



“Unfettered flow”: how ProMED-mail keeps the world alert

For almost 30 years, contributors to ProMED-mail have flagged new and emerging infectious threats to health. Talha Burki reports.

“Have you heard of an epidemic in Guangzhou? An acquaintance of mine from a teacher’s chat room lives there and reports that the hospitals there have been closed and people are dying.’ ProMED-mail appreciates the preliminary information above and would be grateful for any additional information. The etiology and extent of this apparent outbreak of pneumonia are unclear, as is whether the outbreak is secondary to influenza.”

ProMED-mail post (Feb 10, 2003)

The story of how Programme for Monitoring Emerging Diseases (ProMED)-mail alerted the world to the emergence of severe acute respiratory syndrome (SARS) has attained something like folklore status in global health circles. An infectious disease specialist in Maryland, USA, forwarded an email from someone who had heard rumours of unusual goings-on in China. The ProMED moderator responded as ProMED moderators usually do when they receive unverified reports of disease outbreaks. They issued a request for information to the thousands of researchers, health-care workers, veterinarians, public health officials, journalists, and members of the public who subscribe to ProMED-mail. Within 24 hours, officials from Guangdong province, for which Guangzhou is the capital, publicly acknowledged for the first time 305 cases of the atypical pneumonia that became known as SARS. The ensuing epidemic infected more than 8000 people around the world and killed 774.

It was precisely the kind of scenario that Jack Woodall, Stephen Morse, and Barbara Hatch Rosenberg had in mind when they founded ProMED in 1994. SARS-CoV was a new virus spreading in human populations, yet it was not being publicised by local, national, or

international authorities. It was not until after the ProMED-mail post that WHO received its first notification of the outbreak from the Chinese Ministry of Health.

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“WHO and other official sources are constrained in their reporting by the need for bureaucratic clearance”, Woodall pointed out in 2001. “ProMED-mail has no such constraints, and posts outbreak reports 7 days a week.” A 2017 study subsequently linked SARS-CoV to a set of very similar virus strains in a horseshoe bat population in Yunnan province, China. The authors noted that “the risk of spillover into people and emergence of a disease similar to SARS is possible”.

Morse, who is now Professor of Epidemiology at the Columbia University Medical Center, New York, NY, USA, was the first to apply and explain the term emerging in connection with infectious diseases. The swashbuckling Woodall, who died in October, 2016, specialised in arboviruses. He coauthored one of the first papers on Zika virus. Rosenberg retired as Professor of Microbiology at the State University of New York, Purchase, NY, USA.

The concept of ProMED began to coalesce at a 1993 bioweapons conference. The next year, 40 attendees at a follow-up meeting signed up to an email list named ProMED-mail to share information on unusual outbreaks of disease. In 1999, ProMED became a programme of the International Society for Infectious Diseases.

Of the 1400 or so pathogens that infect humans, more than half are zoonotic, including the vast majority of newly emerged pathogens. From its inception, ProMED was underpinned by the notion of One Health. Emerging and re-emerging human, animal, and plant pathogens are all monitored. “One Health has been our guiding principle, the lens through which we have always viewed viruses, protozoa, bacteria, and disease outbreaks. We looped in veterinary and veterinarian scientists very early on”, said Lawrence Madoff, Editor of ProMED 2002–21 and now Editor Emeritus. The readership was not always appreciative. “To an extent, we were force-feeding people animal health”, said Madoff. “We had doctors saying ‘why do I need to know about bluetongue, or John’s disease? What does it matter to me?’” he added.

Marjorie Pollack, former Deputy Editor at ProMED, initially paid scant attention to bovine spongiform encephalopathy. “It was all veterinary stuff, and I would barely glance at it”, she recalled. “But when variant Creutzfeldt-Jakob disease suddenly emerged, I went back over the earlier posts; that was when I realised I needed to be reading about everything that was happening in the animal world.” “COVID-19 has really amplified the message of One Health as it relates to zoonotic diseases. We have watched SARS-CoV-2 spill into human populations from animals and back again”, added Madoff. “Who could have predicted that mink or white-tailed deer would feature in a human pandemic?”

ProMED employs dozens of subject matter experts from around the world. These are specialists in fields such as virology, parasitology, epidemiology, entomology, and veterinary and



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plant diseases who are paid a stipend and act as moderators, screening and commenting upon reports submitted to ProMED. They also track disease outbreaks using social media and the internet, news reports, press releases, and government statements. “ProMED has always been about transparency”, said Madoff. “It is free to subscribe and anyone can submit a report, confidentially if they wish. We are not beholden to any government or organisation.”

For the week of Jan 16–22 2023, ProMED posts included two cases of brucellosis in French Guinea caused by a novel species of brucella; an outbreak of diphtheria in Nigeria; and updates on the situation with COVID-19 and mpox. There were also reports on foot and mouth disease in livestock in Iraq and Jordan; Newcastle disease in French poultry; and suspected squirrelpox in Scotland. A link to a news report from an agricultural radio network highlighted the emergence of mysterious leaf spots on maize fields in the American midwest. Sources included a range of news outlets, the US Centers for Disease Control and Prevention, WHO, the World Animal Health Information System, and several academic journals.

Given the welter of information, it can be tricky to decipher what is important and what is not. “We have experts involved at all levels

of discovery. They are very good at recognising patterns and aberrations”, said Madoff. A post made on Dec 30, 2019, provides a vivid example:

“The type of social media activity that is now surrounding this event is very reminiscent of the original ‘rumors’ that accompanied the SARS-CoV outbreak... More information on this outbreak including demographics of cases, possible known common contacts, and a clinical description of the illness would be greatly appreciated. And if results of testing are released.”

ProMED-mail post (Dec 30, 2019)

The moderator who made the comment was Pollack. “I checked my email after dinner and one of my colleagues in Taiwan had sent me a Chinese language social media report about a disease outbreak in Wuhan, China. For the next hour and a half we went searching for a second, independent source. As far as I was concerned, this was SARS-like until proven otherwise”, she said. At the same time, an artificial intelligence system based in the USA issued its own alert on the outbreak. Yet it only rated it 3 out of 5 for seriousness.

Prof Sir Ali Zumla, Infectious Diseases and International Health, University College London, London, UK, said: “It has been extremely useful for us working in the One Health field to have event-based surveillance and possible

epidemic intelligence conveyed rapidly with a daily follow-up by ProMED.” “There is an honest, frank, and unfettered flow of information free from political constraints and without being subject to delay or suppression of reporting by governments”, Zumla added. SARS might be the most famous example of ProMED being the first, or among the first, to draw attention to a disease outbreak, but there are plenty of others, some relatively small, such as meningococcal meningitis in Vietnamese immigrants in Russia (1997), others more sizeable. After ProMED posted on Middle East Respiratory Syndrome in 2012, the Saudi Government issued a notice to the website.

As ProMED approaches its 30th anniversary, the prospects for its future are uncertain. Although it only costs around US\$1 million per year to run, it has always struggled to obtain funding. Donor organisations can be reluctant to pay for salaries, stipends, and recurring costs such as those associated with informational technology, though these are the largest expense for ProMED. “Philanthropists are always looking to fund the next big thing, new and shiny initiatives involving machine-learning or artificial intelligence, and ProMED has been around for a long time now, operating in more or less the same way, so it sometimes gets overshadowed”, said Madoff. There are other organisations that are involved in monitoring disease outbreaks, but none of them are purely crowdsourced, as ProMED continues to be.

“Our moderator core is incredibly valuable; working with all these diseases for so many years allows you to develop a feel for when something is going on”, Pollack told *The Lancet*. “It was my gut that told me that we should be worried about what was happening in Wuhan in late 2019.” Perhaps disease surveillance is as much art as it is science.

Talha Burki