



Understanding Nursing's Role in Health Systems Response to Large-Scale Radiologic Disasters



■ Tener Goodwin Veenema, PhD, MS, MPH, RN, FAAN; and Clifton P. Thornton, MSN, RN, CNMT

ABSTRACT: Guidance for the optimal management of patient surge after a radiologic disaster is limited and rarely taught in schools of nursing or staff development/continuing education programs. To prepare and respond to this low-frequency, high-impact event, nurses require a substantive body of knowledge and skill set on which to base both public health and acute care preparedness and response efforts. Hospital and public health emergency management response plans may be insufficient to accommodate the patient surge, health system burden, and the fear and uncertainty that characterize these types of events. Lessons learned from Chernobyl, Three Mile Island, and the Fukushima Daiichi nuclear power plant accidents can inform nurse preparedness efforts by providing information on what can be expected throughout the disaster life cycle of these catastrophic events. Nurse involvement may potentially include site response; the establishment of community reception centers for population screening and monitoring; decontamination; shelter management; and the psychosocial support of victims, families, co-workers, and the community impacted by the event. (*J Radiol Nurs* 2015;34:63-72.)

KEYWORDS: Radiation; Nuclear; Disaster; Nurses; Health systems response; Roles.

INTRODUCTION

Tener Goodwin Veenema, PhD, MS, MPH, RN, FAAN, is an Associate Professor, Department of Community-Public Health, Johns Hopkins School of Nursing and Center for Refugee and Disaster Response, Bloomberg School of Public Health, Baltimore, MD; Clifton P. Thornton, MSN, RN, CNMT, Senior Research Assistant and Pediatric Nurse Practitioner, Johns Hopkins School of Nursing, Baltimore, MD.

Corresponding author: Tener Goodwin Veenema, Department of Community-Public Health, Johns Hopkins School of Nursing, Center for Refugee and Disaster Response, Bloomberg School of Public Health, 525 North Wolfe Street, Office 532, Baltimore, MD 21205. E-mail: tveenem1@jhu.edu

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Nothing in life is to be feared. It is only to be understood. Now is the time to understand more, so that we may fear less—Madame Curie.

Radiologic disasters, particularly those resulting from damage to the integrity of nuclear power plants, although rare, pose a significant public health and health systems challenge when they occur. Unanticipated radiation release from one or many radiation dispersal devices or from a detonated nuclear weapon against a US city would result in widespread chaos (Glasstone & Dolan, 1977; NCRP Report #138,

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2001), the dissolution of social systems, and a sudden demand for public health and health care services (Bell & Dallas, 2007; Dallas, 2012; Dallas & Bell, 2007; Macleod, 1981). Radiation disasters including those involving a nuclear power plant disaster are uniquely frightening as they are characterized by their lack of clearly defined limits in time and space. They happen without warning, can rapidly escalate in severity, and may involve a continually expanding risk zone (Maxwell, 1982).

Nurses as front-line health care providers are an integral component of any radiation disaster preparedness and response plan; they must have the training to screen, identify, treat, and possibly even oversee local disaster preparedness and response initiatives in the event that a large-scale radiation event does occur (Veenema, 2006). Radiology nurses may be uniquely positioned to bring their expertise to a large-scale radiation event in planning, preparedness, and response. Willingness to respond to disaster events involving radiation may be dependent on the nurses' perception of risk (Barnett et al., 2005) and sense of clinical competence (Mitani, Kuboyama, & Shirakawa, 2003; Mitchell, Kernohan, & Higginson, 2012; Veenema, Walden, Feinstein, & Williams, 2008). Despite this knowledge, insufficient attention and resources continue to be allocated in the United States to the education and training of nurses and other health care providers in the medical institutions that will receive victims (Dallas, 2012). Despite excellent evidence-based resources (Table 1), radiation disaster training is rarely incorporated in undergraduate or graduate nursing education or nurse clinical residency training (Veenema & Karam, 2003). This has resulted in a na-

tional nursing workforce that outside of our military nurse counterparts is largely unprepared to participate in a mass casualty response to a nuclear war or large-scale radiation disaster.

BACKGROUND

Review of historic nuclear power plant disasters reveals that nurses have played a significant role in the response and recovery phases of these events. Nurses have screened individuals for exposure to radiation, have decontaminated victims, and have provided clinical care to patients presenting with the signs and symptoms of radiation syndrome. Additionally, nurses have provided mental health counseling and emotional support to individuals and communities as needed throughout the disaster. Many of the individuals living within the communities that experienced nuclear power plant events have suffered significant mental health problems years after the disaster occurred. As the nurse's role is to protect the physical health, mental health, and well-being of the public, it seems apparent that at no point will this be more critical and challenging, than during a large-scale radiation disaster.

Lessons Learned

Three Mile Island. The nuclear power plant accident at Three Mile Island near Harrisburg, PA in 1979 resulted in major organizational challenges for hospitals and health care systems in the immediate-risk area (Haglund, 1979; Katz & Pascarelli, 1978; Kuntz, 1979; Maxwell, 1982). Hospital disaster plans were revealed to be glaringly lacking radiation response guidelines and were unable to handle the sudden unanticipated demand for care and the need for

Table 1. Radiation resources for nurses

American College of Medical Toxicology Course on TICs and TIMs. American College of Medical Toxicology, http://acmt.net/Chemical_Agents_of_Opportunity.html
Centers for Disease Control and Prevention (CDC) Radiation Emergencies, Training, and Tools, http://emergency.cdc.gov/radiation/training_guidance.asp
Nuclear Radiologic Incident Annex, CDC, http://www.bt.cdc.gov/radiation/professionals.asp
Radiation Decontamination Procedures, http://www.remm.nlm.gov/ext_contamination.htm
Radiation Emergency Assistance Center/Training Site
ORISE provides expertise in the medical management of radiation incidents through the operation of the Radiation Emergency Assistance Center/Training Site (REAC/TS), a dedicated DOE facility located in Oak Ridge, TN, http://orise.orau.gov/reacts
Radiation Disasters: Preparedness and Response
American College of Radiology, (2012). <i>Radiation Disasters: Preparedness and Response for Radiology</i> , http://www.acr.org/membership/legal-business-practices/disaster-preparedness
Internal Contamination Clinical Reference, CDC, http://www.bt.cdc.gov/radiation/iccr.asp
Radiologic Terrorism: Medical Response to Mass Casualties, http://www.bt.cdc.gov/radiation/masscasualties/training.asp
Radiologic Terrorism: Emergency Management Pocket Guide for Clinicians http://www.bt.cdc.gov/radiation/pocket.asp
REAC/TS center at the Oak Ridge National Laboratory at http://orise.orau.gov/reacts/ ,
Public Health Planning for Radiologic and Nuclear Terrorism http://www.bt.cdc.gov/radiation/masscasualties/publichealthplanning.asp
Virtual Community Reception Centers, CDC. http://www.bt.cdc.gov/radiation/crc/vrcr.asp

DOE: Department of Education; ORISE: Oak Ridge Institute for Science and Education ; TIC: toxic industrial chemical; TIM: toxic industrial materials.

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