



NURSING AND ENVIRONMENTAL HEALTH

The nursing profession worldwide recognizes the vital role the natural environment plays in global health, and acknowledges the real threat posed by medical waste.

—International Council of Nurses¹

Control of the environment has been the foundation of good nursing care in most settings throughout much of nursing's professional history. More than a century ago, Florence Nightingale, the founder of modern nursing, and Lillian Wald, a public health nurse advocate, voiced concerns about the environments in which people lived and worked. In 1860 Nightingale said:

In watching disease, both in private homes and public hospitals, the thing which strikes the experienced observer most forcibly is this, the symptoms or suffering generally considered to be inevitable and incident to the disease are very often not symptoms of the disease at all, but of something quite different—of want of fresh air, or of light, or of warmth, or of quiet, or of cleanliness, or of punctuality and care



Ms. Melamed is an environmental health specialist for the American Nurses Association's (ANA's) Department of Nurse Advocacy, and Ms. Jackson is an environmental health consultant for the ANA and Health Care Without Harm.

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**BY ANN MELAMED, RN,
MA, & NOVELLA
JACKSON, RN, MS**

in the administration of diet, of each or all of these.²

Clean air, clean water, moderate temperature and activity, healthy foods and rest formed the basis of nursing care for many years. Today's nurses, working in all countries of the world under all conditions, continue to recognize the role of the natural environment in human health and the interrelationship between the health of a country, a community or individual, and the everyday environment.

ENVIRONMENTAL HEALTH

Environmental health comprises those aspects of human health, including quality of life, that are determined by physical, chemical, biological, social, and psychosocial processes in the environment. It also refers to the theory and practice of assessing, correcting, controlling, and preventing those factors in the environment that can potentially affect adversely the health of present and future generations.

—World Health Organization³

According to the World Health Organization (WHO), "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity."⁴ We can, building on that definition, describe environmental health as freedom from illness or injury resulting from exposure to toxic agents and environmental conditions potentially detrimental to human health.⁵ Environmental hazards can be chemical, physical, biological, or psychosocial. For nurses, who work in all kinds of settings, the health care environment can be the home, hospital, clinic, school, or workplace. Any environment can be considered as coming under a nurse's purview. In this article, however, we will limit ourselves to the



hospital, to medical waste, and to pollution-prevention activities involving nurses.

HEALTH CARE POLLUTION

The health care sector of the U.S. economy produces four billion pounds of waste a year.⁶ The sheer amount of waste generated by an industry committed to health promotion and community responsibility is reason enough for health professionals to examine their practices. Besides constituting huge amounts of material that must be disposed of either by landfilling or incineration, health care waste contains biohazards and, often, toxic levels of mercury and other heavy metals. Such waste also contains large amounts (27 percent) of chlorinated plastics such as polyvinyl chloride (PVC) plastic found in intravenous (IV) bags, tubing and many other products.⁷

To make the plastic soft and flexible, PVC products need a plasticizer added to them. Di(2-ethylhexyl) phthalate (DEHP) is the most frequently used plasticizer in medical products. Because DEHP is not chemically bound to the plastic, it leaches from medical products into fluids, especially fat-containing fluids such as feeding solutions or blood products, both of which are administered to patients through tubing. The DEHP enters into patients' bodies from these solutions. DEHP is a developmental and male reproductive toxin. Recently the National Toxicology Program, the Food and Drug Administration, and Health Canada have all developed warnings for groups at high risk of exposure to DEHP, including male neonates, pregnant women, and prepubescent males.⁸

Another problem with PVC plastics is that, when incinerated, they combine with organic material to create dioxin. Dioxin belongs to a family of highly toxic chemicals that are byproducts of industrial processes, including medical and municipal waste incineration. Dioxins are known human carcinogens, endocrine disruptors, and reproductive and developmental toxicants. Dioxins are found in food because the industrial processes that produce them also discharge them into the air and water, where animals ingest them as part of the food chain. Humans eat the animal products—especially fatty meats, fish, dairy products and eggs—and the dioxins thus become concentrated in their bodies. Because dioxin is lipophilic (fat loving) and concentrates in high-fat, human breast milk, nursing infants are especially vulnerable to dioxin exposures. Breast feeding is still the preferred method for feeding infants.

Mercury is another serious contaminant found in medical waste. A neurotoxin, mercury can

cause a variety of symptoms, including tremors, vision impairments, and attention deficit disorder, especially when exposure happens during fetal and early childhood development. Mercury is also a reproductive toxin that, when consumed in food by women of child-bearing age, can adversely affect brain and neurological development in their children.⁹ Mercury enters the food supply, especially fish, through release into the air and water from medical and municipal waste incineration, coal-fired power plants, and other industrial discharges (including health care). Once in the water, the metallic mercury is transformed by bacteria in the sediment into methylmercury, a biologically active form. The methylmercury then moves into the food chain, and finally becomes most concentrated in those animals—including humans—that eat fish. The highest amounts of mercury tend to be found in larger, older, predatory fish such as tuna and swordfish.

Mercury-containing products in health care include thermometers, sphygmomanometers, bougie intestinal dilators and Cantor tubes, pharmaceuticals, cleaning agents, switches, batteries, and many other items. Alternatives for these devices exist. But if leaders want to eliminate mercury-containing devices from their institutions, they must make a serious commitment to do so.

As with the use of mercury-containing devices, health care organizations contribute to contamination of both the environment of care and the outdoor environment when they employ certain sterilants, cleaning products, pharmaceuticals, personal care products, latex, pesticides, and plasticizers. This list is not exhaustive. The irony that an industry committed to health and healing is also a source of pollution is not lost on nurses. Nurses can be strong advocates for environmental responsibility because they want the best for their patients, for their families and communities, and for themselves.

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THE NURSING PROCESS AND THE ENVIRONMENT

In the everyday patient care regimen, nurses continually employ well-honed assessment skills. In making an assessment, a nurse incorporates all information about potential contributors to (or detractors from) the patient's health status, including physical and psychosocial information. Knowledge about, and control of, environmental exposures are part of a good nursing assessment because nursing is a holistic and a prevention-oriented profession. Because environmental health is a prevention-oriented approach to health care, nurses are well positioned—both in their particu-



lar facilities and in the larger community—to act as advocates for it.

Nurses, who constitute the largest single body of health care workers, typically have daily, direct contact with the public. They are the frontline of the public-health surveillance system, seeing patients in a wide variety of practice settings, ranging from the emergency room to the private home. In each of these settings, nurses can use their assessment skills both to understand medical waste and unhealthy products and to plan ways to prevent threats posed by them. They can then implement their plans for action and evaluate the impact of care on the environment. All this is part of the nursing process.

THE HEALTH CARE WASTE STREAM

In practicing environmental health care, the first thing nurses need is an understanding of the complex waste stream in the health care setting. Hospitals generate four major types of waste:

- *Solid Waste* This is simple garbage. It should have all reusable, recyclable, “compostable,” and toxic waste removed before it is disposed of.

- *Regulated Medical Waste* This is infectious or “red bag” waste, usually defined as “any solid waste that is generated in the diagnosis, treatment, or immunization of human beings or animals, in research pertaining thereto, or in the production or testing of biologicals.”¹⁰ (Specifically, “Red bag” waste is fluid blood, blood-saturated items, bags and IV tubing that contain blood products, chest drainage units, hemodialysis products, and similar articles.)

- *Hazardous/Chemical Waste* This is waste regulated under the Federal Resource Conservation & Recovery Act. It includes mercury and other heavy metals, certain pharmaceuticals, and many other health care wastes that—if disposed of in a way that puts them in direct contact with land, water, or air—can potentially be harmful to humans or the environment. Hazardous waste requires special disposal that is much more costly than regular waste disposal.

- *Recyclable/Reusable Waste* This includes such items as paper, cardboard, some plastics, metals, glass, and even compostable food and yard waste that should not go into landfills.

Once the separate waste streams are understood, it becomes easier to begin planning strategies to reduce or eliminate the problems. The most important concept for nurses to understand and promote is waste reduction or pollution prevention, sometimes called “P2.” P2 is a way of “thinking upstream” and is comparable to primary nursing prevention, including health promotion and health protection strategies. When nurses

isolate a patient with an infection, thereby preventing others from being exposed to it, they are practicing primary prevention. P2 is a similar concept. When a nurse manager eliminates mercury from a nursing unit, he or she is making sure that no one will be exposed to it—another form of practicing primary prevention. Nurses can promote P2 strategies by seeing them as patient care issues. Administrators can support nurses’ deeper understanding of and commitment to better waste management by showing them exactly where the waste goes. For example, nurses might visit the landfill where trucks take their facility’s garbage. Seeing such landfills can be a life-changing experience for people, especially for nurses and other health advocates.

REUSE, RECYCLING, AND WASTE SORTING

Nurses can work with their facilities’ environmental health and safety teams to develop plans to reduce red bag waste and to recycle items. If no team has been formally established for the care setting, the nurse may want to help establish a “green team” to conduct an audit of waste in the setting. Nurses, who are usually well aware of the flow of traffic and trash on their units, can, after an assessment of the situation, recommend the best places to put collection containers and signs that guide staff in the proper segregation and disposal of waste.

Waste containers should be color-coded. For instance, most infectious waste is red bagged. Chemotherapy and other hazardous waste are often placed in yellow containers, whereas regular trash is placed in brown or clear bags. Most waste—approximately 85 percent of the waste that has been in contact with patients—does not need to go into the red bag. Red bags should be covered and generally accessible only to nursing or medical staff, not to patients or visitors. Red bags should be used only in cases requiring the disposal of bloody or highly infectious articles.

Reusable “sharps” containers (in which needles, syringes, razors, and other potentially dangerous items are deposited) are available in some areas and should be considered by nursing staff. These can divert enormous amounts of plastics from the waste stream and possible incineration. Nurses should always take measures to segregate out cardboard, paper, batteries, and other recyclables. In some hospitals, nurses have set up collection systems in their units for plastic bottles and “blue wrap” (soft blue polypropylene wrapper for sterile instruments, linens, and other items). Nurses can look into bringing back more durable goods, such as metal basins and real linens rather than paper. Reusable crates for

Nurses can promote waste reduction by viewing it as a patient care issue.



products are a very good way to reduce disposal costs and decrease cardboard waste.

PURCHASING PRODUCTS FOR SAFETY

The hospital's purchasing department is the primary place nurses can promote upstream thinking and pollution prevention, because every item coming into a hospital comes through this department. Nurses can think upstream by advocating the purchase of products that are environmentally preferable, by promoting and using reusable products, and by lobbying vendors and manufacturers for environmentally preferable products and less packaging.

Environmentally preferable purchasing (EPP) is the act of purchasing products/services whose environmental impact has been considered and found to be less damaging to the environment and human health than other products or services.¹¹ Environmentally preferable products include mercury-free, latex-free, PVC and DEHP-free items, reusable or durable items, and safer sterilants and cleansers. Nurses should evaluate products according to environmental lifecycle impact and should be involved in developing purchasing policies. Purchasing policies prevent unwanted products from reappearing. Mercury thermometers, for example, may creep back into a facility that lacks a policy permanently eliminating mercury-containing products.

Most hospitals have mission statements saying that the facility believes in health protection and community responsibility. These should be used to guide the drafting of written purchasing policies for EPP. It is imperative that hospitals have nurses on the committees that govern product purchasing and evaluation. Valuable information on product evaluation committees is available at Health Care Without Harm's website.¹² Because nurses have extensive experience with products used in patient care, they can be influential in helping to choose products that are preferable from a patient care as well as an ecological perspective.

NURSES AS ADVOCATES

Patient advocacy is a primary role for nurses. When a nurse questions an action or an order from a superior or a physician, the justification frequently cited is, "I am a patient advocate." In terms of a healthy environment, acting as a patient advocate means advocating the best care, the best choices, and the best products available in the given circumstance. The ANA believes that nurses, in their role as advocates, can expand this role to be advocates for the environment. Nurses play a key role in prevention and education and

have the potential to lead their patients and communities to environmentally safer health care facilities. Nurses also have the education and knowledge to guide policymakers toward a new way of viewing the relationship between life choices and environmental impact.

ATTRACTING NURSES WITH AN ECOLOGICAL ETHIC

Because of a widespread and chronic nursing shortage, nurses today have more choices concerning the type of settings in which they prefer to work. Among the workplace issues important to them are staffing, the health and safety of patients, and the health and safety of nurses themselves. In a 2001 online survey sponsored by the ANA/*NursingWorld*, 88 percent of the nurse respondents said they considered the health and safety of the work environment in deciding whether to remain in a position or go to another.¹³

What if a nurse could choose to work in a hospital that prided itself on using the least toxic cleaning agents and sterilants; that had eliminated mercury products with their potential health risks to staff and patients; that had instituted integrated pest management, a method of dealing with pests that uses the least toxic alternatives available? What if a nurse could choose to work in a hospital that composted its food waste and recycled its linens and metal basins, that used real china instead of paper products, and that had strict recycling and waste segregation programs? Such a facility would look very attractive to nurses with a broad, holistic outlook and concern for the greater community. Every nurse is a citizen and a member of a community. Most nurses want to be part of a larger community, contributing to the ecology and health of the entire ecosystem.

NURSES AND ADVOCACY FOR HEALTH

The nursing profession worldwide recognizes the significance of environmental health threats that face all people. Nurses everywhere understand the significance of environmental controls for promoting health and primary prevention. Nurses play a key role in prevention and teaching about the environment and the impact that health care has on it. Nurses are vital to the promotion of healthy environments of care in hospitals and the reduction of health care waste.

All nurses are advocates for patients, whether the patient is an individual or a community. All nurses can and must advocate clean air, water, healthy food free of contaminants, and clean environments. Hospitals must begin to view their responsibility for public health in a more holistic and global way. A healthy hospital, with a mission

Continued on page 53

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LAUNCHING MERCURY-REDUCTION EFFORTS

Continued from page 38

must develop a transition plan for implementing the needed changes. New policies and procedures must be documented in a written policy that is supported by the facility's leadership team.

When Saint Joseph Mercy launched its mercury-reduction initiative, for example, Gonyon and his ad hoc team wrote procedures for controlling staff exposure to the substance, for avoiding spills, and for handling the contaminated waste during the transition. The team also put in place a policy to ensure that materials management staff would avoid purchasing products containing mercury. In addition, the team developed protocols to ensure that, if and when Saint Joseph Mercy buildings are demolished, mercury in them will be contained. For instance, demolition contractors will be required to identify mercury-containing items, such as thermostats and plumbing traps, and ensure that they are collected and properly disposed of before demolition occurs.

Gonyon and the team also created a phase-out plan for replacing products containing mercury with mercury-free alternatives.

COMMUNICATING WITH STAFF MEMBERS

Informing staff members throughout the facility of new environmental programs is essential to ensuring compliance, Gonyon said. Management teams, safety committees, physicians, and other staff members must have a clear understanding of how their departments will be involved in implementing environmental plans. "You don't want to just show up and take their old devices without letting them know in advance," Gonyon explained. "Change is disruptive. You need to communicate why the change is important."

Training sessions, open meetings, and newsletter updates are a few of the ways environmental team members can keep staff members informed of the status of implementation. Periodic updates are necessary even after an environmental program is well underway.

Ongoing training and communication not only keep ecology initiatives on track, they also can bring about broader cultural change in a facility. "Through education, we're trying to move people to be more respectful of the Earth," said Sr. Janet.

IMPLEMENTING PLANS

As plans to reduce or eliminate hazards are implemented, the environmental team should maintain contact with the materials management and safety teams and with the other involved departments to ensure that product phase-outs and replacements happen smoothly, new procedures are effective, and patient care is not disrupted. Solutions can be tweaked if concerns are raised. When Saint Joseph Mercy implemented its mercury-reduction plan, Gonyon worked closely with affected departments, helping them recycle old materials and train staff to use new products.

If environmental teams secure the support and resources they need, they will develop a culture of environmental awareness that permeates their facilities. At organizations with this type of culture, environmental responsibility is a priority; it is tracked and measured, and every department is held accountable for addressing it.

"As health care providers, we need to be concerned about environmental health," said Sr. Janet. "We can't sit back. We must keep challenging ourselves to do better." □

NURSING AND ENVIRONMENTAL HEALTH

Continued from page 32

of health promotion and service to the community, including the reduction of medical waste, will attract nurses with an ecological ethic. There has never been a better time to engage nurses on environmental accountability in their workplaces and communities. □

NOTES

1. The Position Statement of the International Council of Nurses, Geneva, Switzerland, can be found at www.icn.ch/psmedwaste.htm.
2. Florence Nightingale, *Notes on Nursing*, Dover Publications, New York City, 1969, p. 8.
3. World Health Organization, www.health.fgov.be/WHI3/Hub/hub3/history.htm
4. World Health Organization, "Definition of Health," which can be found at www.who.int/about/definition/en/
5. See Andrew M. Pope, Meta A. Snyder, and Lillian H. Mood, *Nursing, Health, and the Environment*, National Academies Press, 1995, p. 8; also available at www.nap.edu/books/030905298X/html/R1.html.
6. Kathy Gerwig, "Waste Management & Health Care," available at Health Care Without Harm, www.noharm.org/details.cfm?type=document&id=492.
7. Mark Rossi and Ted Schlettler, "PVC and Healthcare," available at Health Care Without Harm, www.noharm.org/details.cfm?type=document&id=489.
8. For these warnings, see www.noharm.org/pvcDehp/GovernmentReports.
9. National Research Council, *Toxicological Effects of Methylmercury*, National Academies Press, 2000, available at <http://books.nap.edu/books/0309071402/html/310.html#pagetop>.
10. U.S. Environmental Protection Agency, "Medical Waste," available at www.epa.gov/epaoswer/other/medical/index.htm.
11. See Hospitals for a Healthy Environment, "How to Do EPP," which can be found at www.h2e-online.org/tool/epp1.htm#1.
12. Health Care Without Harm, "Green Purchasing," available at www.noharm.org/greenPurchasing/pecs.
13. American Nurses Association, "Nurses Say Health and Safety Concerns Play Major Role in Employment Decisions," available at www.nursingworld.org/pressrel/2001/pr0907b.htm.

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