

► the European Commission in which the first 20 psychiatric nurses graduated from the University of Sierra Leone in 2013. But clinical expertise is still scarce in the Ebola zone: Liberia has just one psychiatrist; Sierra Leone has none.

Even the simplest interactions between people with Ebola, their families and health-care workers are complicated by the precautions needed to prevent infection. Because doctors and nurses can wear their heavy personal protective equipment only for short periods, they focus on providing treatment. Tasks such as counselling bereaved families are often left to mental-health providers from aid groups. In Sierra Leone, for instance, the non-governmental group Community Association for Psychosocial Services (CAPS) has redirected its 18 employees from assisting war survivors to helping people with Ebola and educating communities about the disease. “In this emergency, everyone’s kind of in slow motion, making sure that the health staff are safe,” says Cynthia Scott, a psychologist with Médecins Sans Frontières (also known as Doctors Without Borders) who recently returned from Sierra Leone.

Surviving the virus presents its own challenges. Some patients refuse to eat or leave their beds. Many blame themselves for contracting

the disease. And those who return home are often barred from housing complexes or workplaces. That is a distinct contrast from the way in which communities hit by war or natural disasters typically rally around victims, says Inka Weissbecker, psychosocial adviser at the IMC in Washington DC.

Non-governmental organizations are working to decrease the stigma using approaches such as portraying Ebola survivors as heroes. They are also addressing another contentious issue — regulations that outlaw traditional burial rites — by providing families with photos of their loved ones’ bodies, which offer some comfort. “I have heard people say, ‘If we cannot bury our people properly, we feel our community is sick,’” Scott says.

But some actions taken to limit Ebola’s reach are harder to deal with. Fear of spreading infection among doctors and patients prompted the E. S. Grant Mental Health Hospital in Monrovia — Liberia’s only such facility — to cease most of its operations last autumn. The facility has

discharged most of its patients, including several dozen with psychotic conditions. “There’s no doubt there’s an increase in the number of people in the streets because the hospital is still not functioning at the normal level,” says Benjamin Harris, Liberia’s only psychiatrist.

Efforts to build treatment capacity in West Africa are showing encouraging signs. The programme in Liberia will, over a three-year period, deploy mental-health clinicians in schools, among other actions. The Liberian Ministry of Health lists mental health as a priority in its Ebola-recovery plan, along with issues such as maternal care (see page 24) and HIV. And in Sierra Leone, CAPS has treated roughly 1,500 people affected by Ebola.

These developments are part of a broader shift in the global health community’s attitudes toward mental health. The World Health Organization increasingly addresses psychological care in its reports, and donors to groups such as the IMC are becoming more amenable to supporting mental-health programmes. But there is still much work to be done to ensure that psychological care is a priority in the Ebola response, Weissbecker stresses. “We have to be vigilant about this,” she says, “and make sure it stays on the radar.” ■

“The majority of psychological problems are because the country is frozen, with nothing moving forward.”

TECHNOLOGY

Robo-rescuers battle it out

Nimble bots rise to the challenge in DARPA competition.

BY BOER DENG

When the humanoid robot SAFFiR gets a shove, it reflexively moves to maintain its balance. SAFFiR can also walk over uneven terrain, turn its head to scan its surroundings and — with the help of a human operator — reach out to grasp objects.

Built by a team at Virginia Tech in Blacksburg, SAFFiR is a firefighting robot and a prototype for one that will compete in the final stage of the DARPA Robotics Challenge (DRC), a contest run by the US Defense Advanced Research Projects Agency. The aim is to produce robots with improved mobility, autonomy and responsiveness to human commands. On 5 March, DARPA will announce the 25 finalists who will vie for the US\$2-million first prize at the final event in June.

Most advanced robots today follow preset instructions in familiar environments, such as a factory floor, or are almost entirely remotely controlled, says Gill Pratt, a programme manager at DARPA who is running the contest. But there is a need for shrewder, nimbler machines that can operate in less-predictable situations.



A robot developed by Japanese company Schaff takes the DARPA Robotics Challenge in 2013.

For example, radiation from the 2011 Fukushima nuclear meltdown in Japan made it unsafe for people to manage the contamination. The robots that could be deployed for clean-up were slow and maladroit, and could do little more than survey the damage.

DARPA set up the contest to spur the development of robots that might perform better in future disasters, and several rounds of the competition have been held since the event’s launch in 2012.

A key to winning will lie in a robot’s ability to do things on its own, such as deciding how high to lift a leg to climb a step, or tracking its location relative to a target object. During trials in December 2013, robots had to complete tasks such as shutting off a valve, climbing a ladder and driving a car through a winding speedway course. Those with greater autonomy performed better, according to an analysis by Holly Yanco, a computer scientist at the University of Massachusetts at Lowell. Robots were faster and errors were easier to fix when they needed less human input.

For the final round, the machines will compete with a time limit, without an external

power source and sometimes without communication with their operators. This mimics real disaster scenarios, in which connectivity can be spotty. DARPA expects that this constraint will encourage teams to increase their robots' capacity to map out, plan and act independently. "Success at this level would be a huge achievement," says Pratt.

Robots have become reasonably good at sensing and moving, says Henrik Christensen, chair of robotics at the Georgia Institute of Technology in Atlanta. Remote sensors on SAFFiR, for example, measure force and body position (part of what allows the robot to find its centre of gravity); cameras and software let it monitor distance and potential obstacles. CHIMP, a robot built by a team at Carnegie Mellon University in Pittsburgh, Pennsylvania, transitions deftly from trundling along on four tank treads to standing on two.

But the machines are "not much good at making judgements, like deciding if something is a drill or a cup, or figuring out which is relevant to what it needs to do", Christensen says. "These things turn out to be very hard, and humans are much better at them."

DIVISION OF LABOUR

Some teams want to better translate what a robot sees into something that a human operator can easily understand. The goal is to create an efficient human-robot team that is "more like having two humans, where one directs the other", says Todd Danko, who leads a DRC team from defence contractor Lockheed Martin. In fact, Yanco's analysis found that teams with better-designed human-robot interface platforms were better at completing contest tasks.

"I think a big part of this contest is that it will get people to embrace a kind of 'shared autonomy' between the humans and the robots," says James Kuffner, a roboticist at Google in Mountain View, California. "That means thinking about what's necessary for the human to do, for the robot to do, and for how to tell that to the robot."

DARPA-sponsored robot contests in the mid-2000s focused on autonomous transport and were driven by an interest in taking human couriers off the explosive-strewn streets of Iraq and Afghanistan. These races helped to spawn interest in driverless cars from companies such as Google.

In more recent years, the defence department has recommended that the military change its approach to autonomous systems and focus on collaboration between people and technology. Unlike autonomous trucks and unmanned drones, the robots under development for the current competition will be accomplices — not mere substitutes — in helping humans to get difficult jobs done. ■



Former IPCC head Rajendra Pachauri (left) consults with potential successor Thomas Stocker.

POLICY

UN climate panel charts next steps

Intergovernmental Panel on Climate Change prepares for new leadership and another assessment of climate science.

BY JEFF TOLLEFSON

Despite calls for change, the next United Nations climate assessment will take much the same form as the last one, the panel charged with producing the recurring reports announced on 27 February. The decision comes just days after the panel's long-time leader resigned in the middle of a sexual-harassment investigation.

Meeting in Nairobi from 24 to 27 February, the United Nations Intergovernmental Panel on Climate Change (IPCC) made several minor adjustments to its assessment process. The changes aim to engage more scientists, in part by boosting the representation of developing nations in the group's governing body. But the basic framework will continue to comprise a comprehensive assessment published every five to seven years plus two or three special reports on specific topics. The fifth and most recent IPCC climate assessment, which was completed last year, concluded that it is "extremely likely" that humans are responsible for the bulk of recent global warming.

"The overall structure remains, but some key aspects of its mode of operation have been

improved to facilitate a fuller participation of all scientists, in particular from developing countries," says IPCC vice-chair Jean-Pascal van Ypersele, a climatologist at the Catholic University of Louvain in Louvain-la-Neuve, Belgium. "This was a key thing I think the IPCC needed to do."

The meeting follows the sudden departure of Rajendra Pachauri, who has headed the IPCC since 2002 and whose term was due to end in October. Pachauri is under investigation over allegations that he sexually harassed a colleague at the Energy and Resources Institute in New Delhi, of which he is director. He has denied the claims but elected to step down on 24 February, soon after announcing that he would not be attending the Nairobi meeting.

"We cannot ignore the resignation of Dr. Pachauri, but the allegations against him ... do not relate to the IPCC," said IPCC secretary Renate Christ during a press conference on 27 February. Christ said that the panel will, however, ensure that it maintains an atmosphere in which "everyone's rights are respected and upheld".

Ahead of the meeting, some scientists involved in the IPCC argued that the ▶