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Use of Remote Video Auditing to Validate Ebola Level II Personal Protective Equipment Competency

abstract

Faced with an Ebola-related mandate to regularly train front-line hospital staff with the donning and doffing of personal protective equipment, a community hospital's emergency department implemented remote video auditing (RVA) to assist in the training and remediation of its nursing staff. RVA was found to be useful in assessing performance and facilitating remediation.

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In 2014, Ebola virus disease (EVD) spread beyond contained and isolated geographic areas into populated regions in four West African countries, stoking great concern about the potential for, and the impact of, an international spread of a little-understood viral disease with an estimated 53% fatality rate (Centers for Disease Control and Prevention [CDC], 2014b).

In October 2014, America's first patient with EVD was treated at a hospital in Dallas, Texas, and the deficient response to this unexpected event was widely reported in the news media. Following the patient's EVD-related death and the exposure of two nurses to EVD, U.S. health care agencies initiated directives for EVD patient care. The focus sought to keep health care workers safe by stressing training and ongoing practice in the application and removal of the personal protective equipment (PPE) required for an EVD event (CDC, 2014a).

The donning and doffing procedure is multisteped and complicated, and failure to follow an established sequential order leaves health care workers vulnerable to EVD exposure.

To increase comfort and familiarity with this process, the CDC (2014a) recommended that health care workers train in PPE donning and doffing practices under the direct supervision of a trained observer and that corrective in-

struction be provided for poor performance.

Also in October 2014, the New York State Acting Commissioner of Health mandated EVD-specific, regularly scheduled PPE training for health care workers that allows for retraining of unsatisfactory performances (State of New York Department of Health, 2014).

OBJECTIVE

A large, multisite health care system in the New York metropolitan area developed a best practices training plan (North Shore-Long Island Jewish Health System, 2014) in response to the federal and state mandate, and a community hospital (part of that health care system) rolled out PPE training for all of its emergency department RNs, who comprise the essential frontline staff likely to have the initial encounter with a patient who has risk factors associated with EVD. The nurses were trained to screen every emergency department patient for EVD, to isolate if the patient screened positive for EVD risk factors, and then to implement a protocol that includes the use of CDC-recommended Level II PPE for direct care team members.

The challenge for emergency department nursing administration and nursing education at the community hospital was in providing regular, labor-intensive training of more than 50 emergency department RNs on all shifts (days, nights, and weekends) within the high-volume,

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high-stress emergency department environment (during influenza season) without incurring additional expense through use of overtime.

Bristol (2014) stated that learning can be successful when the planned experience reproduces reality and provides relevance for the learner—a basic tenant of adult education. Given the extensive news coverage of EVD during the training period and the news that American nurses were exposed to EVD (likely through PPE don and doff errors), buy-in was instantaneous. All of the nurses had a vested interest in learning the sequence correctly and delivering a high-level, error-free performance.

Oermann (2015) found great value in having the learner take the driver's seat instead of being passively chauffeured by a content expert. Ebola-related PPE training is a perfect match for a flipped classroom concept (Bristol, 2014), where the learner is actively and critically involved in training. The remote video auditing (RVA) PPE practice used by the current authors is learner driven and is initiated and managed by the two-nurse team empowered to take responsibility to initiate a practice session.

Bensinger (2015) described simulation as a nonthreatening environment where learners' practice (with all the fumbles, shortcuts, and do-overs) does not result in patient harm. Oakley, Stocker, Staubli, and Young (2006) found that video recording is an effective way to catch medical errors during procedural-type events, which was exactly why it was a good match for PPE practice. Sequential errors and contamination risks are identified through the auditing process. RVA has been used previously to monitor compliance by hospital personnel with hand hygiene and has contributed to a "significant and sustained improvement" in the compliance rate

(Armellino et al., 2013, p. 927). The current authors were hoping for similar results using RVA to monitor Level II PPE practice.

DESIGN AND TOOLS

High-definition video cameras were installed outside of the emergency department's "Ebola" isolation rooms to capture the donning procedure and within the isolation rooms to capture the doffing procedure. To maintain privacy and in accordance with Health Insurance Portability and Accountability Act of 1996, the cameras never film the patient, and all video is erased after 24 hours.

A detailed step-by-step don-and-doff procedural checklist for observer and participant was developed through the department of nursing education in conjunction with end users for use by an unbiased third-party video auditor.

To signal the initiation of an event and trigger the auditing process, distinct signs were created to identify one of three possible events, which were posted within view of the camera:

- Educator-related initial training.
- Competency practice of emergency department RN staff.
- Interdepartmental monthly drills.

The focus of this project was the regular practice of emergency department RN staff after they had achieved initial competency through an instructor-facilitated practice session, which tended to run smoothly and be error free because the educator (P.J.A.) had extensive pretraining and was familiar with the routine, having previously provided more than 50 initial individual training sessions.

The real question was, could the nursing staff demonstrate the same level of competence in the donning and doffing process when training independently, sustaining a low

error rate than that which had previously been attained in training sessions that were closely supervised?

Further enhancements to this process include:

- When an event is initiated, text message alerts are sent in real time to identified stakeholders (executive director, emergency department nursing administration, infection prevention director, and emergency department nurse educator).
- An automated method for enrollment is included in monthly practice. Links to a Google™ document were installed on two computers in the emergency department, enabling the participants to select their names from a drop-down list and specify a role (first to practice, first to observe) in the event.
- A procedural flip-book provides the observer with a step-by-step, photograph-enhanced guide to follow so that donning and doffing is completed in the correct sequence without variation.

Following an event, a detailed performance report is e-mailed by the auditors to key stakeholders providing the percentage of participant-observer steps completed correctly or incorrectly by the individuals in practice (e.g., 80% of the steps were performed correctly, whereas 20% of the steps were performed incorrectly or out of sequence).

The report tracks several elements:

- Percentage of nurses trained to date, compared with the target percentage (e.g., 10% have been trained to date versus 16% targeted for training to date), including those needing remediation or those who have completed remediation.
- Aggregate PPE compliance rate to analyze general performance and trends (shared strengths and

weaknesses), which helps to target areas requiring further training and the continued tweaking and improvement of the process.

KEY IMPROVEMENTS

RVA has assisted in making the Ebola-focused training and practice a streamlined process that actively involves the emergency department participants:

- PPE RVA has automated an arduous and complicated process, allowing for a streamlined registration, training, and feedback procedure.
- RVA individual performance reports allow for immediate feedback to participants and real-time remediation.
- Stakeholders are continually informed of training progress and performance issues.

RESULTS

RVA for Ebola-related PPE practice has allowed the emergency department to achieve:

- 100% compliance in two consecutive quarters (Last Quarter, 2014; First Quarter, 2015) of full implementation, including full remediation.
- An organized individualized record-keeping process that facilitates ongoing retraining efforts.
- Provides quick feedback on a team's PPE effort by producing a performance scorecard for both the participant and observer roles.
- Allows for the easy analysis of department-wide trends. Weak-

nesses can be remediated and strengths can be built upon.

Continued practice using RVA has helped the emergency department nursing staff to reduce doffing errors by 54% in the second round of independent training sessions (First Quarter, 2015). Elements that had high error rates (doffing gloves, foot and leg covers, head and neck cover) were identified in the aggregate report, and, by focusing on unit-based remediation sessions on mastering these deficiencies, the error rate decreased by half.

TRANSFERABILITY

For appraising PPE donning and doffing performance, RVA helps with team performance—for example, some participant-observer teams scored zero errors, whereas other teams made multiple errors. Analyzing the aggregate performance data have made clear opportunities for and areas of improvement, so that the process can be tweaked and the staff remediated.

RVA technology is an invaluable tool when assessing ongoing efforts to keep the emergency department staff on point. This process is completely transferable to any hospital or health care agency and can be implemented for any type of procedural competency validation, not just for PPE practice. RVA facilitates the training process and performance remediation and is an important component in the community hospital effort to comply with federal and state mandates regarding EVD awareness and preparation.

Most importantly, it helps to keep staff safe from EVD in the event that a screened-positive patient turns out to be a true occurrence of EVD.

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