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Review Article
Ebola Outbreak in Africa and its Potential Threat to Global Health

[1,2]Kaushik Bharati

[1]Health Policy Consultant, UNESCO, New Delhi, India
[2]Ambassador, Asian Council of Science Editors, Dubai, United Arab Emirates

Abstract

The ongoing Ebola virus disease (EVD) outbreak caused by the Bundibugyo virus (BDBV) in the Democratic Republic of the Congo (DRC) and Uganda represents a major emerging global health concern. Unlike previous Ebola outbreaks, this epidemic involves a species of Orthoebolavirus for which no licensed vaccine or approved antiviral therapy currently exists, posing significant challenges to outbreak control. This review aims to provide a comprehensive overview of the current BDBV outbreak, including its epidemiology, virology, clinical manifestations, public health implications, and global preparedness requirements. A structured literature search was conducted using PubMed/MEDLINE, Scopus, Web of Science, Google Scholar, and official reports from the World Health Organization (WHO), Africa Centres for Disease Control and Prevention (Africa CDC), and the United States Centers for Disease Control and Prevention (CDC). Articles and reports published from October 2000 to June 2026 were reviewed, with emphasis on peer-reviewed studies, epidemiological reports, outbreak investigations, clinical studies, and international public health guidance relevant to Bundibugyo virus disease and Ebola outbreak preparedness. The review identifies several factors contributing to the heightened international risk, including the absence of licensed medical countermeasures, delayed case detection, fragile healthcare infrastructure, ongoing armed conflict, population displacement, extensive cross-border movement, and limited laboratory and surveillance capacity. It also highlights the unique virological and clinical characteristics of BDBV, current diagnostic and supportive management strategies, and the challenges associated with infection prevention and outbreak containment. The current outbreak underscores the persistent global threat posed by emerging and re-emerging filoviruses and exposes important gaps in pandemic preparedness for pathogens lacking licensed vaccines or specific therapeutics. Strengthening surveillance systems, expanding laboratory diagnostic capacity, accelerating research on vaccines and therapeutics against BDBV, reinforcing infection prevention and control measures, and fostering coordinated international collaboration are essential to contain the ongoing outbreak and mitigate the risk of wider regional and global spread. Continued investment in resilient health systems and preparedness capacities remains critical for preventing future Ebola epidemics and safeguarding global health security.

Key words: Ebola virus disease, bundibugyo virus, public health emergency, DRC, Uganda, global health, viral hemorrhagic fever

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Corresponding Author: Kaushik Bharati, WZ 43-44, Om Vihar Phase 3, Uttam Nagar, New Delhi, 110059, India

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Data Availability: All relevant data are within the paper and its supporting information files.

INTRODUCTION

Ebola virus disease (EVD) is one of the most feared infectious diseases in the world, characterized by acute hemorrhagic fever, multi-organ failure, and case fatality rates historically ranging from 25 to 90% depending on the infecting species and the quality of clinical care available[1]. Caused by members of the genus *Orthoebolavirus* within the family *Filoviridae*, EVD was first recognized in 1976 near the Ebola River in what is now the Democratic Republic of Congo (DRC) and has since caused more than 30 documented outbreaks, predominantly in Sub-Saharan Africa[2].

The largest Ebola outbreak in 2014-2016 spread across Guinea, Liberia, and Sierra Leone, becoming a watershed moment for global health governance and epidemic preparedness[3]. Although the subsequent 2018-2020 outbreak in eastern DRC was brought under control in part through the deployment of a newly licensed vaccine (Ervebo®, targeting the Zaire Ebola virus), the current 2026 outbreak presents a qualitatively different challenge, as it is driven by the Bundibugyo virus (BDBV), a rarer species for which no vaccine or approved therapeutic exists[4]. The current outbreak has significant public health implications owing to its high case-fatality rate, rapid cross-border spread, and occurrence in regions with fragile healthcare systems, armed conflict, and high population mobility. The absence of a licensed vaccine or approved antiviral therapy for BDBV limits outbreak control to early case detection, isolation, contact tracing, infection prevention and control (IPC), and supportive clinical care. Moreover, BDBV remains relatively under-researched, with limited evidence on optimal therapeutics and vaccine effectiveness. Weak surveillance systems, inadequate laboratory capacity, community mistrust, and delayed diagnosis further complicate containment efforts. The outbreak underscores the urgent need for strengthened surveillance, enhanced cross-border collaboration, accelerated research on BDBV-specific medical countermeasures, and sustained investment in resilient public health systems to prevent regional spread and mitigate future global health threats.

On 17 May 2026, the World Health Organization (WHO) declared the Bundibugyo Ebola Outbreak in the DRC and Uganda a Public Health Emergency of International Concern (PHEIC). This is the third such declaration for Ebola in history, signaling an extraordinary public health event with potential for international spread[5] (Fig. 1).

Despite increasing recognition of BDBV as an emerging cause of EVD, the current evidence remains fragmented, with most published literature focused on Zaire Ebola virus. There is limited synthesis of the epidemiology, virology, clinical characteristics, outbreak dynamics, and public health challenges specific to BDBV, particularly in the context of the rapidly evolving 2026 outbreak in the DRC and Uganda. Furthermore, the absence of licensed vaccines or approved therapeutics for BDBV, coupled with ongoing cross-border transmission, has created an urgent need for evidence-based guidance. A timely review is therefore essential to consolidate current knowledge, identify critical preparedness and response gaps, evaluate existing control strategies, and inform clinicians, researchers, and policymakers. Such a synthesis can support coordinated international action, strengthen outbreak preparedness, and guide future research aimed at improving the prevention and management of Bundibugyo virus disease.

This review examines the current epidemiological situation, the biology and clinical course of BDBV, the factors that elevate global concern, the international response, and the gaps that must urgently be addressed.

MATERIALS AND METHODS

A comprehensive literature search was conducted to identify relevant evidence on the topic. Electronic databases including PubMed/MEDLINE, Scopus, Web of Science, and Google Scholar were systematically searched for studies published between October 2000 and June 2026. To ensure inclusion of the most recent epidemiological data, policy updates, and technical guidance, the literature was also searched through the official websites of the World Health Organization (WHO), Africa Centres for Disease Control and Prevention (Africa CDC), and the United States Centers for Disease Control and Prevention (US CDC).

The search strategy combined controlled vocabulary (Medical Subject Headings [MeSH], where applicable) with free-text keywords using Boolean operators (AND, OR, NOT). Search terms were adapted for each database and included combinations of disease-specific terms, pathogen-related terms, epidemiological concepts, clinical manifestations, diagnosis, management, prevention, surveillance, public health response, and outbreak-related terminology relevant to the review topic. Database-specific syntax and indexing terms were applied to maximize retrieval of relevant publications. The reference lists of all eligible articles and relevant review papers were manually screened to identify additional publications not retrieved through the electronic search.

Inclusion criteria: Original research articles, systematic reviews, narrative reviews, clinical guidelines, surveillance reports, and official public health documents published in English were considered for inclusion.

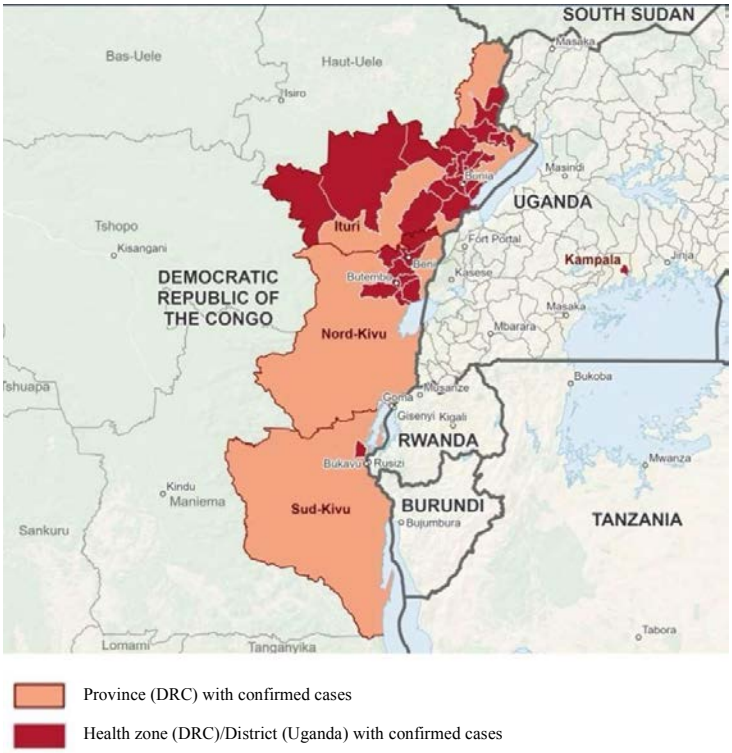


Fig. 1: Map showing affected areas in the Democratic Republic of Congo (DRC) and Uganda
Centers for Disease Control and Prevention (CDC), Atlanta, Georgia, USA[5]

Exclusion criteria: Conference abstracts, editorials, letters lacking substantive data, duplicate publications, and studies not directly relevant to the objectives of the review were excluded.

Retrieved articles were screened for relevance based on their titles, abstracts, and full texts where necessary. As this was designed as a narrative review, the identified literature was critically appraised and synthesized descriptively to provide a comprehensive overview of the available evidence. Transparent reporting of the search sources, search period, and selection approach ensured reproducibility and methodological rigor of the review.

VIROLOGY AND CLASSIFICATION OF EBOLA VIRUSES

Orthoebolaviruses are enveloped, non-segmented, negative-sense single-stranded RNA viruses with a characteristic filamentous morphology[6]. Four species within the genus cause disease in humans. These include *Orthoebolavirus zairense* (Zaire Ebola virus), *Orthoebolavirus sudanense* (Sudan Ebola virus), *Orthoebolavirus taiforestense* (Tai Forest Ebola virus), and *Orthoebolavirus bundibugyoense* (Bundibugyo Ebola virus). A fifth species, Reston Ebola virus, infects non-human primates, but has not been shown to cause clinical disease in humans[7].

Bundibugyo virus was first identified in 2007 following an outbreak in the Bundibugyo District of western Uganda, near the border with the DRC. A second outbreak occurred in the Province Orientale of the DRC in 2012, resulting in 59 cases and 34 deaths. Before the 2026 outbreak, BDBV had thus caused only two known human outbreaks, leaving it severely understudied compared to the Zaire virus. Its natural reservoir is suspected to be fruit bats (*Pteropus* spp.), consistent with the reservoir hypothesis for other filoviruses, although direct evidence remains limited[8].

The genome of BDBV encodes seven genes (NP, VP35, VP40, GP, VP30, VP24, and L), producing at least nine structural and regulatory proteins (Fig. 2). The glycoprotein (GP) mediates host cell entry via the Niemann-Pick C1 (NPC1) receptor and is the primary target for neutralizing antibodies[9]. This is a critical entry point given that the GP sequences of BDBV and the Zaire Ebola virus differ substantially, explaining why existing Zaire-targeting vaccines and monoclonal antibodies are not expected to provide cross-protection.

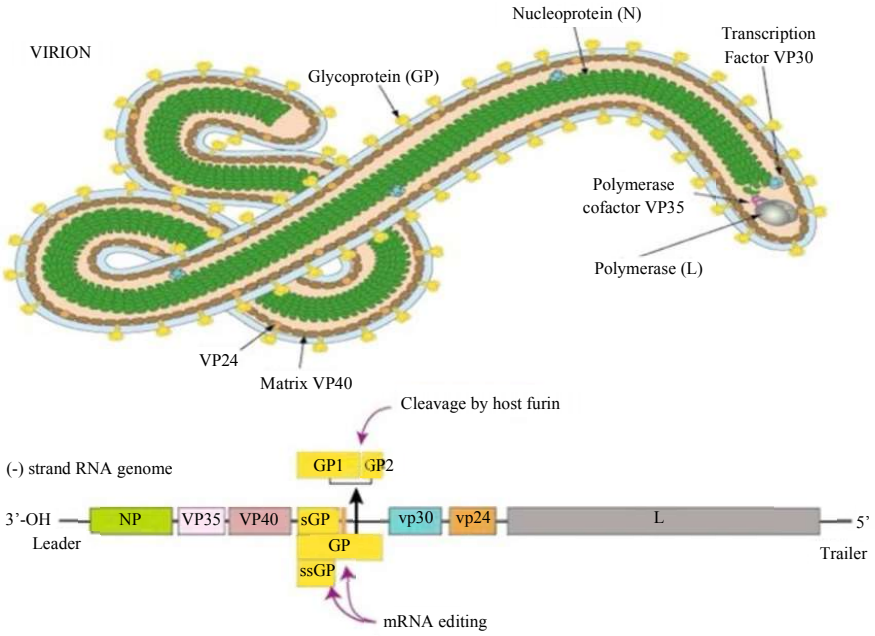


Fig. 2: Bundibugyo Ebola virus complete genome structure[10]

THE 2026 OUTBREAK: EPIDEMIOLOGY AND TIMELINE

On 5 May 2026, WHO was alerted to a cluster of severe, high-mortality illness of unknown cause in the Mongbwalu Health Zone of Ituri Province in Northeastern DRC, with healthcare workers among the victims. Laboratory analysis at the Institut National de Recherche Biomedicale (INRB) in Kinshasa confirmed Bundibugyo Ebola virus in 8 of 13 blood samples on 15 May 2026[5]. On the same day, the DRC and Uganda jointly declared an outbreak; two confirmed cases had already been identified in Kampala, Uganda, in individuals who had travelled from the DRC.

Mongbwalu, the outbreak's origin, is a commercially active gold-mining hub and is epidemiologically significant. The zone sees high volumes of population movement, creating conditions for rapid geographic dissemination. By 17 May 2026, cases had been confirmed across at least three health zones in Ituri, including Bunia, the provincial capital, acting as a secondary amplification point. Within days, a positive case was identified in Goma, the capital of North Kivu Province and a major transit hub bordering Rwanda. By 21 May 2026, 746 suspected cases and 176 deaths among suspected cases had been reported in the DRC, alongside 85 laboratory-confirmed cases across the DRC and Uganda[11].

This is the 17th recorded Ebola outbreak in the DRC and the first involving BDBV anywhere in the world since 2012. The speed of geographic expansion and the involvement of Ituri Province, which borders South Sudan and Uganda, prompted WHO to assess national risk as very high in DRC and high in Uganda and neighbouring border countries. Consequently, WHO declared a PHEIC on 17 May 2026, and the Africa Centers for Disease Control and Prevention (Africa CDC) declared a Public Health Emergency of Continental Security one day later. On 5 June 2026, Africa CDC and WHO launched a joint continental preparedness and response plan, seeking USD 518 million to fund surveillance, treatment, contact tracing, and border health measures[12]. The timeline of the current outbreak is presented in Table 1.

CLINICAL FEATURES AND PATHOGENESIS

Ebola virus disease caused by BDBV presents with a clinical syndrome broadly similar to that caused by other Orthoebolavirus species, though direct comparative data remain sparse given the limited number of prior BDBV outbreaks. The incubation period ranges from 2 to 21 days, with a mean of approximately 6-12 days. Initial symptoms are non-specific and include acute-onset fever, severe headache, myalgia, fatigue, and sore throat, making early clinical differentiation from malaria, typhoid, and other endemic febrile illnesses extremely challenging. As the disease progresses, patients develop gastrointestinal (GI) symptoms, including vomiting, diarrhea, and abdominal pain. This is followed by vascular dysfunction, leading to diffuse rashes and, in severe cases, frank hemorrhagic manifestations including epistaxis, hematemesis, melena, and mucosal

Table 1: 2026 Ebola outbreak timeline

Date	Event
February	Early infections are theorized to have begun in the mining town of Mongbwalu in Ituri Province, Democratic Republic of Congo (DRC)
May 9	Médecins Sans Frontières (MSF) receives the first alerts regarding an undiagnosed disease
May 14	The first confirmed Ebola death is reported in Kampala, Uganda, after the patient was transported from the DRC
May 15	The DRC Ministry of Health officially declares the Ebola outbreak in Ituri
May 17	WHO declares a Public Health Emergency of International Concern (PHEIC). The Africa CDC concurrently declares a Public Health Emergency of Continental Security
May 21	The first case of the virus spreading out of the epicenter is reported in the Miti-Murhesa health zone of South Kivu
June 5	The WHO and African Heads of State launch a joint continental strategic preparedness and response plan
June 16	Confirmed case numbers grow to 827 across 31 health zones, presenting the third-largest Ebola outbreak in recorded history
June 23	Death toll crosses 1,000

bleeding. Multi-organ failure involving the liver, kidneys, and cardiovascular system leads to death in a substantial proportion of untreated patients. Case fatality rates in the two prior BDBV outbreaks ranged from 30 to 57%. The current outbreak appears to fall within the upper range of this interval[13].

Pathogenically, BDBV, like other Ebola viruses, triggers a dysregulated innate immune response, with massive cytokine release, endothelial dysfunction, impaired coagulation, and widespread tissue necrosis. VP35 and VP24 proteins actively antagonize type I interferon signaling, facilitating viral evasion of host defences[14]. Viral loads peak during symptomatic illness, when transmission risk is highest; survivors may shed virus in semen for months after clinical recovery, creating a reservoir for secondary transmission even after an outbreak is declared over[15].

TRANSMISSION DYNAMICS AND FACTORS ELEVATING GLOBAL RISK

Bundibugyo virus, like other Ebola viruses, is not transmitted through the airborne route. Human-to-human spread occurs through direct contact with the blood, secretions, organs, or other bodily fluids of symptomatic infected individuals, or with surfaces and objects contaminated by these fluids. Healthcare workers, family caregivers, and those involved in traditional burial practices are disproportionately exposed. During the 2014-2016 West Africa epidemic, healthcare workers accounted for approximately 5% of all EVD cases, with nosocomial transmission driven primarily by inadequate personal protective equipment (PPE) use and poor triage systems[16]. Several factors specific to the 2026 outbreak substantially elevate the risk of international spread, which are discussed below.

Absence of countermeasures: No licensed vaccine or approved therapeutic agent exists for BDBV. The Ervebo® (rVSV-ZEBOV) vaccine, which proved highly effective against the Zaire Ebola virus, is not expected to confer cross-protection against BDBV based on animal immunogenicity data, and WHO recommended against its use for this outbreak on 28 May 2026[17]. The licensed monoclonal antibodies, atoltivimab, maftivimab, odesivimab, and ansuvimab, developed against the Zaire GP, are also not approved for BDBV[18,19]. This leaves response strategies almost entirely dependent on classical non-pharmacological interventions, namely, case isolation, contact tracing, infection prevention and control (IPC), and safe burial[20].

Geographic location and population mobility: Ituri Province, the epicentre of the outbreak, is a commercial and migratory hub with porous borders adjacent to Uganda and South Sudan. Bunia and Goma, which are both affected cities, are major transit nodes with frequent air and road connectivity to Kampala, Nairobi, and other East African capitals. The 2014-2016 epidemic demonstrated that delays in identifying infected travellers departing from affected countries can seed cases elsewhere. The same risk applies in 2026[21].

Fragile health systems and active armed conflict: Eastern DRC has experienced decades of armed conflict involving multiple non-state armed groups, severely disrupting health infrastructure, surveillance capacity, and community trust in public health interventions. During the 2018-2020 DRC Ebola outbreak, which included conflict-affected Ituri and North Kivu provinces, security incidents directly impeded response activities, and similar disruptions are also being reported in the current outbreak[22].

Diagnostic delay and cryptic spread: Because BDBV is so rarely encountered, initial laboratory samples from the Mongbwalu cluster tested negative for Ebola virus (the Zaire species) before confirmatory testing for other filovirus species was performed. This diagnostic gap may have allowed unchecked community transmission for days or weeks before the outbreak was confirmed. Notably, the true geographic scale of the epidemic could not be ascertained, as clusters of suspected cases were appearing simultaneously across multiple parts of eastern DRC[23].

International travel and importation risk: Although the WHO has assessed the overall global risk as low, this assessment is contingent on effective entry and exit screening at affected airports and border crossings. The Centers for Disease Control and Prevention (CDC) has issued a Health Alert Network advisory urging clinicians and public health departments to be alert to potential cases in travellers returning from the DRC and Uganda. Historical precedent from the 2014-2016 epidemic that reached the United States and Europe through air travel underscores that even a low probability of importation demands heightened clinical vigilance worldwide[24].

GLOBAL HEALTH RESPONSE

The PHEIC declaration by WHO on 17 May 2026 activated a suite of international response mechanisms. The International Health Regulations (IHR) Emergency Committee convened its first meeting on 19 May 2026, issuing temporary recommendations to all UN Member States encompassing enhanced surveillance, rigorous screening at points of entry and exit, risk communication, and immediate initiation of clinical trials for investigational vaccines and therapeutics.

On 5 June 2026, WHO and Africa CDC jointly launched a USD 518 million continental preparedness and response plan. Bilateral support was mobilized rapidly: The UK announced up to 20 million GBP; the European Union pledged 15 million EUR; and the US announced USD 112 million in bilateral assistance encompassing PPE, screening, contact tracing, and diagnostics[25]. Additionally, the Coalition for Epidemic Preparedness Innovations (CEPI) announced funding on 1 June 2026 to fast-track three BDBV vaccine candidates.

The WHO identified several investigational therapeutics, including the antiviral remdesivir, the bispecific antibody MBP-134, and the monoclonal antibody maftivimab, for prioritized evaluation in clinical trials for treatment and post-exposure prophylaxis[26]. Moreover, Médecins Sans Frontieres (MSF) has established Ebola isolation zones in Goma and is engaged in discussions with WHO regarding emergency trial protocols, building on its experience during the 2018-2019 DRC trials that led to the licensure of Ervebo® and the monoclonal antibodies for the Zaire species.

Despite this mobilization, significant operational challenges persist. The involvement of M23 (March 23 Movement)-controlled territories in North Kivu limits the reach of contact tracing and response activities. Community resistance rooted in historical mistrust of external health interventions remains a major barrier, as documented during the 2018-2020 DRC outbreak[27]. The reduction of US government contributions to global health following cuts to USAID and the US withdrawal from WHO has further strained the multilateral response capacity[28].

LESSONS FROM PAST OUTBREAKS AND PERSISTENT PREPAREDNESS GAPS

Historically, past outbreaks and pandemics have provided many lessons on preparedness[29]. The trajectory of the 2026 BDBV outbreak confirms a pattern seen repeatedly in filovirus epidemics i.e., preparedness investments made in the aftermath of one outbreak are narrowly tailored to the causative agent, leaving the global community exposed to related but distinct pathogens. Post-2014 investments in EVD countermeasures, such as the Ervebo® vaccine, ring vaccination strategies, and licensed monoclonal antibodies, are substantially ineffective against BDBV because they were developed exclusively for the Zaire virus. It has been observed that commercially driven vaccine development pipelines create dangerous blind spots for rare pathogens with limited commercial market potential.

It has been found that most high-level post-Ebola initiatives had failed to meet their financing goals by 2019, and operational progress remained limited, particularly in surveillance and detection capabilities[30]. A 2025 regional assessment of West African preparedness, marking the tenth anniversary of the 2014-2016 epidemic, found that despite measurable progress in some countries, critical vulnerabilities in cross-border coordination, laboratory capacity, and sustainable domestic financing for emergency response persisted across the Economic Community of West African States (ECOWAS) member states[31].

Mathematical modeling by the CDC projected that the current outbreak trajectory is highly sensitive to the efficacy of non-pharmaceutical interventions. Scenarios with only 20% isolation and treatment of symptomatic individuals resulted in dramatically worse outcomes than scenarios achieving 95% efficacy. This underscores the degree to which outbreak control, in the absence of vaccines, depends on community engagement, functional healthcare infrastructure, and operational security[32]. In this context, it has been suggested that susceptibility of populations from high-income countries is very low owing to the requirement for direct contact with bodily fluids and the low probability of sustained transmission in high-income healthcare settings. Nevertheless, it should be kept in mind that this outbreak is more challenging to control than Zaire Ebola virus outbreaks, given the absence of countermeasures and the limited institutional knowledge of BDBV.

FUTURE DIRECTIONS AND RECOMMENDATIONS

The 2026 Bundibugyo Ebola outbreak offers a stark reminder that epidemic preparedness cannot be pathogen-specific. Several concrete steps are required at national, regional, and global levels, which are highlighted below.

Accelerated, equity-focused R&D initiatives: The vital importance of vaccines in tackling infectious diseases cannot be stated enough[33]. The CEPI-funded vaccine candidates for BDBV are entering early-phase development. Adaptive platform trial designs should be employed to compress development timelines, as was successfully demonstrated during the COVID-19 pandemic[34]. Broadening the pipeline to include pan-filovirus vaccine platforms, including those eliciting cross-reactive T-cell responses[35], would reduce future blind spots[36].

Strengthening surveillance and laboratory capacity: The diagnostic delay that preceded BDBV confirmation in May 2026 highlights the ongoing need for point-of-care diagnostics capable of detecting multiple Orthoebolavirus species simultaneously, and for functional biosafety level 3 (BSL-3) laboratories distributed across high-risk regions[37].

Sustained, predictable financing: Epidemic response must not depend on emergency bilateral pledges assembled after a crisis has expanded. National epidemic preparedness and response funds, as recommended in the 2025 West African preparedness assessment, must be established and capitalized by domestic revenues and multilateral mechanisms alike[38].

Community engagement as a core strategy: Sustained investment in community health workers, transparent risk communication, and engagement with traditional and religious leaders is essential to achieving the high levels of case isolation and safe burial compliance that mathematical models show are necessary for outbreak control[39].

Reforming global health governance: The fragmentation of the global health security architecture demands renewed political commitment to multilateral preparedness. The WHO Pandemic Treaty must translate into operational commitments, including guaranteed financing for the Pandemic Fund and binding obligations on sharing of pathogen samples, genomic sequences, and medical countermeasures[40,41].

CONCLUSION

The ongoing 2026 Bundibugyo virus disease outbreak in the DRC and Uganda highlights the persistent threat posed by emerging filoviruses and underscores the vulnerability of global health systems to pathogens for which no licensed vaccines or approved therapeutics are available. This review synthesizes the current evidence on the epidemiology, virology, clinical features, transmission dynamics, public health challenges, and global response to the outbreak, providing a comprehensive and timely overview of an evolving public health emergency. By integrating the available evidence, it identifies critical knowledge gaps and preparedness deficiencies that must be addressed to improve outbreak detection, containment, and clinical management. Future efforts should prioritize strengthening integrated surveillance and laboratory diagnostic networks, particularly in high-risk and border regions, to enable rapid detection and response. Accelerated research and investment are urgently needed to develop and evaluate Bundibugyo virus-specific vaccines, antiviral therapies, and rapid diagnostic tools. Sustained international collaboration among governments, public health agencies, research institutions, and funding organizations is essential to facilitate data sharing, coordinated outbreak response, and equitable access to medical countermeasures. In addition, strengthening infection prevention and control practices, expanding workforce training, engaging affected communities, and investing in resilient health systems should remain central components of preparedness strategies. Collectively, these measures will not only improve the control of the current outbreak but also enhance global readiness to respond to future Ebola epidemics and other emerging infectious disease threats.

SIGNIFICANCE STATEMENT

This review highlights the global health security implications of the 2026 Bundibugyo virus outbreak, emphasizing gaps in surveillance, diagnostics, infection control, cross-border coordination, and medical countermeasures. It provides timely evidence to guide policymakers, clinicians, researchers, and public health agencies in strengthening outbreak preparedness, response capacity, resilient health systems, and development of vaccines and therapeutics against emerging filoviruses.

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