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Brief Report

Preparedness planning and care of patients under investigation for or with Ebola virus disease: A survey of physicians in North America

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The West African Ebola virus disease (EVD) epidemic of 2014-2015 required North American hospitals to undertake comprehensive planning and training for the potential need to care for patients with EVD. Here we describe physician contributions to EVD preparedness planning and the care of persons under investigation for or patients with EVD.

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INTRODUCTION

The largest outbreak of Ebola virus disease (EVD) in known history began in West Africa in December 2013 and has just recently come to an end. The outbreak resulted in 28,616 confirmed, probable, and suspected cases of the disease and left 11,310 people dead. Although cases were primarily limited to Guinea, Sierra Leone, and Liberia, isolated travel- and health care-associated cases were reported in Mali, Nigeria, Senegal, Spain, Italy, the United Kingdom, and the United States. At the peak of the outbreak, the Centers for Disease Control and Prevention, the Public Health Agency of Canada, and the World Health Organization released guidelines for the management of patients with known or suspected EVD for health care workers in the United States, Canada, and those working in affected areas in Africa requiring North American hospitals to undertake comprehensive efforts to plan and train for this potential need. It is not known how North American health care facilities selected and trained their physician staff to care for persons under investigation (PUIs) and patients with EVD to whom EVD preparedness planning responsibilities were delegated. Developing an understanding of physicians' roles in EVD preparedness planning and the care of PUIs and patients with EVD will allow more specific recommendations and workforce estimates to be generated for future use in preparedness planning for novel pathogens. Here we describe selected physician contributions to EVD preparedness planning and the care of PUIs or patients with EVD, as determined by voluntary survey.

METHODS

An electronic survey invitation was sent to a convenience sample of health care epidemiologists (primarily infectious disease specialists) in the United States and Canada. The convenience sample of hospital epidemiologists and infectious disease physicians was obtained from a circulating listserv that includes a preponderance of academic institutions, including a majority of those institutions designated as Ebola Treatment Centers (ETCs). This sample was expanded to known colleagues who were not included on the listserv. QuestionPro (Seattle, WA) was used to generate and distribute the survey and store response data. The survey was developed specifically for purposes of this study and included 24 questions, which are delineated in Table 1. Data were de-identified before analysis. Descriptive statistics were used to analyze survey responses. The University of Virginia Institutional Review Board for Human Subjects Research reviewed the methods and questionnaire and deemed this study exempt from institutional review board approval.
Table 1
Questions included in distributed survey

| Question                                                                 | Response options                                                                 |
|-------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| Please choose from the dropdown list the state in which your institution is located. What is your institution's affiliation? | Academic/university Government Community Other (please specify)                   |
| How many beds does your institution have?                               | < 200 200-299 300-399 400-599 600-799 > 800                                     |
| Is your institution a frontline health care facility, a designated EVD assessment center, a designated EVD Treatment Center, or other? | Frontline health care facility EVD assessment center EVD Treatment Center Other (please specify) |
| If a designated EVD Treatment Center, how many beds are designated for the care of patients with EVD? | 1 2 3 4 5 or more Stand-alone unit Part of a larger unit 0-5 6-10 11-20 21-50 > 50 |
| Are these beds in a stand-alone unit or part of a larger unit; that is, a section of an intensive care unit? | Adult infectious disease Adult critical care Pediatric infectious disease Pediatric critical care Anesthesiology Anesthesiology critical care Nephrology General internal medicine General pediatrics Family medicine Hospitalist Emergency medicine Interventional radiology Obstetrics Neonatologist General surgery Other (please specify) |
| What size is the pool of physicians who are trained and prepared to care for a patient with known or suspected EVD at your institution? | Physicians from which of these specialties are trained to be involved in the care of a patient with known or suspected EVD at your institution? (Choose all that apply) |
| How many physicians comprise the primary team caring for an individual PUI or patient with confirmed EVD? | 1-2 3-4 5-9 ≥ 10 Adult infectious disease Adult critical care Pediatric infectious disease Pediatric critical care Anesthesiology Anesthesiology critical care Nephrology General internal medicine General pediatrics Family medicine Hospitalist Emergency medicine Interventional radiology Obstetrics Neonatology General surgery Other (please specify) |
| Physicians from which of these specialties are part of the primary team for the care of a patient with known or suspected EVD at your institution? (Choose all that apply) | Which of these groups (level of training) are part of the physician staff trained to care for a patient with EVD? (Choose all that apply) |
| What method(s) are/have been used to train physician personnel who may care for patients with EVD? | In-person training Simulations Online or computer modules No training has occurred Other (please specify) |

(continued on next page)
RESULTS

Ninety initial survey requests were sent; 41 surveys (46%) were completed. Responding institutions were diverse in type, size, and geographic location. The majority (71%) of responding physicians were affiliated with academic medical centers. Other institutional affiliations included government institutions (15%), community hospitals (10%), other health care facilities (2%) (described as a freestanding children’s hospital), and unanswered (2%).

Responses were split between ETCs (41%), EVD assessment centers (32%), and frontline health care facilities (22%). Thirty-eight responding institutions were located in the United States: 14 (34%) in the South US Census Region, 11 (22%) in the Northeast Census Region, 7 (17%) in the West Census Region, and 6 (15%) in the Midwest Census Region. Three (7%) institutions were located in Canada. Sixteen institutions had >800 beds (39%), 13 (32%) had 400–799 beds, and 11 (29%) had <400 beds.

Of the 17 institutions that were identified as designated ETCs, the majority (n = 13, 77%) had 2 beds designated to care for PUIs or patients with confirmed EVD. Two ETCs had just 1 designated bed, and 2 had 3 designated beds. Approximately half of ETCs had designated beds as part of a stand-alone unit (47%), whereas half were part of a larger unit (53%).

Most institutions (n = 28; 68%) reported having a pool of 0–20 physicians who were trained and prepared to care for a PUI or patient with EVD, whereas 22% had 21–50 physicians, and only 5% had more than 50 physicians. The predominant specialties trained in the care of patients with EVD included adult infectious disease (n = 30), adult critical care (n = 29), emergency medicine (n = 25), pediatric critical care (n = 21), and pediatric infectious disease (n = 13). In all cases, only attending physicians were trained to care for a patient with EVD; fellows, residents, and students were excluded from training. The majority of institutions used both in-person training (93%) and simulations (80%) to train personnel.

At the time of the survey, only 1 responding institution had cared for patients with confirmed EVD and approximately half (n = 19; 46%) of responding institutions had cared for a PUI. Nine (22%) institutions had cared for 1–2 PUIs, 4 (10%) had cared for 3–4 PUIs, 5 (12%) had cared for 5–9 PUIs, and just 1 (2%) had cared for ≥10 PUIs. At those institutions that had cared for PUIs, half (n = 10) had 3–4
physicians involved in the care of the PUIs, whereas 21% had only 1-2 physicians involved, 10% had 5-9 physicians involved, and 21% had ≥10 physicians involved.

Physicians designated to care for patients with EVD were selected on a voluntary basis in most institutions (n = 32; 78%). The vast majority of physicians were not granted protected time (n = 31; 76%) nor received additional pay (n = 37; 90%) to train to care for PUIs or patients with EVD. In addition, most physicians who cared for PUIs (63%) were not removed from other clinical, educational, and/or administrative duties at the time; physicians at the institution who cared for patients with confirmed EVD also were not relieved of other duties. Finally, 9 (22%) physician respondents reported various negative consequences that resulted from their training or actual care of PUIs or patients with EVD. These are summarized in Table 2.

DISCUSSION

Our data confirm that the burden of EVD preparedness planning and care of PUIs and patients with EVD was borne by a small number of trained physicians. These physicians largely volunteered for the role; however, they were not granted protected time or additional compensation for this challenging and time-consuming work. In addition to the time commitment and effort that EVD preparedness planning required of these physicians, they had negative consequences and dealt with negative comments and concerns from colleagues and family members.

This experience is reminiscent of that of health care workers during the outbreak of severe acute respiratory syndrome (SARS) in Canada during 2003. Maunander et al. found that health care workers in Toronto, the center of the outbreak in North America, reported higher levels of burnout, psychological distress, and post-traumatic stress than a comparator group. Interestingly, the various forms of distress were increased in Toronto health care workers irrespective of their degree of contact with actual SARS patients, indicating that institutional factors played a role, not simply the stress of caring for such patients. The authors found that perceived adequacy of training and moral support were protective factors against psychological distress. A study of nurse leaders involved in the care of SARS patients in Taiwan also identified several factors that were believed to be helpful in relieving the stress of caring for such patients: psychological support from other clinicians, health professionals, and the public; stress management techniques; counseling and referral services; and the assurance of availability of personal protective equipment. Additionally, these nurse leaders reported that improvements in self-learning and problem-solving competency and acknowledgements by patients, higher authorities, and national organizations contributed to a sense of reward from their experience with SARS.

Our study has a few limitations, including use of a convenience sample of physicians as survey respondents, which may have inherent bias. In addition, the survey did not include questions seeking the positive aspects of the experience of EVD preparedness planning, as was included in surveys of those involved in the care of patients with SARS.

Our data help to define physician contributions to preparedness planning for novel pathogens and also identifies areas for improvement, particularly in terms of institutional support such as relief from other duties, protected time, moral support, or compensation. Additionally, it suggests that the pool of physicians responsible for such challenging and time-consuming work should be expanded in the future to relieve the significant burden that responding physicians reported. The lessons taught by epidemic preparedness planning for EVD and SARS should be reviewed and incorporated into epidemic preparedness planning for future novel pathogens.

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