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## Providing nursing care to Ebola patients on the national stage: The National Institutes of Health experience

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Over the summer of 2014, researchers, caregivers, and our support team at the National Institutes of Health (NIH) Clinical Center went through the “lived experience” of preparing for and caring for two patients with exposure to and actual Ebola virus disease (EVD). We anticipate being called on to do so again at any time. We offer a description of our experience and a few critical lessons we feel should inform the nursing community in preparation for the possibility of a patient presenting for care.

**The phone call that we had been anticipating for over 2 months came at 4:00 p.m. on a Friday afternoon in September. A health care provider from West Africa who had been exposed to Ebola was going to be admitted and would arrive at NIH Sunday evening.**

Plans had been underway since July to prepare for the admission of a patient with EVD, or exposure, to the NIH Clinical Center. However, when the phone call came, the enormity of this impending admission became a reality. As nursing leadership, we knew that nurses would be at the front line and on the national stage in providing care to our patients as well as preventing transmission to caregivers or others in the hospital or community. We responded to the call by setting into action an intensively practiced response to transport, receive, assess, and care for someone with potential EVD. Our first patient never developed EVD and was discharged after 10 days. We received our second patient several days later, one of the nurses involved with the EVD case in Dallas. She had documented EVD and also was discharged free of disease 10 days later. We are ready if needed for another patient. Our experience demonstrated that we could be successful in safely caring for patients with Ebola in a highly specialized facility staffed by a specialized team in an extraordinary state of training readiness. Our experience also raised several

significant questions about if and how such an approach could be translated successfully and sustainably to the general health care system and revealed some key priorities that should inform future efforts by nursing leaders to respond to similar crises.

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### Our Unique Facilities and Staff

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The Special Clinical Studies Unit (SCSU) at the NIH Clinical Center was opened in 2010 to provide a resource for the study of patients with any level of isolation requirement for a documented or suspected infection. Funding and resources to construct the unit within the new Hatfield Clinical Research Center were fueled by concerns about emerging unusual infectious diseases as well as the potential use of disease causing organisms in acts of bioterrorism. Our role was to support research on vaccines and treatments and offer a resource for the evaluation, treatment, and study of workers with occupational exposure to these agents.

The SCSU includes a room that can be used for intensive care-level patient care and has multiple redundant systems for the management and disinfection of any materials or waste that leaves the unit. As a part of preparing for their role in studying highly infectious diseases, SCSU staff has been trained, drilled, and observed using personal protective equipment (PPE) and has regularly rehearsed patient scenarios requiring the most intensive isolation procedures known. Our team of specialists in epidemiology and infectious diseases had been tracking the unusual outbreak of Ebola in West Africa since its emergence in early 2014. Before the phone call in September, an interdisciplinary team had been preparing for months

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to be sure we could safely manage an admission of a patient with EVD exposure, working through scenarios from staffing to transport of specimens to managing the trash. All employees who participated in the care of our two patients (and any who participate in any future admissions) are volunteers drawn from among our trained staff members.

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### Principle of Extreme Caution

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Setting our level of isolation for patients with EVD in the SCSU was a major challenge because guidelines were still emerging based on the known mode of transmission, and there was limited experience in Western health care facilities with the potential for transmission during invasive procedures and close quarters contact. Because Ebola was not previously broadly treated in the U.S. health care system, there were no published guidelines for health care worker safety. In the early 2000s, we had developed a high level of isolation at the NIH Clinical Center called special respiratory isolation (SRI) in the event that we were going to provide care to research patients with severe acute respiratory syndrome (SARS), H1N2, or other viruses with known airborne transmission. Although Ebola is not transmitted through the air, the isolation protection for SRI did not leave any exposed skin on the health care worker and provided the level of barrier protection we were looking for. Using the guidelines for SRI, combined with what was known about Ebola, isolation guidelines were updated for health care workers in the SCSU who would be working with patients with known or suspected Ebola infection. This approach of developing guidelines to exceed safety goals became a theme as we worked through the delicate process of balancing staff protection and patient safety with staff comfort and endurance in caregiving and institutional expense.

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### Observed Use of PPE

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We have had extensive experience at the Clinical Center with complex or rare infections requiring special isolation procedures and with the significant effort required to contain a resistant or difficult-to-treat infectious agent within a health care setting. We now commonly use “monitors” to assure adherence to barrier protections and hand hygiene when caring for patients with multidrug resistant infections. This is needed to protect our immunocompromised patients already at risk for severe infections from multidrug-resistant organisms (Palmore & Henderson, 2013). Our first information from the field in West Africa was that the use of trained observers in the care process to assure there was no break in barrier protection was essential, especially during donning and doffing. This

led us to the use of observers within the care process as well as during the donning and doffing of PPE.

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### Crisis-level Staffing

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Staffing was another major consideration. This period was approached as an extreme crisis, with an absolute requirement for enough resources to assure staff and patient safety and to fulfill the mandate of the NIH in taking a leadership role in this global public health emergency. Depending on the condition and clinical trajectory of each patient, we needed to ensure that we had staffing immediately available to provide intensive care unit-level nursing care in full isolation. To provide redundancy and constant observation, we built reserve capacity by having SCSU nurses who specialize in infectious disease augmented with two other trained nurses to provide safety observation and environmental support for each patient, including critical care support if needed. Staffing a unit for one critically ill patient would require 16.8 full-time equivalents for a week of 24/7 care. That is four nurses per shift! The team was adamant that our plans be built around requirement for the safety of our staff and other patients in the facility.

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### Reality Training

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With new information coming every week from public health authorities, other institutions, and patient care efforts in Africa and the United States, we implemented staff training. We understood from consultation with clinical staff returning from the field in West Africa that the constant maintenance of unbroken barrier protection was imperative to staff and community safety. We divided our training into two sessions: basic training with return demonstration of donning and doffing and an interdisciplinary simulation session of caring for a patient in full PPE with the SCSU staff acting as evaluators. Simulation exercises in full PPE included nursing and medical procedures, waste management procedures, communication strategies, equipment handling, and documentation requirements. One of the most useful simulation exercises, dubbed “a day in the life,” was a simulation with a person playing the role of a patient with gastrointestinal distress. The day in the life was conducted after the staff went through basic and team simulation training. The exercise showed the nurse’s role in caring for a patient with severe uncontrollable gastrointestinal symptoms requiring intravenous hydration with the staff in full PPE. The simulated waste was treated with a special glow gel that would show up under an ultraviolet light if not entirely cleaned up, giving the staff a clear view of the contaminated areas even after cleaning. A secondary outcome of the “day

in the life” was the nurses learning by direct experience what it was like to stay in their PPE for up to 3 hours. This was a vivid experience for those involved and brought home how careful they needed to be in caring for the patient while protecting themselves from accidental exposure.

### The Principle of Volunteer Staffing

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We approached the staffing for a possible patient with EVD using volunteers only. Given the intensive nurse to patient staffing ratios, the number of nurses in the SCSU was not sufficient to provide the needed care. Very explicit information about EVD and our role in the crisis was provided in person and in writing to nurses on staff in the SCSU and to nurses with the needed acute care competencies within our hospital. Nurses who expressed an interest in volunteering to provide direct patient care were educated about Ebola, trained in SCSU procedures, and oriented. This provided sufficient staff although we had to “backfill” the clinical areas providing staff. The staff who volunteered became a close-knit group and weathered many difficulties caused by fear and lack of knowledge in the community and even our own facility. Some nurses were told their colleagues would not willingly welcome them back to their home units after a shift with our EVD patient. At least two nurses were told their children were not welcome to attend day care while they were caring for the patient and 21 days after.

### Requirement for Constant Communication

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From the very beginning of the crisis, constant, detailed, and up-to-date communication was essential. This included consultation with physicians who had participated in care in the field in Africa, communication and verification of media reports about possible patient arrivals and the evolving outbreak in Africa, and discussion of information gained from the broad network of our infectious disease team about emerging experience at other U.S. facilities who had accepted patients. When there was a lag in communicating some aspect of our preparations, media-driven fear and concerns surfaced. During each patient admission, daily huddles were held with key members from each interdisciplinary team, which allowed for quick fixes when glitches were identified in any of our processes.

### Providing Care on the National Stage

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In both cases, our staff remained focused because there was a complex care delivery issue at hand that

required precise communication, meticulous practice, and above all compassion for our patients and their families. We also have a commitment and long-standing experience preserving confidentiality both of patient-identifiable information as well as the progress of a high-profile case in the Clinical Center. However, as practitioners in a federal clinical research institution, we remained keenly aware that the public who we serve were looking to us for answers and guidance that could alleviate some of the rapidly proliferating misinformation about Ebola and its transmission. When it became known we were caring for a patient with EVD, our leadership team became the subject of numerous calls for information about how we were handling the various aspects of the admission, notably staffing and procedures for isolation and use for PPE. There was early intensive effort to collate and prepare our internal procedures for dissemination. They are now available on the web ([Ebola Virus Disease, 2014; Palmore & Henderson, 2014](#))

### Key Lessons Learned

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We believe the following points are key in translating our experience to the broader nursing community:

1. It is possible to care for patients with EVD with much better clinical results than are seen in the field and simultaneously provide protection for staff and other patients.
2. Exquisitely exact barrier protections are essential to prevent transmission to care providers or environmental contamination.
3. Procedures to care for EVD within isolation are not simple and not likely to be learned through a 1-hour video and demonstration. Intensive practice and observation as well as a chance to experience working in full gear are needed.
4. Repeated, redundant, and detailed communications to all in and around a clinical situation involving EVD is essential because the associated fear and inaccuracies in the media exaggerate concerns about personal and community risk.
5. Volunteerism is a critical element in first response to this crisis, both in America and in Africa.

Our nurses were deeply affected by the experience of caring for a nurse who had cared for an infected patient and had contracted EVD. At the Clinical Center, we are accustomed to providing extraordinary care and precautions to protect patients from harm as well as safeguarding staff and our wider patient community because many of the treatments we support are first in human and may have little documentation of toxicity or safety. This crisis is not over, and as biomedical scientists, epidemiologists, and public health experts work to understand and control

The Ebola virus was discovered in 1976 and is a filovirus known to cause hemorrhagic fever in humans. Until the most recent outbreak in 2014, EVD has been confined primarily to countries in Africa. This virus has four strains known to cause disease in humans. After exposure to Ebola, patients can become symptomatic anywhere from 2 to 21 days. The average time frame for disease manifestation is 8 to 10 days. Common symptoms are fever, severe headache, muscle pain, weakness, fatigue, diarrhea, and vomiting, with death resulting from profound dehydration, shock, and multiorgan failure. The transmission of Ebola from an infected human to another occurs through direct contact with blood or body fluids. Patients are considered contagious when they have symptoms and the virus can be detected in their blood (Ebola Virus Disease, 2014).

the underlying disease process and treatments and causes for the expanded outbreak, the nursing community will need to respond with rapidly developed and communicated information, guidelines, and materials to assist nurses who may be drawn into involvement.

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