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Movement of refugees and fighters in North Kivu is complicating the response by aid workers to an Ebola outbreak.

## PUBLIC HEALTH

# War zone complicates roll-out of Ebola vaccine

*Latest outbreak comes amid fighting in the eastern Democratic Republic of the Congo.*

BY AMY MAXMEN

Aid workers in the Democratic Republic of the Congo began giving an experimental Ebola vaccine to health workers on 8 August — one week after the World Health Organization declared an outbreak of the virus. First responders and public-health staff are scrambling to contain the outbreak while planning how to distribute the vaccine to communities in the middle of a conflict zone.

The virus is spreading in North Kivu and Ituri, in the east of the Democratic Republic of the Congo (DRC). As of 12 August, 57 people had shown symptoms of Ebola — including 41 who had died. But violence perpetuated by more than 100 armed groups fighting over resources in those lush, green provinces has escalated this year ahead of a presidential election scheduled for December. This is the DRC's tenth Ebola outbreak since 1976, but it is the first in this tumultuous eastern region.

“The situation is volatile,” says Ibrahima Socé-Fall, director of emergency operations for the World Health Organization (WHO) in Africa, based in Brazzaville in the neighbouring Republic of Congo.

Even so, in addition to dispensing the vaccine, researchers are preparing to give people with Ebola experimental antibody treatments and antiviral drugs.

Socé-Fall says that at least 2,000 doses of the experimental vaccine, called rVSV-ZEBOV, ▶

► remain in the country from the most recent Ebola outbreak, which ended in July, and more doses are on the way. The DRC will need a larger vaccine supply now, because the strategy deployed during the previous outbreak will not work for the current one.

During the previous outbreak — which lasted three months — officials vaccinated health workers, people who had had direct contact with someone with Ebola and the contacts of those contacts. But the instability in North Kivu and Ituri has made tracking such connections difficult. In towns where people have been infected but officials can't track down their contacts, workers might vaccinate the entire community instead, says Socé-Fall.

An inability to track these connections worries epidemiologists because people on the move spread the virus. Humanitarian groups estimate that this year, nearly 750,000 people in North Kivu and Ituri have fled from militia fighters. And about one million refugees displaced from their homes by the violence over at least the past decade continue to travel frequently between cities in the region. Some refugees migrate to neighbouring countries such as Uganda, Rwanda and Burundi.

Aid agencies must now consider how to get into these conflict zones to fight Ebola without endangering their staff. Workers might travel with armed security escorts provided by the DRC government for their protection, said Peter Salama, the WHO's head of emergency preparedness and response, at a press briefing on 3 August.

But a key organization fighting Ebola in the area, Médecins Sans Frontières (MSF, also known as Doctors Without Borders), hesitates to use that approach. The group feels that travelling with armed escorts hinders its ability to help people of various political affiliations, says Salha Issoufou, the head of MSF's operation in DRC. So MSF will forgo the escorts.

The next phase of the response by the WHO, the DRC government and aid groups will be to use experimental drugs to treat people who have Ebola. A national review board that evaluates research ethics has approved the use of these treatments, and Steve Ahuka, a virologist at the National Institute for Biomedical Research based in Kinshasa, says that some therapeutics have just arrived in the region.

One treatment is an antibody called mAb114, which was manufactured by the US government. Others include the antiviral drugs Favipiravir (T-705), made by Japanese company Toyama Chemical, and Remdesivir (GS-5734), produced by Gilead, based in Foster City, California.

"Thanks to our experience from the previous outbreak, we are prepared," says Ahuka. ■



Jason Priem (left) and Heather Piowar co-founded Impactstory, which launched Unpaywall in 2016.

#### DATA ACCESS

# The rise and rise of Unpaywall

*Non-profit is a gift to many academics — and tie-ins with established scientific search engines could broaden its reach.*

BY HOLLY ELSE

After being kicked out of a hotel conference room where they had participated in a three-day, open-science workshop and hackathon, a group of computer scientists simply moved to an adjacent hallway. There, Heather Piowar, Jason Priem and Cristhian Parra worked all night on software to help academics see how much of their work was freely available on the Internet. They realized how much time had passed only when they noticed hotel staff starting to prepare for breakfast.

That all-nighter, back in 2011, laid the foundation for Unpaywall. This free service locates open-access articles and presents paywalled papers that have been legally archived and are freely available on other websites to users who might otherwise have hit a paywalled version. Since one part of the technology was released in 2016, the service has become indispensable for many researchers. And firms that run established scientific search engines are starting to make good use of Unpaywall.

On 26 July, Elsevier announced plans to integrate Unpaywall into its Scopus database searches, allowing it to deliver millions more free-to-read papers to users than it does currently. Scopus's embrace of Unpaywall, along with similar moves by other search engines, means that much more open-access content

is now at researchers' fingertips. These deals are also enabling funders, librarians and others to study open-access publishing trends comprehensively for the first time.

"Unpaywall is a groundbreaking development," says Alberto Martín-Martín, who studies bibliometrics and science communication at the University of Granada in Spain. "It takes us one step closer to achieving a true open research infrastructure."

After participating in the 2011 hackathon, Piowar and Priem founded a non-profit organization called Impactstory, in Vancouver,

**"Unpaywall is a groundbreaking development. It takes us one step closer to a true open research infrastructure."**

Canada, where they refined Unpaywall. (Parra is now a consultant at the World Bank in Asunción, Paraguay.)

Research by Priem and Piowar published as a preprint in August 2017 — using Unpaywall, naturally — suggests that almost half of the recent research papers that people search for online are available for free (H. Piowar *et al.* Preprint at *PeerJ Preprints* <https://doi.org/10.7287/peerj.preprints.3119v1>; 2017). But, says Priem, "there is a terrific gap between the availability and discoverability" of these papers, and it is this problem that Unpaywall hopes to solve.

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