

TerranearPMC Safety Share

Week of October 20, 2014 – Ebola's Lessons for PPE

Personal protective equipment-PPE- it's the hazard control method that should be considered as a last resort to protect people. It's almost a mantra the way this statement is repeated in HAZWOPER training classes and S&H briefings. Regulations such as OSHA's respirator protection standard (29 CFR 1910.134(a)) and Occupational Noise Exposure (29 CFR 1910.95(b)(1)) make it quite clear that that respirators and hearing protection devices should only be considered if appropriate engineering and administrative controls would not be feasible to control occupational hazards.

It was on September 25, 2014 that Thomas Eric Duncan arrived at Texas Health Presbyterian Hospital with a fever of 103° F, abdominal pain, dizziness, and nausea and was provided minimal medical treatment before being sent home with a prescription; even though he informed the emergency room staff that he recently arrived from Liberia; the epicenter of the current Ebola epidemic.

Since then, Mr. Duncan succumbed to the Ebola virus, while two nurses that attended to Mr. Duncan have contracted the disease.

Ebola is not considered to be an airborne/inhalation hazard as it has been established that transmission between humans only occurs via physical contact where body fluids of the infected person is involved. This prompted the Centers for Disease Control and Prevention (CDC) to specify certain PPE for health care workers to wear when caring for infected or potentially infected patients. Such PPE includes safety glasses and a face shield, multi-layered gloves, booties and a protective body gown (i.e. disposable coveralls). In addition, a simple filtering face piece has been included as part of the required protective gear; not so much as to prevent an inhalation exposure, but rather to control liquid splashes to the nose/mouth area. Often times many news reporters have incorrectly referred to this type of ensemble as a "full HAZMAT suit." The fact is, this level of PPE is a comprehensive encapsulating suit for which the wearer is isolated from the atmosphere, including the use of a self-contained breathing apparatus (SCBA)).

While health care workers are clearly not wearing HAZMAT suits, the PPE they are wearing is fairly extensive; yet two nurses that were directly in contact with Thomas Duncan contracted the Ebola virus. Now the media is asking how this could happen. Was the PPE incorrect? Experts versed in protective methods have been invited on many of the national news networks to explain and demonstrate the purpose and effectiveness of proper PPE. Most notably has been Dr. Sanjay Gupta (Medical consultant for CNN and CBS) as well and Deborah Burger of National Nurses United (NNU). All subject matter experts have been consistent in their assessments; that is, the assigned PPE may be appropriate but has not been worn properly and personnel assigned to wear the PPE have not been properly trained regarding how to wear their protective gear including proper donning and doffing (placement and removal). Notable behaviors include lax adherence to protocol. This involves poor removal and general work practices while wearing PPE.

Lax application refers to personnel not wearing the assigned PPE 100% of the time. Such PPE needs to be properly worn when health care workers are in contact with infected or suspected



infected patients. Experts have explained that this is not being practiced. This means that there are many instances where health care workers are contacting patients without wearing PPE effectively. For instance, a healthcare worker may decide to re-examine a patient after they have removed gloves. Because the re-examination is anticipated to take only a few seconds, taking the time to put on another set of gloves is ignored and thus, the health care worker has now placed his/herself in a potential contamination situation.

Another reason cited for current PPE practices not being 100% effective is poor removal practices. When doffing PPE, gloves need to be the last item to be removed. This is due to handling potentially contaminated clothing such as coveralls, booties, face shields, glasses and filtering face masks. If gloves are not removed as the last item, then hands could easily become contaminated, allowing an exposure vector to the nose and mouth as well as to other persons they may come in contact. Therefore, a double layer of gloves has been recommended. During the PPE removal process, outer gloves can be removed while the inner gloves are still worn and therefore, will act as a barrier should the hands now contact the face area, as the inner gloves – the clean layer - would be the only material coming in contact with skin surfaces.

Even with the proper PPE removal process, a contamination concern to exposed skin surfaces still exists. Recent studies have shown that humans have hand-to-face, as well as hand-to-neck contact on the average of 15.7 times per hour, ranging from 1 to 35 times (Nica and Best, 2008). This supports the likelihood of cross contamination due to contact between gloves to face and neck while working with Ebola-infected patients. Meanwhile nurses have indicated that the assigned PPE lacks protection for the neck area and therefore, verifying the concern of disease transmission due to involuntary cross-contamination contact. Such concerns for nurses have been confirmed by the NNU, stating that nurses have their necks and heads exposed as they were forced to “use medical tape to secure openings in their flimsy garments” while caring for a patient with explosive diarrhea and projectile vomiting.

Training is a very important component to ensure the effectiveness of PPE. As the news media has presented, healthcare workers throughout the country (and internationally) have not been properly trained in the use of PPE. Many hospitals have merely provided PPE without instruction while insisting these items be worn.

As the Ebola issue remains in the news and keeps gaining publicity, Americans appear to be losing confidence in health organizations’ ability to control this disease. Controls other than PPE are now being considered. Isolation and placing persons that have visited locations where the Ebola virus seems to be originating (West Africa) under surveillance may increase the effectiveness in controlling the spread of this disease. And while PPE may be appropriate for those on the front lines, ensuring that they are properly trained and they strictly follow protocol are necessary. Otherwise, PPE would not only be ineffective, but would actually contribute to the potential escalation of the current Ebola epidemic.

The young man knows the rules, but the old man knows the exceptions.

Oliver Wendell Holmes, Sr.

