target such issues as allergic reactions to latex products. In fact, work by the Association of Occupational and Environmental Clinics and the American Association of Occupational Health Nurses, in partnership with the ATSDR, has pushed to include environmental health in occupational health nursing to the extent that the nursing specialty plans to incorporate “environmental health” into its title.

Private-sector and nonprofit organizations are also working to advance environmental health nursing. The National Environmental Education & Training Foundation has initiated projects and partnerships to strengthen nursing’s role in addressing environmental impacts on health. In addition to generating environmental health tools and resources, the foundation has engaged nursing professionals in a national initiative to improve the ability of health care providers to recognize, manage, and prevent pesticide-related health conditions in patients and communities. This effort, says Jennifer Bretsch, an associate for health and environment programs at the foundation, will serve as a replicable model for infusing environmental health issues into nursing and medical education and training nationwide. Initiative projects include assessing how health care providers may respond to the integration of environmental health

into their practices, developing national guidelines for incorporating environmental health content into nursing curricula and practice skills training, and establishing a recommended resources list for health care providers on pesticide-related health issues.

In another effort, the Paso del Norte Health Foundation recently founded the Center for Border Health Research as a binational academic, health, and policy coalition to address environmental health problems along the border between El Paso, Texas, and Chih, Mexico. Maria Amaya, a professor in the College of Health Sciences and director of the Women’s Health Nurse Practitioner Program at the University of Texas at El Paso, is leading an environmental nurse research project there to study childhood lead exposure and other border health issues.

Strategic Thinking

Outside of formal initiatives, environmental health nursing is being revitalized in other ways. Nurses in a variety of practice settings are focusing attention on the health effects of exposures to a range of environmental toxicants, many of which have not been rigorously studied for their effects on humans. Nurses in general, says Mood, are striving to be more responsive to patients’ concerns about the link between environmental agents and disease. They are watching for links between health problems and potential exposures, particularly in such vulnerable populations as infants and children, the elderly, and people with already compromised health statuses, as well as potentially uniquely susceptible groups such as racial and ethnic minorities and the poor. Nurses can play a key role in establishing a national tracking system of environmental health as well as in conducting patient research. “They are well situated to document both exposures as well as disease outcomes that have environmental triggers,” Butterfield says.

In addition, says Mood, “Nurses [who are] attuned to the broad determinants of health are in a position to advocate changes in conditions and public policy that can have significant impacts.” For example, the Health Care Without Harm initiative, begun in 1996 largely with the support of nurses, is working to eliminate adverse environmental and health effects of the health care industry through measures such as reducing the use of mercury-based equipment in medical settings and reducing or halting the incineration of plastic medical supplies, which produces dioxin emissions. “A lot of the measures we have implemented we learned how to do from nurses,” says Charlotte Brody, co-coordinator of Health

Care Without Harm. In 1997, the American Nurses Association formally endorsed the initiative, becoming the first large professional organization to do so. The association’s Pollution Prevention Kit for Nurses, developed with the Nightingale Institute for Health and the Environment, is designed to educate nurses on reducing toxic pollution created in the course of providing health care.

Still, there are barriers to advancing environmental health nursing, the largest perhaps being money and time. Nurses must contend with economic factors that limit the scope of their practice and the time they may allot per patient, which may affect the amount of time they can devote to environmental health-related activities such as taking exposure histories and providing patient education. Categorical funding programs continue to reinforce a “think small” perspective, Butterfield says, supporting an emphasis on patient outcomes instead of a more complex, holistic view of health. “Environmental health is often seen as a competing priority with other health issues,” Ranger says.

Under most current medical service reimbursement schedules, environmental health care and counseling are not acknowledged or compensated, despite the benefits to the patient. “Cost benefits of environmental health nursing are pretty clear for many illnesses like asthma, for example, [which may enable] patients to reduce emergency room visits and hospital stays,” Sattler says. Insurance reimbursement codes need to be modified or augmented to include environmental health problems, Butterfield adds.

Part of the onus is on nurses to change administrative policies. “Nurses still don’t know what we want to ask of health care agencies and providers in terms of environmental health,” Sattler says. “We’re not quite there yet.” Part of the problem may be that even among nurses, the attitude toward environmental health nursing sometimes is that it is more of an advocacy type activity and not something to incorporate into their practice to affect patient outcomes. By the same token, Ranger says, “Other professions need to recognize that nurses are part of the team, and the intent is not to take over but to contribute what skills we bring to the table that are sometimes unique to nursing.” Butterfield concurs, saying that “if health care systems would look up, they’d see nurses are an underused resource. When it comes to environmental health, we can do a lot more. We’re willing to do a lot more.”

Julie Wakefield