

# WPI explores using robots to treat Ebola

WORCESTER — For health and sanitation workers dealing with the deadly Ebola outbreak in West Africa, their safety depends on flimsy gloves, masks, gowns and other personal protective equipment.

But a group of engineers, technology company executives and public health experts who gathered at WPI's Gateway Park on Friday morning see a role for robotic technology in fighting the outbreak.

Why should a person need to enter an Ebola quarantine ward for routine decontamination? That was the question Jennifer Pagani of the international defense contractor QinetiQ Group asked herself.

"Put that stuff on a robot. The best personal protection is to not send a human," said Ms. Pagani, the program manager of the company's unmanned systems department.

Long a leader in robotics, Worcester Polytechnic Institute was the host of one of four Ebola robotic response workshops held across the country Friday as part of a federal initiative.

Karen Oates, WPI's dean of arts and sciences, welcomed the diverse group of experts from academia and industry, and incoming WPI President Laurie Leshin urged them to work together.

"Do your best thinking and your best collaborating because, obviously, this is a serious problem we're facing," Ms. Leshin said.

Ed Neister of Healthy Environment Innovations, a New Hampshire

technology company, told the group about a kind of ultraviolet light capable of busting up proteins in the DNA of Ebola virus. Special UV lamps mounted on a remote-controlled vehicle theoretically could disinfect a room in seconds without exposing a person to the contaminated environment, he said.

An engineering professor from Oregon State University showed the group a video his students had filmed the night before the workshop of a robot haltingly stripping linens from a bed and stuffing them in a waste disposal bag.

As it stands now in West African treatment centers, people suited up in full protective gear dispose of soiled linens and handle disinfection jobs with the same kind of spray bottles used here by pest control exterminators.

In West Africa, people must also move and bury the bodies of those who succumb to the disease. The Ebola virus is spread through bodily fluids, and the bodies of victims can be particularly dangerous because the hemorrhagic fever often causes severe bleeding before death.

Dr. Catherine Brown, a veterinarian and public health specialist with the state Department of Public Health, suggested robots of various types might be helpful for disease screening, decontamination and waste disposal as well as transporting supplies and bodies.

Perhaps the first place technology might help, Dr. Brown said, is in the labor intensive screening process. Machines might be designed to automate checking blood samples for genetic material associated with the virus.

Dr. Julian Goldman of Massachusetts General Hospital appeared at the workshop by telephone and video link. He explained how certain kinds of infusion pumps that deliver drugs intravenously have to be kept far away

from the powerful magnets of MRI machines. But that setup means a medication or dose cannot be adjusted quickly because the medicine must flow slowly down the entire length of a tube running between two rooms.

"There are real challenges if you try to do things remotely with current equipment," Dr. Goldman said.

But he highlighted a number of new technologies that he hopes can be harnessed to allow for more remote treatment of patients with Ebola and other infectious diseases.

"In the hospital, in contrast to what we do today where we all rush to the patient's bedside, we need to move personnel away from the patient," he said.

While directly caring for Ebola patients in the field with today's generation of costly, clunky humanoid robots is improbable, William Smart of Oregon State University's engineering program said, "Maybe we can have the robots help deal with some of the contaminated material."

QinetiQ's Ms. Pagani noted that her company's remotely-controlled robots designed for natural disasters already have been operated in an environment highly dangerous for human beings, in the radiation at the Fukushima nuclear power plant damaged three years ago by a tsunami.

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