COMMENT

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Global security: US officers collaborating with Kenyan community health workers in 2011.

Joining forces

Civilians and the military must cooperate on global disease control, say **David Blazes** and **Kevin Russell**.

"Vulnerability is universal," wrote Margaret Chan, director-general of the World Health Organization (WHO), in *The World Health Report 2007*. The words ring even truer today. Heightened concern about the 2009 influenza pandemic, the rapid global spread of antimicrobial-resistant organisms and even the popularity of *Contagion*, a film featuring a lethal airborne virus, capture this sentiment.

Global public health has become a national-security and foreign-policy issue. Rapid transportation of people, diseases and information has increased public-health threats — from emerging influenza strains to bioterrorism — that cannot be managed solely through conventional practices such as isolation and quarantine. Effective global disease surveillance, timely detection of outbreaks and appropriate responses that help to control epidemics are the essential tools of public-health security.

Here, civilian organizations have much to gain by working with the military. While many public-health agencies struggle for funds, the militaries of various nations are investing in public-health security. Military scientific efforts towards characterization, prevention and vaccine development for emerging infectious diseases, for example, improve the lives of civilians as well as soldiers, in peace and war.

But tensions can arise from the different priorities of civilian and military groups. Our experience leading US military disease surveillance activities leaves us convinced that such vital collaborations can succeed if there is transparency and trust on all sides.

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FROM SOLDIERS TO CITIZENS

Armies have long worked to prevent their personnel from contracting or spreading diseases, in the process making seminal contributions to public-health security that also benefit civilians. Ronald Ross, a British officer in the Indian Medical Service in the late nineteenth century, was the first to work out that *Anopheles* mosquitoes transmit malaria to humans. During the building of the Panama Canal at the start of the twentieth century, US Army researcher Walter Reed made discoveries about yellow fever that helped to control the disease and allow the completion of the construction, which opened new trade routes. US Army scientists developed vaccines for hepatitis A in the 1990s and hepatitis E in the 2000s[1]. And in 2009, working with local Thai officials and others, US Army scientists developed the first vaccine to partially protect against HIV[2].

Indeed, the US Department of Defense (DOD) dedicates hundreds of millions of dollars every year to understanding infectious diseases and pathogens worldwide. Since 1997, the DOD Global Emerging Infections Surveillance and Response System (GEIS) has spent about US$54 million a year on emerging infectious diseases. It coordinates a network of institutes that includes research laboratories in Egypt, Cambodia, Peru, Thailand and Kenya. Scientists in these labs have made breakthroughs including isolation of new pathogens, the first description of *Plasmodium falciparum* that are resistant to artemisinin antimalarials and contributions to annual flu vaccines (including the seed strain for the 2009 H1N1 influenza A virus)[3].

The scope of DOD investment is broad. In addition to disease surveillance, it includes: enhancing global biosafety and securing existing high-risk biological agents; HIV prevention and treatment; and the development of diagnostics and vaccines for vector-borne infections and diarrhoeal disease. Several DOD laboratories collaborate with the WHO as reference laboratories, and with developing countries on topics including occupational health, human subject ▶

research protection, electronic disease surveillance and outbreak response.

These successes have not come easily. Some people are concerned that military engagement in public health shifts priorities away from health to security topics, even though security has been part of the WHO's remit since its inception — its constitution states that the "health of all peoples is fundamental to the attainment of peace and security". Local officials and scientists sometimes hesitate to trust military public-health personnel, believing that the military's agenda is to protect its staff, citizens and allies ahead of others, or believing misinformation about the military's engagement with biological weapons.

Sometimes, open, mutually beneficial relationships are not possible. For example, in regions with active conflict, such as Iraq, US military officials conduct disease surveillance among its forces, but it is often difficult to focus on local health issues. But more commonly, the military's aim is to maintain security for civilians and soldiers alike. A healthy society is more stable than an unhealthy one.

THE WAY FORWARD

The military can do much to build trust. When military scientists work with local scientists, by sharing projects and data and by jointly reporting results, they prove their commitment to transparency. By focusing on local diseases, they build relationships. It is in the military's interest to do so, because cosmopolitan diseases are more likely than exotic pandemic strains to affect populations, and widespread illness could compromise a region's security.

Local officials who engage with the military can harness a wealth of resources and expertise. Small pilot projects can help to build confidence among those on the ground.

Transparency is a tenet of the International Health Regulations. The regulations — agreed to by 194 countries in 2005, entering into force in 2007 — set standards for the detection, diagnosis, reporting and control of a public-health emergency of international concern. The framework also encourages developed countries to assist other states in building these core capabilities, which the GEIS programme has endeavoured to provide through its efforts in developing countries.

The US military's commitment to transparency was demonstrated in the 2009 H1N1 influenza pandemic. The first cases were discovered by the Naval Health Research Center in San Diego, California, (a hub of the GEIS network) and were reported to the WHO through the US Centers for Disease Control and Prevention (CDC). Researchers across the GEIS network (see 'A global network') assisted 14 other nations in making their first diagnoses[3].

"Local officials and scientists sometimes hesitate to trust military public-health personnel."

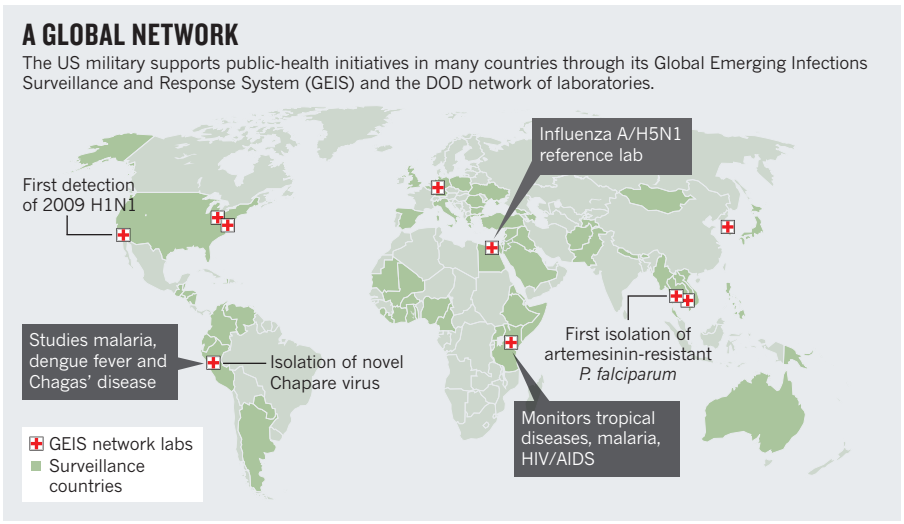
The GEIS network also promotes sharing genetic data on potential pathogens freely through GenBank submissions. In the past year, the GEIS network has deposited genetic sequences for more than 1,000 strains of influenza A from around the world, to increase worldwide representation in the WHO's Global Influenza Surveillance and Response System. This open approach contrasts with the 'viral sovereignty' attitude adopted by some countries, which in the past have not shared influenza samples because of inequitable access to diagnostics, vaccines or treatments derived from viruses originating in their country. In response, this spring, the WHO created a Pandemic Influenza Preparedness framework for virus sharing, benefits sharing and standard material transfer agreements.

A model lab for scientific transparency, institutional trust and effective public-health security is the Naval Medical Research Unit 3 (NAMRU-3) in Cairo. It was established in the 1940s to work with the Egyptian Ministry of Health on the fight against typhus, at the time a cause of epidemics in Egypt and worldwide[4]. The lab has since become integral in studying a variety of infectious diseases such as food-borne and respiratory illness that affect locals and military personnel. The relationship was so valued that the lab was the only official US government presence to remain in Egypt during the Six-Day War in 1967.

Work on H5N1 Avian influenza and other infectious diseases continues at NAMRU-3, where 250 Egyptian scientists and technicians work alongside 21 US military colleagues[4]. Just after the H1N1 influenza pandemic was declared in May 2009, NAMRU-3 trained 73 scientists from 32 countries within 3 weeks on molecular diagnosis of this new strain with CDC assistance, regardless of country of origin and focused only on underlying need of public-health assistance[3].

The development of an open-source software system for electronic disease surveillance is another military effort that has benefitted international and local disease-monitoring programmes. A partnership between GEIS and the Johns Hopkins Applied Physics Lab in Laurel, Maryland, created the Suite for Automated Global Electronic bioSurveillance, which can use mobile phones to report cases of disease, by voice or text message, and then collate the data to inform public-health leadership[5]. This system has been piloted in Peru, the Philippines and Cambodia. It is being offered to all free of charge and with no requirement to share data, although sharing aggregate information with the WHO can be facilitated by the system and is encouraged.

In this time of increasing global complexity and fiscal constraints, all components of society, including the military, should work together to secure global public health through transparent actions. The struggle between life and death plays out both on the battlefield and in the hospital. It is time we fought for global public-health security together. ■ SEE EDITORIAL P.369



David L. Blazes *and* **Kevin L. Russell** *are at the Armed Forces Health Surveillance Center, Silver Spring, Maryland 20904, USA.*
e-mail: david.blazes@us.army.mil

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