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Next-generation **Protection**

SPECIAL REPORT: Syria to Salisbury – the Year of the Chemical Attack

ONE WORLD, ONE HEALTH

Gary Flory sets out ways to combat pandemic threats

A pandemic is the greatest threat humanity faces. The 1918 'Spanish' flu sickened a staggering 500 million people and killed nearly 50 million. More recently, the 2014 Ebola crisis killed more than 11,000 and the swine-flu pandemic of 2009 may have killed up to 203,000 people worldwide.

With increasing global travel and trade and population growth resulting in more interactions between humans, wildlife, and livestock, infectious disease threats are increasing rapidly.

In 2017 Bill Gates warned "The next epidemic could originate on the computer screen of a terrorist intent on using genetic engineering to create synthetic versions... of a super contagious and deadly strain of the flu." Naturally occurring or intentionally introduced, we must prepare for the next infectious disease outbreak.

Fighting back with One Health

To combat these ever-increasing threats, the Global Health Security Agenda (GHSA) was launched in February 2014 to strengthen both global capacity and each individual nation's capacity to prevent, detect, and respond to infectious diseases threats. Since that date, the GHSA has expanded to include over 60 countries. The initiative brings together nations, international organizations, and non-governmental stakeholders to make measurable strides to address public health emergencies. It supports collaboration not just among countries but also between public health, agriculture, security, and environmental sectors.

The GHSA is one way to operationalize the One Health concept—the idea that the health of humans, animals, and the environment is inextricably connected. As described on the GHSA website, the vision of the initiative is a world safe and secure from global health threats posed by infectious diseases whether naturally occurring,



Decontamination procedures are exercised in Malaysia.

“Whether it occurs by a quirk of nature or at the hand of a terrorist, epidemiologists say a fast-moving airborne pathogen could kill more than 30 million people in less than a year”

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disease and include efforts to address antimicrobial resistance, zoonotic diseases, biosafety and security, and immunization. Of the 1,415 pathogens known to infect humans, 61% of those disease organisms are zoonotic – transmitted from animals to humans. Examples are avian influenza, rabies, Ebola, and anthrax.

To reduce the emergence and spread of infections of zoonotic diseases, the first step is to identify the diseases not only in humans but also in wildlife and livestock. With enhanced animal disease surveillance, it may be possible to identify and respond to disease outbreaks before they pose a significant risk to human populations.

Once identified in an animal population, responders can implement measures to prevent the spread of the disease within the animal population and minimize human exposure. A comprehensive animal disease response plan may include quarantine in infected animals, vaccination, movement control, enhanced surveillance, stamping out, carcass disposal, and facility disinfection. Strategies will vary depending on the disease organism and the type of animal infected.

The Biosafety and Biosecurity Action Package focuses on the storage and handling of dangerous pathogens. This is important to avoid not only the theft and intentional misuse of pathogens, but also the accidental release and spread of diseases.

Implementing effective biosecurity programmes requires extensive training wherever these organisms exist. Strong biosecurity protocols can often be more difficult to implement in the agricultural setting than in the controlled laboratory environment. Preventative Action Packages are designed to address microbial



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deliberate, or accidental.

The pathway to this vision is organized around three main objectives: to prevent, detect, and respond to disease threats. Within these three broad objectives are eleven specific targets critical to the goals of the GHSA. These targets are identified as Action Packages and were developed by participating countries during two commitment development meetings in 2014. Each Action Package includes a five-year target, an indicator to measure progress, desired outcomes, country commitments, and long-term actions.

Preventing zoonotic disease

The Action Packages focus on preventing avoidable

DETECTING THREATS EARLY

This second broad objective of the GHSA includes four Action Packages:

- 1 National laboratory systems**
- 2 Real-time surveillance**
- 3 Reporting**
- 4 Workforce development**

These save lives by improving our ability to quickly identify disease outbreaks, share disease detection information with public health officials, and train staff to detect and investigate disease outbreaks.

PANDEMICS

resistance and to prevent death and illness through the implementation of a robust vaccination programme.

Responding to disease threats

The third and final objective is to enhance response to confirmed disease threats. In a disaster, the difference between success and failure often lies in the effectiveness of communications. Emergency Operations Centres with well-trained staff are able to efficiently monitor and respond to disasters by deploying resources where they can do the most good. The action packages Linking Public Health Law & Multisectoral Rapid Response and Medical Countermeasures & Personnel Deployment support the deployment of trained, cross sector responders from the Emergency Operations Centre.

Measuring capabilities

At the heart of the GHSA is the country assessment conducted by a standardized Joint External Evaluation (JEE) process. This measures a country's current capabilities and progress toward building capacity to prevent, detect, and respond to infectious disease threats, and highlights gaps in capabilities. As a two-stage process, JEE includes a self-evaluation

“Most of the new and emerging infectious diseases are zoonoses. Accordingly, they occur at the wildlife-livestock-human interface in remote areas in the tropics with limited infrastructure and resources, while the capacity to run diagnostic assays is centralized in national or regional laboratories. Valuable time is lost and correct diagnosis missed due to sample transport delays and inferior sample quality. Valid diagnostic results start with correct sampling procedure and sample processing.”

EMERGING INFECTIOUS DISEASE SPECIALIST DR KATHERINE KOPP

Vaccination programme in Mogadishu.



Decontamination procedures are implemented following a zoonotic animal disease outbreak.

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GHSA SUCCESSES

- County-level One Health units in Kenya conducting joint human and animal health outbreak investigations
- Successful piloting of an event-based surveillance programme in Vietnam that engages local community leaders
- Significantly increased rates of reporting and investigating human and animal diseases in Cote d'Ivoire

GLOBAL HEALTH SECURITY AGENDA MEMBER COUNTRIES*

Afghanistan	India	Saudi Arabia
Argentina	Indonesia	Senegal
Australia	Israel	Sierra Leone
Azerbaijan	Italy	Singapore
Bangladesh	Japan	South Africa
Burkina Faso	Jordan	Spain
Cameroon	Kenya	Sweden
Canada	Laos	Switzerland
Chile	Liberia	Tanzania
China	Malaysia	Thailand
Colombia	Mali	Togo
Côte d'Ivoire	Mexico	Turkey
Democratic Republic of Congo	Mongolia	Uganda
Denmark	Netherlands	Ukraine
Ethiopia	Nigeria	United Arab Emirates
Finland	Norway	United Kingdom
France	Pakistan	United States
Georgia	Peru	Vietnam
Germany	Philippines	Yemen
Ghana	Portugal	Zimbabwe
Guinea	Republic of the Congo	
Guinea-Bissau	Republic of Korea	

* as of February 2018



A healthcare worker wears protective clothing at a field hospital in Monrovia, Liberia, during the Ebola epidemic in 2014.

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conducted by in-country representatives from ministries of health, agriculture, wildlife, environment and defence. Together these stakeholders collect the necessary information to evaluate the country's capabilities to prevent, detect, and respond to infectious diseases.

An external evaluation follows the self-evaluation phase. This is conducted by a Joint External Evaluation Team made up of experts from member countries, the World Health Organization, the World Organization for Animal Health, the

Food and Agricultural Organization, and others. The Joint External Evaluation Team and experts from the host country assign scores to the country's capabilities in the 19 areas covered in JEE.

As well as scoring each area the team identifies strengths, best practices, areas of improvement, challenges, and priority actions. The information collected is published in a Joint External Evaluation Mission Report containing some 60 priority actions identified in the external evaluation process.

Filling the gaps

With the gaps and priority actions identified through JEE, countries can develop a five-year action plan to address gaps in capabilities. Called Roadmaps, these plans include annual milestones and provide a way to prioritize and match action items to available resources, and a way for potential funders to identify projects that match their organization's mission.

Since its launch in 2014, membership in the GHSA has risen steadily from 40 participating countries to over 60. Each year more JEEs are conducted, Roadmaps developed, and priority action items addressed to increase our global capacity to prevent, detect, and respond to infectious disease threats. ■■

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- Laboratory Hall
- DOCEX/MEDEX/ELEX
- Chemex
- Evidence Custody
- Biometric Analysis
- Meeting Room
- Command & Control

