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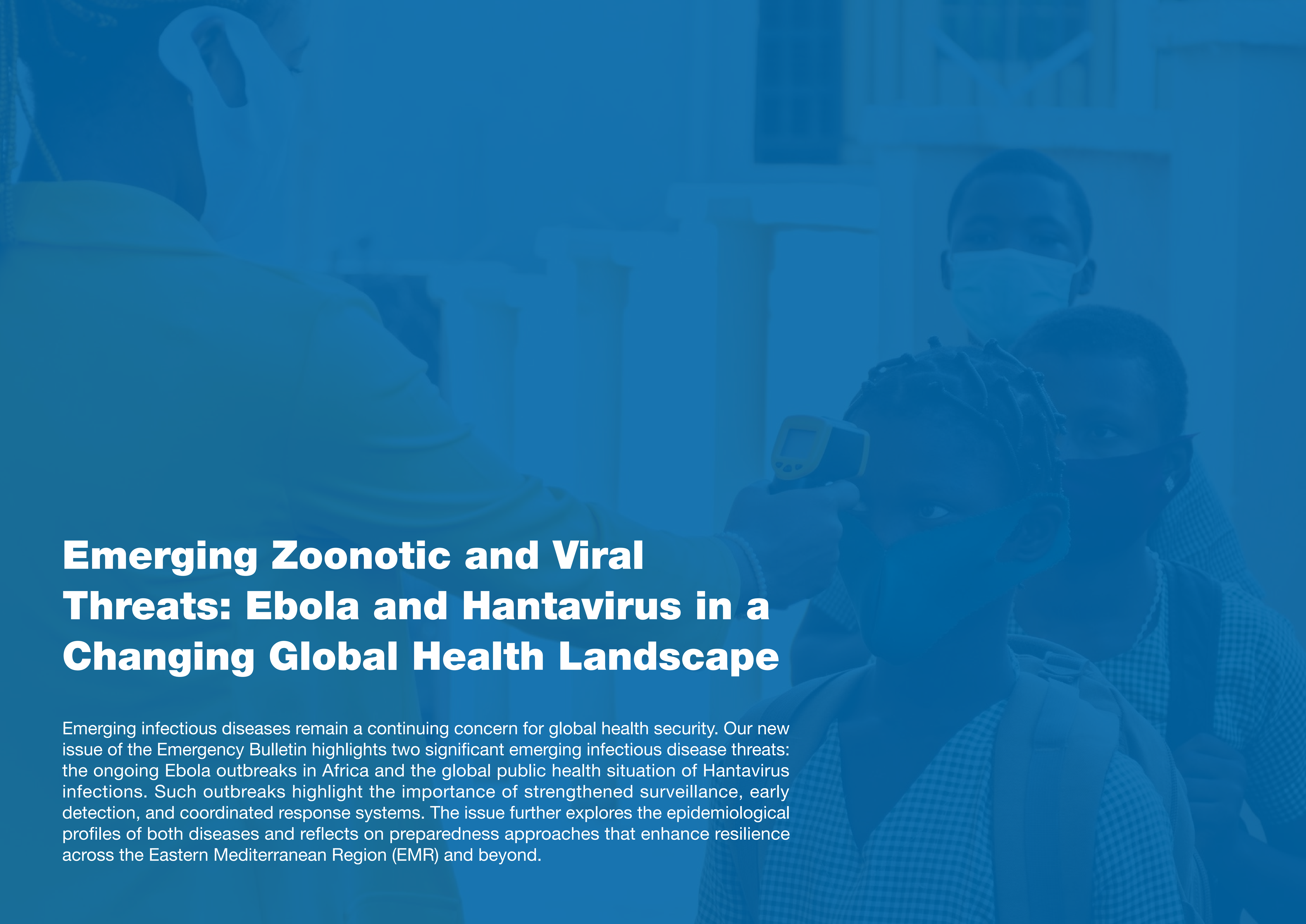

Emerging Zoonotic and Viral Threats: Ebola and Hantavirus in a Changing Global Health Landscape

Emerging infectious diseases remain a continuing concern for global health security. Our new issue of the Emergency Bulletin highlights two significant emerging infectious disease threats: the ongoing Ebola outbreaks in Africa and the global public health situation of Hantavirus infections. Such outbreaks highlight the importance of strengthened surveillance, early detection, and coordinated response systems. The issue further explores the epidemiological profiles of both diseases and reflects on preparedness approaches that enhance resilience across the Eastern Mediterranean Region (EMR) and beyond.

Ebola Virus Disease and Hantavirus: A Comparative Epidemiological Analysis of Transmission Dynamics and Public Health Risks to the EMR

By Dr. Mohammad Abu Khudair, Senior Technical Specialist, EMPHNET

Ebola virus disease (EVD) and Hantavirus infections are severe zoonotic illnesses caused by viruses from two distinct families: Filoviridae and Hantaviridae, respectively. Despite significant differences in their epidemiology, ecology, and transmission dynamics, both diseases pose major challenges to global public health security.

EVD is caused by infection with one of four pathogenic Ebola virus species: Zaire, Sudan, Bundibugyo, and Taï Forest virus, and was first identified in 1976 during simultaneous outbreaks in Central Africa. Hantaviruses, by contrast, have likely circulated in human populations for centuries, with retrospective serological evidence linking hantaviral illness to cases reported during the Korean War (1950–1953).

Although both pathogens are zoonotic, they differ significantly in their natural reservoirs, transmission mechanisms, geographic distribution, and epidemic potential. Ebola viruses are primarily associated with spillover events from wildlife reservoirs, followed by sustained human-to-human transmission through direct contact with infected bodily fluids and contaminated materials. Recent importations of Bundibugyo virus disease into neighboring East African regions further highlight the potential for cross-border spread and establish a basis for possible importation risk to the Eastern Mediterranean Region.

Hantaviruses, in contrast, are maintained in rodent reservoirs and are most commonly transmitted to humans through inhalation of aerosolized particles from contaminated urine, feces, or saliva. Human-to-human transmission has been documented for only a limited number of hantavirus species, most notably Andes virus, and remains uncommon. Consequently, the World Health Organization currently considers the overall global public health risk posed by hantaviruses to be low.

Ebola Virus Disease: Epidemiology and Transmission Dynamics

Transmission and Reservoir

Ebola viruses are believed to circulate primarily in bat populations, particularly fruit bats in the family Pteropodidae, which are considered the most likely natural reservoir. Human-to-human transmission occurs through direct contact with the blood or other bodily fluids of infected individuals, as well as exposure to contaminated surfaces or materials.

Transmission may also occur through close-range exposure to infectious droplets during intensive patient care or aerosol-generating medical procedures, although Ebola is not considered an airborne disease. Healthcare workers and individuals involved in traditional burial practices face disproportionately high risk due to frequent contact with infectious body fluids. The 2014–2016 West African Ebola epidemic demonstrated the virus's capacity for large-scale urban transmission and regional spread, resulting in more than 11,300 deaths across Guinea, Liberia, and Sierra Leone.

Case Fatality Rates and Clinical Impact

Ebola virus disease exhibits substantial variation in case-fatality rates (CFRs) across species, ranging from 0% for Taï Forest virus to as high as 90% for Zaire ebolavirus and 41–100% for Sudan virus. Outcomes are strongly influenced by the speed and quality of the public health response.

For example, the 2025 Uganda Sudan virus outbreak recorded a CFR of approximately 29% through rapid detection and early supportive care, substantially lower than historical averages. In contrast, the ongoing Bundibugyo outbreak in the DRC has reported CFRs exceeding 26%, with higher mortality likely in resource-limited settings.

As no licensed vaccines or species-specific therapeutics currently exist for Sudan or Bundibugyo viruses, early diagnosis, isolation, supportive care, and coordinated outbreak response remain the primary tools for reducing mortality and preventing regional spread.

Hantavirus: Epidemiology and Transmission Dynamics

Transmission and Reservoir

Hantaviruses are enveloped RNA viruses that circulate in rodent populations globally, each species closely associated with a specific host. Human infection occurs through inhalation of aerosolized particles from contaminated rodent urine, feces, or saliva, particularly in enclosed, poorly ventilated environments.

Historically, hantavirus transmission has been exclusively zoonotic; human-to-human spread is absent, as infected humans do not efficiently generate infectious aerosols. The April–May 2026 cruise ship hantavirus cluster fundamentally challenged this paradigm by documenting sustained person-to-person transmission of Andes virus (ANDV) through respiratory droplets.

Andes virus is the sole hantavirus species with documented human-to-human transmission capacity, rooted in its ability to cause severe respiratory involvement and generate infectious aerosols in infected humans. The maritime cluster, involving international passengers with multiple transmission generations despite the absence of direct rodent exposure, provided the first large-scale evidence that ANDV can transmit in non-endemic regions independent of animal reservoirs.

Although ANDV transmission remains conditional on sustained close contact and is less transmissible than influenza, its potential to establish circulation in densely populated urban centers outside South America raises critical pandemic concerns. This represents a paradigm shift in hantavirus epidemiology: from a universally zoonotic disease to a pathogen capable of human-to-human respiratory transmission, with profound implications for surveillance and containment strategies in non-endemic regions.

Andes Virus and Person-to-Person Transmission

Andes virus (ANDV) is unique among hantaviruses as it is the only species with documented human-to-human transmission. First identified in Argentina and Chile in 1993, ANDV spreads through respiratory droplets in close-contact settings, including households and healthcare facilities, unlike other hantaviruses, which are transmitted solely through exposure to infected rodent excreta.

This capability gives ANDV greater epidemic potential than other hantaviruses, which are typically limited to sporadic zoonotic cases. The 2026 cruise ship cluster further highlighted this risk by demonstrating sustained transmission in an international, non-endemic setting without direct rodent exposure. Multiple passengers and crew members were infected during maritime travel, suggesting that ANDV can establish transmission chains beyond its traditional South American ecological range.

Comparative Epidemiological Analysis

The table below summarizes the principal epidemiological features that distinguish Ebola virus disease from hantavirus infections.

Feature	Ebola Virus Disease	Hantavirus	Notes
Primary Reservoir	Bats (Pteropodidae)	Rodents (species-specific)	Zoonotic spillover
Human-to-Human	High (direct contact, droplets)	Rare (ANDV only)	ANDV is the exception
Case Fatality Rate	15%–90% (species-dependent)	1%–40% (species-dependent)	varies by strain
Geographic Distribution	Sub-Saharan Africa (endemic foci)	Americas, Europe, Asia, Africa	Hantavirus is globally distributed

Key epidemiological distinctions influence outbreak trajectories and control strategies. Ebola spreads rapidly from person to person in healthcare and community settings, enabling explosive outbreaks within weeks. Hantavirus, limited by its rodent-dependent transmission, causes sporadic cases or small clusters, except for the Andes virus, which can transmit between humans.

Ebola is geographically restricted to Central and West Africa, while hantavirus is distributed globally, making it a persistent endemic threat across multiple continents.

The apparent shift towards human-to-human hantavirus transmission in the cruise ship cluster, though epidemiologically unusual, raises concern for Andes virus circulation in international maritime settings and highlights the need for increased epidemiological surveillance.

Public Health Risks to the Eastern Mediterranean Region

Ebola Importation Risks

The EMR faces a moderate risk of Ebola importation through air travel, workforce mobility, and trade links with endemic areas such as the DRC and Uganda. The recent cross-border spread of Bundibugyo virus disease from the DRC into Uganda highlights the continued risk of regional transmission through infected travelers.

Several EMR countries remain particularly vulnerable because of ongoing conflicts, large populations of internally displaced persons and refugees, overcrowding, and fragile health systems. Weak surveillance networks, limited laboratory and diagnostic capacity, shortages of trained personnel, and inconsistent supplies of personal protective equipment (PPE) could delay detection and containment. Strengthening surveillance, laboratory infrastructure, cross-border coordination, and emergency preparedness is therefore essential to reduce the risk of sustained regional transmission.

Hantavirus and Andes Virus Emergence

Hantavirus presents a more insidious threat to the EMR. Although no endemic hantavirus pulmonary syndrome has been documented in the EMR, serological surveys and rodent surveillance suggest possible circulation of Hantaan- and Puumala-like viruses in eastern European and Central Asian member states. The absence of systematic hantavirus surveillance across the EMR obscures the true disease burden.

Maritime importation via infected rodents in cargo shipments or passenger vessels remains an unquantified pathway. The cruise ship cluster, with its documented South American itinerary and human clustering patterns, raises particular concern for potential Andes virus circulation in international maritime commerce. As the only hantavirus species with established human-to-human transmission, ANDV importation to the EMR would represent an unprecedented epidemiological threat.

Health System Preparedness

Both pathogens reveal critical gaps in EMR health systems: limited diagnostic capacity for filoviral and bunyaviral infections; inadequate infection-control protocols in secondary and tertiary hospitals; insufficient PPE stockpiles; and fragmented epidemiological surveillance networks. The recent PHEIC declaration for Bundibugyo virus highlights the international nature of these threats and the need for coordinated regional preparedness. Enhanced maritime surveillance, with particular attention to rodent-associated illness in travelers, would strengthen early detection of hantavirus importation events.

In conclusion, EVD and hantavirus infections are significant zoonotic threats with distinct transmission patterns and public health implications. EVD remains a high-risk outbreak threat due to its rapid human-to-human transmission, high case-fatality rates, and ongoing circulation in parts of Central and East Africa, highlighting the need for robust surveillance and rapid-response capacity in the EMR.

By contrast, hantavirus infections are primarily associated with rodent exposure and environmental risk factors and typically cause sporadic endemic disease rather than large outbreaks. The Andes virus is a notable exception, as it can be transmitted from person to person, and recent maritime-associated clusters emphasize the need for continued monitoring. Although WHO currently considers the global hantavirus risk to be low, ecological changes and increasing international mobility may affect future transmission patterns.

To mitigate the risks posed by both pathogens, EMR countries should strengthen laboratory and diagnostic capacity, enhance integrated epidemiological and zoonotic surveillance systems, maintain strategic stockpiles of essential medical countermeasures, and ensure healthcare workforce preparedness for early recognition and containment. Sustained international collaboration through WHO's frameworks, regional coordination mechanisms, and strengthened maritime and border health surveillance will be essential for reducing the risk of cross-border transmission and improving preparedness.

Dr. Mohammad Abu Khadair is a public health specialist with over 30 years of experience in epidemiology, disease surveillance, outbreak investigation, and emergency response. He currently serves as a Senior Technical Specialist at EMPHNET. Previously, he led the Disease Surveillance Department at Jordan's MoH, where he coordinated public health responses during major humanitarian crises. Dr. Abu Khadair holds a Master of Public Health degree and is a graduate of the MOH/CDC FETP. He has contributed to publications on refugee health, immunization, disease surveillance, and public health preparedness.

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New Ebola Threat Challenges Us: Key Lessons to Remember

By Prof. Mohamed Chahed, Former General Director of Tunisian National Observatory of Emerging Diseases, and Former Director of EMPHNET's CEAE

Dr. Peter Piot in the year 1976 first detected Ebola in the Democratic Republic of Congo (DRC, ex Zaire). The name "Ebola" was termed as the disease was noticed near the Ebola river in Congo. The vast majority of EVD cases and outbursts have been endemic to African continent ever since the disease detection. From 1976 to 2014, 36 Ebola outbreaks have occurred in six African countries.

Early May 2026, the DRC reported a cluster of severe illnesses affecting healthcare workers. Patients have experienced classic Ebola disease symptoms like fever, headache, vomiting, severe weakness, abdominal pain, nosebleeds, and vomiting blood. In DRC, most cases to date have been in people between 20 and 39 years old, and two-thirds have been in female patients. The virus was identified as Bundibugyo virus. There have been 2 previous outbreaks of Bundibugyo virus, one in Uganda (2007) and one in DRC (2012), with death rates of 25% and 50%, respectively. Rwampara Health Zone in Ituri province in DRC is the current epicenter of the outbreak.

As of June 8, 2026, the Ebola outbreak caused by Bundibugyo virus continues to affect the DRC and Uganda. On June 7, the DRC Ministry of Health reported a total of 515 confirmed cases, including 91 confirmed deaths, with 283 individuals hospitalized in isolation as of June 6.

Although information remains limited, WHO estimates that the probability of infection for people living on other continents and in African countries far from the epicenter of the epidemic is low, however, Ebola outbreaks will continue to occur.

Public health experts involved in previous Ebola outbreaks highlighted that a key lesson learned from their experience is that maintaining community trust and acceptance remains a major challenge in the face of misinformation, fear, and resistance to safe burial practices. They emphasized the importance of outbreak preparedness and community engagement as critical to interrupting transmission. Health teams should work closely with affected communities to build trust and promote informed participation in response efforts.

The severity and complexity of responding to an Ebola outbreak require a pre-designated and well-trained Rapid Response Team (RRT). The RRT should be a multidisciplinary, coordinated, and intersectoral team, including at a minimum physicians, nurses, data analysts, laboratory technicians, IT experts, veterinarians, and social scientists. A robust and continuous training program is essential to strengthen the capacity of healthcare workers and enable them to effectively lead and support the RRT.

Ebola outbreaks, often with high fatalities rate, frighten populations and have a social impact that quickly catch the health authorities attention, even in low-risk countries. Therefore, a comprehensive and deeply understanding of local context is crucial to combating such epidemic.

In-country leadership makes the difference. Integrated leaders are well positioned to understand the local health system, cultural contexts and operational realities. Their presence enables faster and more context-appropriate responses, facilitates community engagement, and helps build trust with affected communities.

Science is the pillar for strengthening community preparedness and public awareness efforts in the context of Ebola outbreaks. Experts in tropical diseases and public health, along with relevant institutions, should be part of a broader network contributing to Ebola preparedness and response planning. A strong Ebola preparedness and response plan should include clear guidelines for prevention activities through community mobilization, leveraging social media and local media channels, supporting diagnostic capacity, and defining coordination processes for a potential early response to Ebola virus disease. Such plans should be endorsed and routinely reviewed and updated.

Long-term support for outbreak preparedness and response planning is a productive investment before a crisis occurs. As Ebola and other infectious disease outbreaks continue to threaten vulnerable populations, it is clear that building capacity in advance is strategic. Preparation should not begin during an outbreak. Countries with trained health professionals and operational systems in place are more likely to have resilient health systems and are better able to respond quickly to protect communities.

Prof. Mohammad Chahed

is a former Professor of Epidemiology and Community Medicine at University of Tunis El Manar and a freelance public health expert. He has extensive experience in epidemiology, preventive medicine, biostatistics, and FETPs at national, regional, and international levels. Throughout his career, he has held several leadership positions within Tunisia's Ministry of Health and has served as a consultant for organizations including WHO, UNICEF, ECDC, and CDC. He has also authored numerous publications on communicable disease epidemiology, surveillance, and control.

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From Ebola to Hantavirus: Reflections on Two Decades of Epidemic Change

By Prof. Salim Adib, Professor of Public Health, American University of Beirut

In 1993, I returned from my studies in the USA to teach Epidemiology and Public Health (PH) at the American University of Beirut (AUB). Soon after, I became a consultant on surveillance and control for the Lebanese Ministry of Public Health (MoPH). MoPH had started to rebuild the PH structures which had been destroyed during a protracted period of civil wars and foreign invasions (1975-1991).

In 1995, when an Ebola outbreak was reported from the then-Zaire (now Democratic Republic of Congo or DRC), a crisis unit was convened to discuss the potential threat posed by this outbreak. Lebanese communities exist in practically every country in sub-Saharan Africa, and it was feared that our expatriates returning to Lebanon for the summer would carry the deadly virus. The group acknowledged the lack of resources at that time to control such an occurrence from creating a major outbreak in Lebanon. However, what re-assured us was that all flights to Lebanon from Zaire were connecting through Brussels or Paris, and that authorities there would act as a protective line against any epidemic spread! The outbreak had started in a district in Zaire near the capital Kinshasa, which allowed for the area to be rapidly put under a military "cordon sanitaire." It was so virulent, with case-fatality rates ranging from 80% to 90%, that it rapidly burned itself out before any undetected carrier could leave the district and contribute to further spread. By the end of the summer, the epidemic stopped and Lebanon was spared! (WHO 1995).

Twenty years later, the situation had changed. A new Ebola outbreak was signaled in 2014 in a border area between three African countries: Guinea, Liberia and Sierra-Leone. The heavy cross-border traffic made it very difficult to limit the transmission, and by the time the epidemic was controlled in 2016, it had cause at least 30,000 cases of which at least 30% died, based on reported statistics (Kyobe Bosa et al. 2024). When cases were reported from Senegal and Nigeria, our Lebanese MoPH crisis unit had more grounds for concern: both these countries have almost daily direct flights to Beirut, and the potential for spread was serious. Fortunately, the control procedures in Lebanon had evolved and strict airport measures were taken to prevent our returnees from becoming human bridges for the transmission.

This recollection provides us with a first essential lesson regarding emerging epidemic threats. The intensity of human mobility, especially by airplane, is making future pandemics increasingly more expected, if not all-out inevitable. Pathogens have been using mutations for ever to overcome the elimination threat posed by herd immunity, which naturally occurs once a virus comes in contact with human or animal communities long enough. Mutations also appear to resist new therapeutic tools, most notably antibiotics. With rare exceptions, when mutations occurred in isolated socially stable communities, they tended to fizzle out where they were born, hardly emerging on the radars of history (Nature 2014).

In our modern times, human travels can generate a pandemic in a matter of weeks, as we have seen in the SARS pandemic (2003), and more recently with its mutant cousin during the Covid-19 pandemic of 2019. In response to this aggravating yet seemingly unstoppable change in human mobility, the 2005 International Health Regulations (IHR) version changed the paradigm on control. Unlike the historical approach of borders protection, the IHR, in an open world, calls for alerts to be sent out early from the source, and for global measures to be taken fast (Singh and Kumar, 2009). Transparency and global cooperation are the only acceptable international norms in global health in our days and times. No nation, no matter how large and resourceful, can close up long enough to choke an emerging strain and to prevent it from becoming a pandemic. Secrecy facing emerging outbreaks is the global threat.

The outbreak of Hantavirus on board a cruise ship in the Atlantic Ocean in 2026 provides another important lesson regarding emerging global threats, some 60% of which are zoonoses (WHO 2026). In 75% of new human pathogens detected since 2000, the pathogens have originated in animals. The disruption of natural ecosystems caused by climate change and human activity is certainly amplifying the risk of zoonotic spillover (Jones et al. 2008). The first report of a cluster of cases of "hemorrhagic fever and renal failure" in modern times occurred during the Korean War in 1951-52. In the 1970s, South Korean virologist Ho Wang Lee was finally able to isolate the etiological virus in mice near the Hantan River, which is how it became to be known as the "Hantavirus." Contaminated mice and other rodents displaced by war activities invaded the trenches, excreting viral components through their urine on soldiers' sleeping mats and blankets, which started the epidemic (Danforth et al. 2015). In the cruise outbreak 2026, an elderly Dutch couple, who were the first to fall ill and pass away, had traveled through southern Argentina. Experts suspect they contracted the virus from infected rodents while hiking or exploring ashore, before the cruise even began. The specific strain causing the outbreak, present mostly in the Andean region, is capable of human-to-human transmission, and did not need exposure to infected rodent droppings, urine, or saliva to be perpetuated, thus contributing to rapid spread of cases aboard the ship (WHO, 2026)

How do we understand this acceleration in the passage of mutations from animals to humans? A common thread to the hantavirus outbreaks in the 1950s and in 2026 is human encroachment on natural wild habitats, where zoonotic mutations are lurking for new, immunologically "naïve" hosts to provide them with a new chance at survival. With dramatic climate changes affecting all living creatures, usual hosts are dying as a result of successive waves of droughts, floods, heat waves and forest fires. The existential threat thus confronting pathogenic agents is very likely resulting, in ways not well understood yet, in a multiplication of mutations with a greater capacity to jump species from animals to humans (Lemieux et al. 2022). The reality of the One Health concept cannot be better illustrated.

In the past decades, the emergence of multiple zoonotic viruses has exposed critical gaps in our ability to predict epidemic trajectories and implement effective interventions. RNA viruses, such as Ebola and Hantavirus, in particular, are challenging to control due to their high mutation rates and ability to adapt and evade immune defenses. To better prepare for future outbreaks, it is vital that we deepen our understanding of the factors driving viral emergence, transmission, and persistence in human populations. Specifically, deciphering the interactions between antibody-mediated immunity and viral evolution would be essential (Jyothi et al. 2025). Open and effective international risk communication remains important to mitigate the impact of future epidemics.

Prof. Salim Adib is a Professor of Public Health Practice at the American University of Beirut and a distinguished epidemiologist with extensive experience in academia, public health leadership, and international consultancy. He has served in senior roles with WHO and the Abu Dhabi Department of Public Health, and currently leads several regional professional bodies, including the Lebanese Epidemiological Association. In 2024, he was recognized among Stanford University's top 2% most impactful researchers worldwide.

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Leveraging Artificial Intelligence for Outbreak Detection and Rapid Containment: Lessons from Multiple Experiences

By Dr. Abdallah Bin Ghouth, Executive Director, National Institute of Public Health, Yemen

In recent months, discussions on the role of artificial intelligence (AI) in public health have gained significant momentum across medical journals, digital platforms, and social media. While our understanding of these rapidly evolving technologies and their potential applications within public health systems remains limited, the growing body of evidence and practical experiences has sparked interest in exploring the added value that AI-driven tools can bring to disease surveillance and outbreak response.

Among the most compelling examples is a recent report highlighting Saudi Arabia's use of AI to support the prediction and rapid management of public health emergencies, including infectious disease outbreaks, during the 1447 Hajj season (May 2026). Hajj is far more than a religious gathering; it is one of the largest annual mass gatherings in the world, bringing together millions of people from diverse countries and health backgrounds within a confined time and place. The continuous movement of pilgrims to and from all corners of the globe means that any outbreak occurring during Hajj has implications that extend well beyond national borders, making it a matter of global health security.

Although Saudi Arabia has long been recognized as a leader in implementing all core components of the International Health Regulations (IHR), its innovative use of AI has elevated its public health expertise to a global level. Today, effective outbreak management is increasingly driven by data, strategic planning, early detection and response, and the seamless integration of technology with public health practice. In another report published by the International Center for Counseling, Strategic Studies and Media (ICCSSM) in London, the discussion highlights how AI is increasingly able to identify potential outbreaks even before the onset of symptoms.

The report also explores the underlying technical models, draws on international case studies, and reflects on the ethical considerations surrounding this emerging field. It suggests that readiness for future pandemics is increasingly shaped by AI-enabled surveillance systems that are interconnected across borders to identify early warning signals. This evolution points to the need to rethink how health monitoring, alert systems, and response mechanisms are designed and coordinated at the global level.

The report also points to the growing use of advanced analytical tools, alongside traditional surveillance methods, to monitor, analyze, and anticipate disease outbreaks. These approaches include:

- **Machine learning**, which helps uncover subtle signals and hidden patterns in health and behavioral data that may indicate the early stages of an emerging outbreak.
- **Neural networks**, which are increasingly used to model complex disease transmission dynamics across social and environmental factors. Evidence from recent studies suggests they can outperform conventional models in forecasting infections and deaths, particularly because they are better at capturing non-linear influences such as climate variation and policy changes on disease spread (Kraemer MUG et al., 2025).
- **Simulation models**, which allow researchers and decision-makers to test different outbreak scenarios and evaluate the potential impact of interventions before they are applied in real settings. These models have become a key tool in preparedness planning, supporting more informed and proactive public health decisions (Kaur J et al., 2025).

Other non-traditional data sources and tools that are increasingly being integrated into outbreak detection systems include:

- **Environmental sensors**, which can detect traces of viruses in wastewater or even the air, enabling early warning signals before clinical cases are formally reported.
- **Climate and weather data analysis**, where factors such as temperature, humidity, and broader environmental conditions are monitored to identify settings that may facilitate disease transmission such as conditions favorable for mosquito breeding. Incorporating these variables into predictive models helps anticipate seasonal hotspots of outbreaks.
- **Social media monitoring**, which analyzes posts containing health-related keywords or symptom descriptions, such as clusters of respiratory complaints emerging in a specific location (MacIntyre CR et al., 2023).
- **Pharmaceutical demand tracking**, where unusual spikes in the online purchase or demand for certain medications can serve as an indirect indicator of emerging illness trends.

Similarly, applications in emerging epidemics, particularly during COVID-19 and the Ebola outbreak (Abebe GF et al., 2025), have demonstrated the growing role of digital tools in outbreak response. These include the Ebola exposure calculator, which estimates an individual's likely exposure window to the virus. In addition, machine learning techniques and predictive models have been used to enhance the interpretation and application of evidence-based clinical guidelines (Colubri A et al., 2019). Likewise, various machine learning algorithms have supported research efforts aimed at predicting potential anti-Ebola compounds, contributing to the ongoing search for effective treatments (Kwofie SK et al., 2023).

In conclusion, these developments indicate that AI is steadily reshaping how public health systems detect, interpret, and respond to emerging threats. However, realizing its full potential will require stronger governance frameworks, ethical safeguards, and investment in digital public health infrastructure to ensure its responsible and equitable use.

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Dr. Abdallah Bin Ghouth is a physician, epidemiologist, and Professor of Community Medicine at Hadhramout University, Yemen. He currently serves as Executive Director of the National Public Health Institute (Y-NPHI), Head of the Community Medicine Department at Hadhramout University, and National Consultant for the FETP in Yemen. With extensive experience in public health, medical education, and epidemiology, he has authored more than 35 publications in peer-reviewed journals.

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In Numbers

This section presents key concerning statistics on the Ebola and hantavirus outbreaks, along with emergency-related figures from various countries in the EMR.

OUTBREAKS

Ebola Disease

676
confirmed cases in the DRC, as of June 13, 2026.

19
confirmed cases in Uganda, as of June 13, 2026.

17.7%
Case Fatality Rate (CFR) have been reported from both countries.

136
deaths among the confirmed cases in the DRC, as of June 13, 2026.

2
deaths among the confirmed cases in Uganda, as of June 13, 2026.

US$ 518 million
was allocated under a joint continental Ebola preparedness and response plan launched by Africa CDC), WHO, and partners.

Hantavirus

13
cases have been reported, as of May 27, 2026.

11
cases have been laboratory-confirmed for Andes virus (ANDV) infection, and 2 are probable cases.

3
deaths have been reported, as of May 27,2026.

600+
contacts, including 53% high-risk and 47% low-risk contacts, have been identified across 32 countries, territories and areas, and are either under close monitoring or self-monitoring.

COUNTRIES

Gaza

45
people have been killed, five bodies were retrieved, two died of wounds, and 254 people were injured between May 20 and June 3, 2026.

35
Emergency Medical Teams (EMTs) are operational, including 310 national and 66 international personnel, as of June 1, 2026.

2,903
people have been injured since the announcement of the ceasefire agreement on 10 October 2025, as of 5 June 2026.

>3,500
children aged 6-59 months were admitted for malnutrition treatment in April, compared with >2,800 in March 2026. This includes over 600 with Severe Acute Malnutrition in April compared with over 400 in March (source: Nutrition Cluster).

20%
of all consultations reported to WHO's Early Warning, Alert and Response System (EWARS) in Gaza between April 26 and May 30 were related to infectious diseases.

37,000
pregnant and breastfeeding women are projected to suffer from acute malnutrition and require treatment in 2026.

48%
of reported conditions were due to acute respiratory infections, which remained the leading cause of morbidity.

850,000
people are in need of emergency shelter items.

Sudan

8.8-9 million
people are internally displaced across the country's 18 states, with children accounting for 55% of the displaced population.

100
suspected cholera infections and dozens of deaths were reported by OCHA within a single week in May 2026.

24.6-28.9 million
people are facing acute food insecurity (IPC Phase 3+), including over 6 million in Emergency (Phase 4) and more than 750,000 in Catastrophe (Phase 5)

2,546
incidents of violence against or obstruction of health care were reported, along with 790 incidents of damage to or destruction of hospitals, clinics, and other health infrastructure during 2025.

Lebanon

3,613+
people have been killed since March 2, 2026, as of June 8, 2026

379
injuries and 129 deaths have been reported by the WHO Surveillance System for Attacks on Health Care since March 2, 2026.

11,072+
people have been injured since March 2, 2026, as of June 8, 2026

47
attacks on health care have been recorded since the announcement of the ceasefire, resulting in 31 deaths among health care workers and paramedics as well as 146 injuries. During the same period, 11 EMS centers were targeted, 48 rescue vehicles were damaged, and 13 attacks on hospitals were reported.

5+
displacement orders were issued between June 5 and 8, 2026, affecting 17 localities across 5 districts of the South, Nabatieh and Bekaa Governorates.

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