



Mr. PPE

A conversation with **William Haskell**, a NIOSH personal protective equipment expert and NFPA technical committee member, on the PPE lessons learned following the recent Ebola outbreak



Interview conducted and edited by **Jesse Roman**, *NFPA Journal* staff writer • Photography by **Jesse Burke**

William Haskell with an assortment of personal protection ensembles. From left, a Kappler ProVent® 10,000 biohazard suit, worn with a filtering facepiece respirator; a DuPont Tychem® TK hazmat suit, worn with a chemical, biological, radiological, nuclear (CBRN) air-purifying respirator, with a CBRN filtering canister; and a Kappler Zytron® 300 chemical protection suit with self-contained breathing apparatus and CBRN filter.

On September 28, 2014, an ambulance was dispatched to transport Thomas Eric Duncan to Texas Health Presbyterian Hospital in Dallas. Duncan, a Liberian national, was suspected of having contracted Ebola, a diagnosis that was soon confirmed, making him the nation's first Ebola patient in this latest outbreak—and, 10 days later, its first confirmed U.S. casualty. The emergency call to Dallas Fire-Rescue put first responders everywhere on high alert.

The episode and the events that followed have led to many tough questions about the nation's ability to deal with a future biological disease outbreak in the U.S. What is agreed is that first responders in cities and towns across the country will be on the front lines when an outbreak does occur. As a result, the Ebola scare this fall has caused myriad organizations, including NFPA, the Centers for Disease Control (CDC), the National Institute of Occupational Safety and Health (NIOSH), and the InterAgency Board, to take stock of the nation's response capabilities and what needs to be done to prepare for future incidents involving highly contagious disease outbreaks.

William Haskell, a personal protective equipment (PPE) expert, is front and center in efforts to protect first responders with appropriate PPE. He is a federal employee and project officer in the Policy and Standards Development branch at the NIOSH National Personal Protective Technology Laboratory, which conducts research, develops standards, and conducts test-

ing and certification of respiratory protective equipment. Haskell is also the chairman of the NFPA Correlating Committee for Fire and Emergency Services Protective Clothing and Equipment, as well as a member of the NFPA technical committees for hazard materials, electronic safety, structural/proximity, special operations, wildland firefighting, and emergency medical service protective clothing and equipment.

In addition, Haskell is a longtime member of the InterAgency Board (IAB), a group of representatives from state, local, and federal agencies with the goal of strengthening the nation's ability to prepare for and respond safely and effectively to emergencies, disasters, and chemical/biological/radiological/nuclear/explosives, or CBRNE, incidents. As federal co-chair of the IAB's Equipment Subgroup, Haskell assisted in guiding efforts during the height of the Ebola scare to develop an IAB recommendations document to aid first responders on how to properly outfit and protect themselves.

As a member of NFPA's Technical Committee on Emergency Medical Services Protective Clothing and Equipment, Haskell is involved in an effort underway to revise NFPA 1999, *Protective Clothing for Emergency Medical Operations*, in light of the recent Ebola outbreak. While NFPA 1999 is often associated with first responder protection, its scope extends to workers at hospitals and similar facilities—informally known as “first receivers”—who can come into contact with infectious-disease patients and for whom NFPA 1999 can have significant utility. Concerns with portions of the NFPA 1999 standard have led the committee to consider developing and processing a Tentative Interim Amendment (TIA) to the standard, which would bypass the normal five-year revision process—a move reserved primarily for emergency situations.

NFPA *Journal* spoke with Haskell about possible amendments to NFPA 1999, the ongoing efforts to keep first responders safe during biological disease outbreaks, and what lessons can be learned from the recent Ebola events impacting emergency responders.

How has the Ebola outbreak in Africa and subsequent events in this country impacted the discussions surrounding personal protective equipment?

I am not a medical professional or infectious disease expert, but I do have expertise in PPE. The thing we have to ask in these committees is: How could the disease or the virus impact a first responder? What is the route of entry into the human body? We need to know the performance characteristics that protective clothing and equipment require to stop the hazard. The Ebola event this past year has taught us that having a process in place to



At left, a prototype biological protective suit, made with a fabric developed by W.L. Gore, created for Ebola first responders and first receivers. The suit, in combination with facemask and boots, is slated to undergo ensemble testing for third-party NFPA 1999 certification in early 2015.

make sure emergency responders are properly equipped and trained to wear that equipment is only going to make everybody better prepared for future events.

What went right and what didn't for the first responders in Dallas and New York City who handled the Ebola response in those cities?

In past decades, emergency medical services, the fire service, and others have had to prepare for responding to suspected cases of SARS, H1N1, and other biological hazards. From the standpoint of first responders protecting themselves, there are a lot of similarities between responses to those events and biological diseases like Ebola. If responders follow a good infection control program and train and practice with their PPE, it gives them an acceptable level of awareness and protection.

From what I read and saw on national news, the Dallas fire and

EMS crews did a good job protecting themselves during the patient transport. They had some level of appropriate training. I read that they were made aware that the individual might have been exposed and contracted Ebola, and they protected themselves appropriately.

When New York City fire and EMS had to transport the medical doctor who was suspected as having Ebola, they had already developed a standard operating procedure to follow. My feeling is that New York and other cities had learned from the Dallas response, and had already been working on protocols and procedures regarding PPE so that they would be ready. That physician, Dr. Craig Spencer, self-reported that he might have contracted Ebola, so the crews from New York City were very well-prepared and had the appropriate type of protective equipment for the response and transport. If

anything, it was probably overkill, because New York City responders were using hazmat response type equipment. But they had confidence it would protect them.

As someone very involved in the world of PPE, do you believe that most emergency responders have access to the appropriate equipment to carry out this type of biological response?

Probably not. I think many of the larger metropolitan departments do, but a lot of the smaller departments may not be prepared or have the right type of PPE. A large

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Read the InterAgency Board document, created in October, to assist first responders with recommendations for the selection and use of PPE against Ebola exposure hazards.

Watch a video of our PPE photo shoot. Think it's easy getting into these things? Guess again.



An American aid worker infected with Ebola in West Africa is received by medical staff at Emory University Hospital in Atlanta in August.

percentage of EMS workers across the country are fire-based, while others are employed by private EMS and ambulance service companies. Unfortunately, I don't think there is a nationally accepted level of understanding and requirements for training and the types of PPE that they should have in their inventory.

Has that concern been recognized, and is it being dealt with?

I'd say yes. Right now you've got CDC, with support from NIOSH and a large number of federal and state agencies, as well as professional and union organizations, that have all been putting out excellent guidance related to Ebola response.

How has the InterAgency board responded to the Ebola situation?

The majority of IAB members were aware of what was going on with the Ebola outbreak in Africa. When the first case came to this country, in Dallas, it was very apparent that CDC was doing an excellent job putting out guidance and awareness information, including protective

clothing and equipment for health care workers and for medical staff working in the hospital environment. The IAB was concerned that the type of protective clothing and equipment being recommended for health care workers may not provide the right design, durability, or protective performance required by emergency responders. So at the October IAB meeting, it was decided to develop a document with recommendations for the selection and use of PPE for first responders against Ebola exposure hazards. The document was written, approved, and released by the end of that meeting.

Describe how NFPA, NIOSH, and the IAB work together to protect first responders?

NFPA and NIOSH have an ongoing partnership agreement which includes cooperation and coordination of activities related to emergency responder protective clothing and equipment and standards. This agreement is in its ninth year and was signed by the director of

NIOSH and the president of NFPA. One of the things the IAB Equipment Subgroup does is maintain the Standard Equipment List of all equipment that emergency response agencies would need—not just for terrorism incidents or chemical, biological, or nuclear threats, but also “all-hazard” events, such as tornadoes, hurricanes, and other disasters. That list of equipment categories covers the full range of PPE.

Whenever there is an existing federal or nationally recognized consensus standard, such as the NIOSH respirator and NFPA PPE standards, it is vital to responder safety that the equipment should be compliant to those standards. A number of federal agency funding organizations have stipulated that, in order to receive federal grant money, fire departments should only procure protective gear and equipment that is compliant to the standards, such as NFPA standards.

Myself and several other IAB members are also on the NFPA Correlating Committee for Fire and Emergencies Protective Clothing and Equipment, and also work on the NFPA Technical Committee on

IT TAKES A VILLAGE

NFPA Journal thanks everyone who helped make the photo shoot for this story possible, including Philip Mann of Kappler USA, Emily Smith and Mike Kienzle of W.L. Gore, Jeffrey Stull of International Personal Protection Equipment, and the State of Connecticut Fire Academy, all of whom provided personal protective equipment used in the shoot, and to William Haskell for making it happen. Big thanks also to Ken Willette, Tom McGowan, and Chris Farrell of NFPA's Public Fire Division, who provided all manner of assistance and expertise. Finally, thanks to all of our models: on the opening spread, from left, Jesse Roman, Journal staff writer; Scott Sutherland, Journal editor; and Tom McGowan. Second spread, Chris Farrell.

Emergency Medical Service Protective Clothing and Equipment. So there is a very close relationship there, which allowed us to develop that IAB recommendation document on Ebola for first responders. It has also helped us with the process NFPA is going through right now on an expedited modification to NFPA 1999.

A review of the Ebola outbreak brought several issues to light, including potential deficiencies in NFPA 1999. What's the concern?

Currently, EMS garments, gloves, face shields, goggles, respiratory protective devices, and footwear are not tested under the NFPA 1999 standard as a complete ensemble providing whole-body protection. The committee is urgently considering changes that would require PPE components to be tested under the standard as a complete ensemble as well as individual items. This way, you're guaranteeing departments and responders they are getting an appropriate level of full-body protection, and it would allow the department to buy the entire interoperable ensemble instead of trying to piecemeal it together.

Another issue is that, while there are a number of manufacturers that have NFPA 1999-compliant multi-use protective garments, there are no compliant single-use garments. One reason is the standard currently has a number of conflicting performance criteria that don't allow current garment materials and products to pass certification requirements. It became apparent that if we want to get single-use and multi-use ensemble products compliant with NFPA 1999, we had to make some revisions to the design and performance criteria in this standard.

Why do responders need access to single-use garments? Couldn't they use the heavy duty, multi-use gear every time?

They could. If you saw the pictures from Dallas and New York and other cases, they were using hazmat response protective gear, which may be considered overkill for these types of biological threats, but it is the gear that they had and are trained to use. But that type of gear can result in issues with heat stress and physiological burden on the wearer. Single-use garments and ensembles certified to the NFPA 1999 standard will have a required level of breathability and reduce the physiological burden on the wearer, while still providing an adequate level of protection.

How is this being addressed?

The NFPA 1999 technical committee brought these concerns to NFPA senior management in November, and the NFPA Standards Council has agreed to allow the committee to move forward with the development of the proposed Tentative Interim Amendment. It's an expedited process for amending a standard for an emergency situation that is outside of the normal five-year revision process. The technical committee must provide substantiation for the technical merit and emergency nature in support of the TIA.

Why is it necessary to bypass the normal revision process?

With a Tentative Interim Amendment, you have to ask, “Is there justification for the technical merit and is it of an emergency nature?” I think because of the recent events, the technical committee agreed that there was a case to be made for the technical merit and emergency nature. The NFPA 1999 document was just entering the beginning of the five-year cycle, and the committee knew that it was going to address these issues in the current

revision cycle. But when the cases of Ebola came to this country and you had EMS making calls to both suspected and confirmed cases, it really brought the issues to the forefront. The responders needed products certified to this NFPA standard, and it needed to be done in a manner much shorter than the normal five-year revision cycle.

Aside from this effort, what do you see as NFPA's role going forward to help prepare and equip first responders?

NFPA has a number of committees that handle areas related to fire and emergency services, including the Fire Services Occupational Safety and Health, Fire Service Training, Professional Qualifications, and the Correlating Committee on Fire and Emergency Services Protective Clothing and Equipment. Those committees are made up of well-qualified members, including responders, consumers, labor, special experts, enforcers, manufacturers, and other classifications. All of that can be pulled together to address this type of situation, both currently and, most importantly, in the future.

With that said, I think NFPA standards could play a bigger role in defining department training for these types of biological responses. I think NFPA needs to raise the level of awareness of one of its standards, NFPA 1581, *Fire Department Infection Control Program*. That's a standard that many fire departments do adopt and implement, but I would say probably not all do. That particular standard would have application to all the different types of emergency responders, not just fire and EMS. I think NFPA could play a bigger role in getting the word out. ♦

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