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Understanding the 2026 Bundibugyo Ebola Virus Disease Outbreak in Eastern Democratic Republic of the Congo: Epidemiological Trends and Health-System Response Constraints

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Understanding the 2026 Bundibugyo Ebola Virus Disease Outbreak in Eastern Democratic Republic of the Congo: Epidemiological Trends and Health-System Response Constraints

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Abstract

Background: The 2026 Bundibugyo Ebola virus disease (BDBV) outbreak in eastern Democratic Republic of the Congo (DRC), primarily affecting Ituri Province, represents the largest documented outbreak caused by Bundibugyo ebolavirus since its identification in Uganda in 2007. The outbreak unfolded in a complex humanitarian and security environment characterized by armed conflict, population displacement, mining-related mobility, constrained health-system capacity, misinformation, and declining public trust. This study aimed to describe the epidemiological characteristics of the outbreak and assess the operational challenges affecting the implementation of response activities.

Methods: An integrated assessment comprising two complementary components was conducted. First, a rapid operational field assessment was undertaken from 12–15 June 2026 in Bunia, Rwampara Health Zone, and the Ituri Provincial Public Health Laboratory. This component involved direct observations, health-facility and laboratory assessments, document reviews, and stakeholder consultations to examine surveillance, contact tracing, laboratory capacity, clinical care, infection prevention and control (IPC), logistics, risk communication, community engagement, and infodemic management. Second, a descriptive epidemiological analysis of routine outbreak surveillance situation reports was conducted using data available up to 10 July 2026. Epidemiological indicators were summarized descriptively, and the temporal distribution of reported cases and deaths was examined using an epidemic curve.

Results: By 10 July 2026, the outbreak had resulted in 1,877 laboratory-confirmed cases and 675 deaths nationally, corresponding to a case fatality ratio of 36.0%. Ituri Province accounted for 90.8% of confirmed cases (1,705/1,877) and 85.5% of reported deaths (577/675). Surveillance reports documented 766 alerts, of which 678 (88.5%) were investigated, identifying 235 suspected cases. Of 6,475 registered contacts, 4,171 (64.4%) were successfully followed, below the recommended target of ≥95%. Among 137 specimens tested, 29 (21.2%) were positive. Treatment-centre reports documented 61 admissions, 14 deaths, and an occupancy rate of 97.3% during the reported period. The June field assessment identified substantial operational constraints, including limited treatment capacity, shortages of trained personnel and essential IPC supplies, laboratory and logistical challenges, insecurity, delayed case investigations, and inconsistencies in surveillance data. Community resistance, misinformation, rumors, attacks on burial teams, and declining public trust further complicated care-seeking, contact tracing, and safe burial practices.

Conclusions: The 2026 BDBV outbreak illustrates the complex interaction between epidemiological, health-system, security, and sociocultural factors influencing outbreak response in conflict-affected settings. The integration of field observations and routine surveillance data provides complementary insights into the progression of the outbreak and the operational constraints affecting its control. Strengthening surveillance, contact tracing, laboratory capacity, clinical care, IPC, and response coordination, alongside context-sensitive risk communication and meaningful community engagement, is essential to improving outbreak control and preparedness in eastern DRC and the wider Great Lakes region.

Keywords: Bundibugyo Ebola virus disease; Bundibugyo ebolavirus; Democratic Republic of the Congo; Ituri Province; epidemiological characteristics; operational challenges; outbreak response; surveillance; contact tracing; laboratory capacity; infection prevention and control; community engagement; public health preparedness.

1. Background

Ebola virus disease (EVD) is a severe emerging infectious disease associated with substantial morbidity, mortality, and socioeconomic consequences. Since the first recognized outbreaks in 1976 in the Democratic Republic of the Congo (DRC) and Sudan, recurrent epidemics have highlighted persistent weaknesses in surveillance, preparedness, infection prevention and control (IPC), healthcare capacity, and health-system resilience across sub-Saharan Africa [1–3]. The 2014–2016 West African epidemic, which caused more than 28,000 cases and 11,000 deaths, demonstrated the potential for localized transmission to escalate into a major public health emergency when detection and response capacities are inadequate [2,4].

Among the recognized Ebola virus species, Bundibugyo ebolavirus (BDBV) remains relatively understudied despite its capacity to cause severe outbreaks. First identified during an outbreak in Uganda in 2007, BDBV has been associated with reported case-fatality rates of approximately 25–50% [5]. The absence of approved BDBV-specific vaccines and targeted antiviral treatments makes outbreak control highly dependent on early detection, laboratory confirmation, isolation, contact tracing, IPC, supportive clinical care, and effective risk communication and community engagement [5].

The DRC has experienced multiple Ebola outbreaks since 1976, including major epidemics in Kikwit, Isiro, Equateur, and North Kivu–Ituri [8,9]. Despite accumulated outbreak-response experience, recurrent epidemics continue to expose structural weaknesses, including limited healthcare capacity, delayed case detection, inadequate IPC, community mistrust, and restricted access to affected populations in insecure areas [8,9]. These challenges are particularly pronounced in eastern DRC, where prolonged armed conflict, population displacement, artisanal mining activities, and cross-border mobility complicate surveillance, contact tracing, healthcare access, and the deployment of response teams [10, 9,11].

The 2026 BDBV outbreak in Ituri Province occurred within this complex humanitarian and epidemiological context. Ituri's geographical proximity and population connections with Uganda and other Great Lakes countries increase the importance of coordinated surveillance, timely information sharing, cross-border preparedness, and regional collaboration [10]. Insecurity, population movements, mining-related mobility, and limited health-system resources further challenge the implementation of conventional outbreak-control measures. Community mistrust, misinformation, and resistance to public health interventions may also undermine care-seeking, contact tracing, and safe burial practices [9–11]. Although previous studies have documented Ebola outbreaks in the DRC

and other conflict-affected settings, evidence remains limited on the epidemiological characteristics and practical operational challenges of large BDBV outbreaks in insecure and resource-constrained environments. In particular, understanding how surveillance, laboratory services, clinical care, IPC, logistics, and community engagement function under these conditions is essential for identifying response gaps and strengthening outbreak preparedness [11–14]. Against this background, we conducted an integrated assessment of the 2026 BDBV outbreak in eastern DRC, combining a rapid operational field assessment conducted in June 2026 with a secondary descriptive analysis of routine surveillance data from July 2026. The study aimed to describe the epidemiological characteristics of the outbreak, assess operational challenges affecting response implementation, and identify priority actions to strengthen outbreak control and preparedness in the DRC and the wider Great Lakes region.

2.1. Study design and setting

We conducted an integrated assessment of the 2026 Bundibugyo Ebola virus disease (BDBV) outbreak in eastern Democratic Republic of the Congo (DRC), comprising two distinct but complementary components: (1) a June 2026 operational field assessment and (2) a July 2026 secondary descriptive epidemiological analysis of routine surveillance data. The operational field assessment was conducted over four days, from 12 to 15 June 2026, while the secondary epidemiological analysis used routine surveillance situation reports covering the period up to 10 July 2026. The investigation was adapted from outbreak assessment and emergency response frameworks developed by the World Health Organization (WHO), Centers for Disease Control and Prevention (CDC), and Africa Centres for Disease Control and Prevention (Africa CDC) [15–17]. The study was conducted in Ituri Province, northeastern DRC, including Bunia, Rwampara Health Zone, selected health facilities and Ebola treatment centres (ETCs), and the Ituri Provincial Public Health Laboratory. Ituri was selected because of its epidemiological importance and complex humanitarian context, characterized by armed conflict, population displacement, artisanal mining, and cross-border population mobility [9,11]. The assessment formed part of an Africa CDC emergency support mission intended to identify operational constraints and inform ongoing outbreak response activities [12].

2.2. June 2026 operational field assessment

The first study component consisted of a rapid operational field assessment conducted from 12 to 15 June 2026. Its primary objective was to examine the practical implementation and functionality of outbreak response activities rather than to generate a representative epidemiological estimate. Health facilities, treatment centres, laboratory services, and stakeholders were purposively selected based on their involvement in outbreak response, epidemiological relevance, operational responsibilities, and geographical accessibility. The assessment involved direct observations, facility and laboratory visits, document reviews, and consultations with provincial and health-zone health authorities, clinicians, laboratory personnel, epidemiologists, surveillance officers, IPC specialists, community engagement personnel, and response partners. The number of facilities visited and individuals consulted was [insert number] and [insert number], respectively. Observations and consultations focused on surveillance and alert management, contact tracing, patient management and referral, laboratory diagnostic processes, IPC practices, availability of human resources and essential supplies, logistics, risk communication, community engagement, and security-related barriers. Community-related observations also explored healthcare-seeking behaviour, public trust, misinformation, acceptance of outbreak interventions, and challenges affecting safe and dignified burial practices [12,15,19].

2.3. July 2026 secondary epidemiological analysis

The second study component consisted of a secondary descriptive analysis of routine outbreak surveillance data available up to 10 July 2026. This analysis was conducted independently of the June field observations and aimed to describe the epidemiological magnitude, geographical distribution, and temporal progression of the outbreak. Data were extracted from routine Ministry of Health and National Institute of Public Health (INSP) surveillance reports, epidemiological situation reports, contact-tracing records, laboratory reports, and health-zone summaries generated during the outbreak response, with contributions from relevant national and international response institutions, including the National Institute for Biomedical Research (INRB), WHO, and Africa CDC [12]. The primary analytical dataset corresponded to SitRep No. 57, dated 10 July 2026. Variables included confirmed and suspected cases, reported deaths, affected provinces and health zones, alerts, investigated alerts, registered and followed contacts, specimens tested and laboratory-confirmed results, and treatment-centre admissions and occupancy. The 10 July 2026 reporting cut-off was consistently applied to the principal epidemiological analysis to ensure comparability of national and subnational case and death denominators. Subsequent surveillance updates were not incorporated into the primary analytical dataset.

2.4. Operational, laboratory, community, and security assessments

The operational component examined the functionality of key outbreak response domains, including surveillance, contact tracing, clinical management, laboratory services, IPC, human resources, logistics, coordination, and community engagement. Health-facility assessments considered patient flow, treatment capacity, bed occupancy, staffing, availability of oxygen, essential medicines, personal protective equipment (PPE), and implementation of IPC measures. Laboratory assessments focused on specimen collection and transportation, biosafety, molecular diagnostic capacity, infrastructure, staffing, quality assurance, available supplies, and turnaround times. Diagnostic platforms reviewed included the RADIONE molecular diagnostic system, RealStar® Ebolavirus RT-PCR, and GeneXpert systems [13]. Community and security assessments documented factors affecting response implementation, including population displacement, armed-group activity, restricted access, mining-related mobility, misinformation, community resistance, and attacks affecting response personnel. These factors were considered in relation to their potential effects on surveillance, contact tracing, laboratory operations, healthcare delivery, and continuity of response activities [9,11,14,19].

2.5. Data analysis

The July 2026 surveillance dataset was analysed descriptively using frequencies, proportions, and percentages. Epidemiological indicators were examined at national, provincial, and health-zone levels to describe the distribution and progression of the outbreak. The case fatality ratio (CFR) was calculated by dividing the number of reported deaths by the corresponding number of cases and multiplying by 100, using consistent reporting dates and denominators. Additional indicators included the proportion of alerts investigated, the proportion of registered contacts successfully followed, and laboratory test positivity. The temporal distribution of reported cases and deaths was examined using an epidemic curve based on the available surveillance dates. Data from the June 2026 field assessment were analysed separately through descriptive synthesis of facility observations, document reviews, and stakeholder consultations. Qualitative information was organized thematically into surveillance, laboratory capacity, clinical care, IPC, logistics, community engagement, risk communication, and security. Findings from the two components were integrated during interpretation to identify operational constraints and priority areas for outbreak response improvement. However, differences in observation periods and data sources were considered, and no causal relationships were inferred from aggregate surveillance data.

2.6. Ethical considerations

The investigation was conducted as part of the public health emergency response under the authority of the Ministry of Public Health, Hygiene and Social Security of the DRC, in collaboration with Africa CDC. The operational assessment and secondary epidemiological analysis involved the review of routine outbreak surveillance and response information. No individual patient identifiers were collected, analysed, or reported. The requirement for individual informed consent was waived in accordance with applicable national public health surveillance and emergency response procedures [15,17]. The investigation was conducted in accordance with applicable ethical principles and regulations, including the Declaration of Helsinki. The findings were intended to support public health decision-making, improve outbreak response implementation, and strengthen preparedness for future public health emergencies.

3. Results

3.1. Component 1: June 2026 operational field assessment (12–15 June 2026)

3.1.1. Operational observations and health-system capacity

The four-day operational field assessment conducted from 12 to 15 June 2026 examined the implementation of outbreak response activities through facility and laboratory visits, direct operational observations, and consultations with relevant health authorities, healthcare workers, laboratory personnel, and response partners.

The assessment identified several operational capacities supporting the BDBV response, including designated Ebola treatment centres (ETCs), ongoing surveillance activities, laboratory diagnostic services, infection prevention and control (IPC) interventions, and community engagement mechanisms.

However, operational constraints affected the continuity and effectiveness of response activities. These included shortages of trained personnel, logistical difficulties, limitations in essential medical and IPC supplies, and challenges in specimen transportation and information exchange. These constraints were particularly relevant to timely case identification, laboratory confirmation, patient referral, and clinical management.

3.1.2. Laboratory and surveillance implementation

The field assessment highlighted the importance of decentralized laboratory diagnostic capacity in supporting timely identification of suspected BDBV cases. Nevertheless, specimen transportation, coordination between surveillance and laboratory services, and the completeness of diagnostic information remained important operational considerations.

Surveillance implementation was also affected by challenges relating to data completeness, communication between response structures, and access to affected communities.

3.1.3. Community engagement, coordination, and security

Community engagement activities included sensitization, communication through local leaders, and interaction with affected households. Nevertheless, misinformation, community mistrust, and resistance to certain response interventions were identified as operational challenges.

Insecurity and restricted access to some affected locations further complicated the implementation of surveillance, contact tracing, safe and dignified burials, and other essential response activities.

Overall, the June field assessment identified operational strengths and implementation gaps across surveillance, laboratory services, clinical care, IPC, community engagement, and response coordination.

3.2. Component 2: July 2026 secondary epidemiological analysis

3.2.1. Epidemiological situation and geographical distribution

According to WHO Situation Report 57, dated 10 July 2026, the Democratic Republic of the Congo (DRC) had reported 1,877 laboratory-confirmed cases and 675 deaths, corresponding to an overall case-fatality rate (CFR) of 36.0%.

Ituri Province accounted for 1,705 confirmed cases (90.8%) and 577 deaths (85.5%), making it the principal epidemiological epicentre. North Kivu reported 165 confirmed cases (8.8%) and 94 deaths (13.9%). Smaller numbers were reported in South Kivu (three cases and one death), Tshopo (three cases and two deaths), and Haut-Uélé (one case and one death).

Within Ituri Province, Bunia recorded the highest cumulative number of confirmed cases (503), followed by Rwampara (384), Mongbwalu (329), Nizi (110), and Nyankunde (97). Considerable variation in CFRs was observed across the major affected health zones. Mongbwalu recorded the highest CFR (52.0%), followed by Nizi (32.7%), Bunia (31.0%), Nyankunde (23.7%), and Rwampara (23.2%).

The higher CFR observed in Mongbwalu compared with Rwampara may reflect differences in case detection, healthcare accessibility, referral delays, clinical management, or completeness of outcome reporting. However, the available aggregate surveillance data do not permit determination of the specific factors responsible for these differences.

The geographical distribution of cumulative confirmed cases and deaths by province and health zone is presented in Table 1.

Table 1. Distribution of cumulative confirmed Bundibugyo virus disease (BDBV) cases and deaths by province and health zone, Democratic Republic of the Congo, 10 July 2026.

Province/Health zone	Confirmed cases, n	% of cases	Deaths, n	CFR, %	% of deaths
Ituri Province	1,705	90.8	577	33.8	85.5
Bunia	503	26.8	156	31.0	23.1
Rwampara	384	20.5	89	23.2	13.2
Mongbwalu	329	17.5	171	52.0	25.3
Nizi	110	5.9	36	32.7	5.3
Nyankunde	97	5.2	23	23.7	3.4
Other Ituri health zones	282	15.0	102	36.2	15.1

North Kivu Province	165	8.8	94	57.0	13.9
South Kivu Province	3	0.2	1	33.3	0.1
Tshopo Province	3	0.2	2	66.7	0.3
Haut-Uélé Province	1	0.1	1	100.0	0.1
Total	1,877	100.0	675	36.0	100.0

Abbreviations: BDBV, Bundibugyo virus disease; CFR, case-fatality rate. Source: WHO Ebola BDBV Situation Report 57, reporting date 10 July 2026.

3.2.2. Surveillance performance and contact tracing

During the reporting period covered by the surveillance indicators, 766 alerts were reported across Ituri, North Kivu, and South Kivu. Of these, 678 (88.5%) were investigated. Investigation coverage varied geographically, reaching 100% in North Kivu and South Kivu, compared with 68.1% in Ituri.

The investigations identified 235 suspected cases, including 61 suspected deaths requiring further epidemiological assessment.

Contact-tracing activities recorded 6,475 registered contacts, of whom 4,171 (64.4%) were successfully followed. Ituri accounted for 5,208 registered contacts, with 3,397 successfully followed. North Kivu recorded 1,187 contacts, of whom 700 were followed, while South Kivu recorded 80 contacts, of whom 74 were followed.

A further 466 contacts were newly listed during the reporting period, all from Ituri Province, predominantly in Rwampara Health Zone. The overall proportion of contacts successfully followed remained below the commonly used 95% operational performance benchmark, indicating an important gap in the completeness of contact monitoring.

3.2.3. Laboratory testing and diagnostic performance

A total of 137 specimens were tested during the reporting period. Of these, 29 were positive, corresponding to an overall laboratory positivity rate of 21.2%.

Ituri accounted for 130 specimens tested and all 29 positive results, giving a positivity rate of 22.3%. South Kivu reported seven specimens, with no positive results. Province-specific laboratory results for North Kivu were unavailable in the analyzed dataset.

These findings demonstrated ongoing laboratory diagnostic activity, particularly in Ituri, while highlighting the importance of complete laboratory reporting and integration of diagnostic results with surveillance databases.

The surveillance, contact-tracing, and laboratory indicators are summarized in Table 2.

Table 2. Surveillance, contact-tracing, and laboratory indicators during the BDBV outbreak reporting period.

Indicator	**Ituri**	**North Kivu**	**South Kivu**	**Total**

Alerts reported	276	483	7	766
Alerts investigated	188	483	7	678
Investigation rate, %	68.1	100.0	100.0	88.5
Suspected cases identified	176	52	7	235
Suspected deaths identified	45	16	0	61
Contacts registered/under follow-up	5,208	1,187	80	6,475
Contacts successfully followed	3,397	700	74	4,171
New contacts listed in 24 h	466	0	0	466
Specimens tested	130	NA	7	137
Positive laboratory results	29	NA	0	29
Laboratory positivity rate, %	22.3	NA	0.0	21.2

Abbreviation: *NA, not available. Source: WHO BDBV situation report corresponding to the reporting period. Exact SitRep number and reporting dates should be verified against the original report before submission.*

3.2.4. Clinical care and treatment-centre capacity

During the reporting period, ETCs recorded 61 new admissions, 14 deaths, and one recovery. Treatment-centre occupancy approached full capacity, with occupancy in Ituri reaching 97.3%.

The high occupancy level indicated substantial pressure on available isolation and treatment capacity. This situation had potential implications for patient admission, referral, clinical monitoring, and the ability of treatment facilities to accommodate additional cases.

The reported clinical indicators highlighted the importance of maintaining adequate staffing, essential medicines, supportive care, and referral capacity.

3.2.5. Infection prevention and control and operational resources

Reported IPC activities included healthcare-worker training and the decontamination of healthcare facilities. Nevertheless, shortages of personal protective equipment (PPE), chlorine, and other essential IPC materials remained important operational challenges.

The availability of adequate IPC resources was particularly relevant to healthcare-worker protection, environmental decontamination, and prevention of healthcare-associated transmission.

Workforce limitations, transportation difficulties, and insecurity also affected the continuity of response activities.

3.2.6. Community engagement, risk communication, and security

Community engagement activities included household sensitization, community meetings, and engagement with political, religious, and community leaders. Despite these interventions, misinformation, rumors, mistrust, and resistance to certain public health measures remained reported challenges.

Security-related incidents, including attacks affecting safe and dignified burial teams and the temporary detention of frontline responders, disrupted response activities and restricted access to some affected communities.

Population movement associated with displacement, trade, and mining activities further complicated surveillance and contact tracing.

Border surveillance was operational at 44 of 55 designated points of entry and control. More than 56,000 travellers were screened during the reported period. These activities demonstrated continued implementation of cross-border surveillance, although incomplete functionality across designated sites and population mobility remained important considerations for geographical containment.

3.3. Integrated assessment of operational capacities and response gaps

The findings from the June operational field assessment and July secondary epidemiological analysis identified complementary strengths and weaknesses in the BDBV response.

The June field mission documented the implementation context, including the availability of surveillance structures, diagnostic services, ETCs, IPC activities, community engagement mechanisms, and coordination arrangements. The July surveillance analysis quantified selected aspects of response performance, including alert investigation, contact tracing, laboratory testing, treatment-centre utilization, and border screening.

Across the two components, important strengths included functioning surveillance systems, ongoing laboratory diagnostic activities, operational treatment facilities, continued contact identification, community outreach, and traveller screening.

However, substantial gaps persisted. These included incomplete contact follow-up, variable alert investigation coverage, high treatment-centre occupancy, shortages of trained personnel and IPC supplies, specimen transportation challenges, incomplete laboratory and surveillance data integration, community mistrust, and insecurity affecting operational access.

Table 3 presents the integrated summary of operational strengths, principal challenges, and priority response actions identified across the two study components.

Table 3. Integrated summary of operational strengths, key challenges, and priority actions identified during the June 2026 field assessment and July 2026 secondary epidemiological analysis.

Response domain	Key strengths	Principal challenges	Priority actions

Surveillance and contact tracing	Active surveillance and continued contact identification	Contact follow-up remained below the 95% operational benchmark; incomplete community-based detection	Strengthen active case finding, contact listing and follow-up, supportive supervision, and cross-border surveillance
Case investigation	Ongoing investigation of suspected and confirmed cases	Incomplete exposure histories, epidemiological links, and outcome classification	Standardize investigation tools, validate probable cases, and reconcile outcomes
Clinical care	Functional ETCs and ongoing admissions	High occupancy and insufficient surge capacity	Expand treatment and transit capacity and strengthen referral pathways
Laboratory services	Decentralized molecular testing available	Specimen-transport delays and database inconsistencies	Improve specimen referral, traceability, and daily laboratory-surveillance reconciliation
IPC	Healthcare-worker training and facility decontamination	Shortages of PPE, chlorine, and other supplies	Maintain uninterrupted IPC supplies and strengthen supervision
RCCE and infodemic management	Household outreach and engagement of community leaders	Misinformation, rumors, mistrust, and resistance	Establish systematic rumor monitoring, feedback mechanisms, and trusted local communication networks
Points of entry/control	Traveller screening operational at most sites	Population mobility and gaps in site functionality	Strengthen cross-border surveillance, screening, referral, and information sharing
Human resources and coordination	Multidisciplinary response teams remained operational	Workforce shortages, delayed payments, and coordination difficulties	Harmonize workforce management, clarify roles, and strengthen incident-management coordination
Security and access	Response continued despite insecurity	Attacks, detention of responders, and restricted access	Integrate security risk management into operational planning and maintain safe access

4. Discussion

The 2026 Bundibugyo virus disease (BDBV) outbreak in the Democratic Republic of the Congo (DRC) highlights the complex interaction between viral transmission, health-system capacity, population mobility, insecurity, and community acceptance in determining the effectiveness of epidemic control. This investigation provides an integrated assessment of two complementary components: a rapid operational field assessment conducted in June 2026 and a descriptive analysis of routine epidemiological and response data from July 2026. The findings demonstrate that, despite the availability of established outbreak-response structures, decentralized laboratory diagnostics, Ebola treatment centres (ETCs), and community engagement mechanisms, important deficiencies persisted in contact tracing, clinical referral, infection prevention and control (IPC), laboratory-surveillance integration, and operational access. The concentration of more than 90% of confirmed cases in Ituri Province, together with substantial mortality and geographical expansion, illustrates the limitations of a predominantly reactive response in a setting characterized by insecurity, displacement, and highly mobile populations. These findings reinforce the importance of considering epidemiological indicators

alongside health-system functionality, operational preparedness, and community-level determinants of outbreak control [1,2,9,11,20–22].

The geographical concentration of transmission in Ituri, particularly in Bunia, Rwampara, and Mongbwalu, is consistent with the epidemiological importance of eastern DRC as a setting for recurrent viral haemorrhagic fever emergencies. Previous BDBV outbreaks were considerably smaller and more geographically restricted. The 2007–2008 outbreak in Uganda involved approximately 149 reported cases and 37 deaths, whereas the 2012 outbreak in Isiro, north-eastern DRC, involved 62 suspected, probable, and confirmed cases and 34 deaths [5,8,10]. In contrast, the 2026 outbreak involved multiple provinces and cross-border transmission, representing a substantial change in the epidemiological scale of BDBV transmission [20,21]. Comparisons with the 2014–2016 West African Ebola epidemic and the 2018–2020 North Kivu–Ituri outbreak further demonstrate common determinants of prolonged transmission, including delayed detection, weak surveillance, insecurity, population movement, and limited community acceptance [4,9,11]. The variation in CFRs between health zones observed in this investigation should nevertheless be interpreted cautiously. Differences in diagnostic delays, access to treatment, referral pathways, patient characteristics, and outcome ascertainment are plausible explanations, but patient-level information would be necessary to establish their relative contributions [2,8,10].

The geographical expansion of BDBV also emphasizes the importance of regional surveillance and genomic preparedness. Previous investigations have demonstrated that molecular characterization is essential for distinguishing filovirus species, understanding viral relationships, and supporting the development and validation of diagnostic assays [3,5,13]. During the current outbreak, the identification of transmission across multiple provinces and into Uganda underscores the need for timely laboratory confirmation, specimen traceability, molecular characterization, and cross-border information exchange [20–22]. Although this investigation did not independently undertake genomic sequencing or phylogenetic analysis, its findings support strengthening genomic surveillance as an integral component of outbreak preparedness. The application of molecular epidemiology alongside conventional field surveillance could improve understanding of transmission patterns, distinguish potential independent introductions from established transmission chains, and inform the development of reliable diagnostic systems. This is particularly important in regions where several ebolavirus species circulate and where diagnostic capacity must be appropriate to the specific viral species involved [3,13].

The clinical findings highlight the importance of strengthening early diagnosis, referral, and supportive care. The occurrence of community deaths, high ETC occupancy, and substantial mortality suggests persistent challenges in accessing timely clinical services. Previous clinical investigations of BDBV in Uganda and DRC documented substantial variation in disease presentation and outcomes, emphasizing the importance of early clinical recognition, systematic patient monitoring, and appropriate supportive management [8,10]. The observed CFR differences between health zones should not be interpreted as direct measures of treatment quality because the available aggregate data do not account for age, comorbidities, disease severity, time to admission, or completeness of outcome ascertainment. Nevertheless, the findings support strengthening decentralized triage, early isolation, fluid and electrolyte management, nutritional support, monitoring of clinical complications, and appropriate IPC precautions. The absence of an established BDBV-specific licensed vaccine and proven specific therapeutic intervention during the initial response period further emphasizes the importance of established outbreak-control measures, supportive clinical care, and ethically conducted clinical research [1,2,8,10,20].

From an international health policy perspective, the findings should be interpreted within the framework of the International Health Regulations (IHR 2005), the WHO emergency preparedness and response guidance, and the Global

Health Security Agenda (GHSA). The IHR framework emphasizes national capacities for prevention, detection, assessment, notification, and response to public health events of international concern. The Joint External Evaluation (JEE), States Parties Self-Assessment Annual Reporting (SPAR), and After Action Review (AAR) provide complementary mechanisms for assessing preparedness, identifying capacity gaps, and evaluating response performance. Although the present investigation did not independently conduct a JEE or SPAR assessment, several identified deficiencies correspond to important preparedness domains, particularly surveillance, laboratory systems, emergency coordination, workforce capacity, risk communication, and response logistics. The WHO Ebola preparedness and response handbook, Africa CDC Public Health Emergency Operations Centre framework, and WHO Integrated Disease Surveillance and Response (IDSR) technical guidelines provide practical instruments for translating these findings into measurable preparedness priorities [16–18]. These frameworks should be used to strengthen national and provincial preparedness through regular simulation exercises, performance monitoring, multisectoral coordination, and implementation of corrective action plans. National preparedness assessments should be linked to operational indicators such as alert investigation coverage, contact follow-up, laboratory turnaround, treatment-centre capacity, and continuity of essential supplies.

The operational and community-level findings are particularly relevant to health-system resilience in conflict-affected settings. The 2018–2020 Ebola outbreak in North Kivu and Ituri demonstrated how insecurity, attacks against response personnel, mistrust, and community resistance can undermine otherwise technically appropriate interventions [9,11]. Similarly, population-based research conducted during the same outbreak identified institutional trust and misinformation as important determinants of community responses to Ebola control measures [14]. The present investigation identified comparable challenges, including misinformation, resistance to response interventions, attacks affecting safe and dignified burial teams, and restricted access to affected populations. These observations reinforce the importance of integrating risk communication and community engagement (RCCE) into surveillance, contact tracing, clinical referral, and emergency coordination. Community engagement should move beyond one-way health messaging towards continuous dialogue, systematic rumor monitoring, local feedback mechanisms, and participation of trusted community representatives. The findings also support integrating security risk assessment, humanitarian access arrangements, workforce protection, and continuity planning into routine emergency preparedness. Cross-border collaboration involving the DRC, Uganda, and other neighbouring countries should prioritize timely notification, coordinated contact tracing, interoperable surveillance, and information sharing across the Great Lakes region [9,11,14,17–22].

This investigation has several methodological and operational strengths. First, it integrated a rapid operational field assessment with a secondary descriptive analysis of routine surveillance data, allowing examination of both implementation-level challenges and quantitative response indicators. Second, the inclusion of epidemiological, laboratory, clinical, IPC, community engagement, and security dimensions provided a broader understanding of outbreak-response performance than would have been possible through surveillance data alone. Third, the use of established epidemiological indicators enabled identification of specific operational gaps, including incomplete contact follow-up, variable alert investigation coverage, and high treatment-centre occupancy. The investigation also has practical relevance because its findings can inform national and provincial preparedness planning, emergency coordination, and strengthening of IHR-related capacities. Nevertheless, several limitations require consideration. The June field assessment and July secondary analysis were conducted during different phases of a rapidly evolving outbreak; consequently, operational observations from June cannot be assumed to represent conditions during July. The analysis relied on routine situation reports that may have contained incomplete, delayed, or inconsistent case, death, laboratory, admission, and contact-tracing classifications. The absence of patient-level clinical information prevented adjustment of CFRs for age,

disease severity, comorbidities, and time to treatment. Insecurity and restricted access may have resulted in under-ascertainment of cases and operational challenges. Furthermore, the rapid field consultations were not designed as a formal qualitative study and therefore cannot establish the representativeness of community perceptions. Finally, the study did not independently measure national JEE or SPAR capacities and should not be interpreted as a formal evaluation of IHR compliance.

The findings support a transition from predominantly reactive outbreak management towards sustained preparedness and health-system resilience. Immediate priorities include strengthening community-based surveillance, improving contact listing and follow-up, standardizing case investigation and outcome classification, expanding clinical referral and treatment capacity, maintaining uninterrupted IPC supplies, and improving laboratory-surveillance data integration. Longer-term priorities include strengthening provincial laboratory networks, developing sustainable emergency workforce capacity, institutionalizing RCCE and infodemic management, improving cross-border surveillance, and integrating security risk management into preparedness planning. The implementation of these priorities should be monitored through measurable indicators and incorporated into national emergency preparedness plans, JEE recommendations, SPAR reporting, and subsequent after-action reviews [15–18]. Overall, the 2026 BDBV outbreak demonstrates that effective Ebola control depends not only on diagnostic and clinical technologies but also on functioning health systems, community trust, secure operational access, reliable information systems, and coordinated regional preparedness. Addressing these interconnected determinants will be essential to reducing mortality, interrupting transmission, and strengthening epidemic preparedness in the DRC and across the Great Lakes region [1,2,9,16–22].

Strengths and Limitations

This study has several strengths. First, it combines a rapid operational field assessment conducted in June 2026 with a secondary descriptive analysis of routine epidemiological surveillance data from July 2026, providing complementary insights into the epidemiological characteristics and operational challenges of the Bundibugyo Ebola virus disease outbreak in eastern Democratic Republic of the Congo (DRC). The field assessment included observations from health facilities, laboratory services, and consultations with key stakeholders involved in the outbreak response, including the Emergency Operations Centre (EOC) team and relevant public health authorities in Kinshasa, Ramparwa, and the Bunia health zone. This integrated approach provides practical insights into surveillance, case management, laboratory capacity, infection prevention and control, and outbreak coordination in a conflict-affected humanitarian setting. However, several limitations should be acknowledged. The operational field assessment was conducted over four days (12–15 June 2026), whereas the secondary epidemiological analysis relied on surveillance reports from July 2026, creating a temporal gap between the two components. Furthermore, the purposive selection of facilities and stakeholders may limit the generalizability of the operational findings. The secondary analysis relied on routinely reported surveillance data, which may be affected by incomplete reporting, delayed notifications, and variations in case ascertainment across health zones. Additionally, the absence of individual-level clinical information limits the interpretation of geographical differences in case fatality ratios, including those observed in Mongbwalu and Rwampara. Consequently, the proposed explanations for these differences should be considered plausible interpretations rather than established causal relationships. Some operational indicators were also derived from field observations and routine situation reports, and their quantitative availability was not uniform.

Perspectives and Future Research

Future research should prioritize longitudinal and integrated assessments combining epidemiological surveillance, clinical outcomes, laboratory performance, and health-system response indicators throughout the different phases of Ebola virus disease outbreaks. Further investigations should examine the determinants of geographical variations in case fatality ratios using patient-level clinical information, including disease severity, delays in healthcare seeking, referral pathways, access to treatment, and clinical outcomes. Operational research should also evaluate the effectiveness of community-based surveillance, contact tracing, risk communication, and community engagement strategies in settings characterized by insecurity, population displacement, and limited access to healthcare services. Strengthening real-time integration of surveillance and laboratory information systems, particularly monitoring specimen collection, transportation, testing, and result notification, should be another research priority. Comparative studies across Ebola virus disease outbreaks, including those caused by Bundibugyo virus and other Ebola virus species, could further identify context-specific challenges and effective preparedness approaches. Particular attention should also be given to the sustainability of local response capacities between outbreaks through continued investment in workforce development, laboratory infrastructure, emergency coordination, and community engagement.

Policy Implications and Recommendations

The findings highlight the need to strengthen national and subnational outbreak preparedness and response capacities through sustained investment in integrated surveillance, laboratory systems, healthcare infrastructure, and community engagement. The Ministry of Health and the Institut National de Santé Publique (INSP), in collaboration with provincial health authorities and response partners, should reinforce early detection, timely case investigation, contact tracing, and coordination between community-based surveillance, health facilities, laboratories, and Emergency Operations Centres. Ensuring the continuous availability of essential infection prevention and control supplies, adequate treatment-centre capacity, reliable specimen transportation, and timely laboratory diagnosis should be prioritized. Continuous training and supportive supervision of healthcare workers are also necessary, particularly in remote and insecure areas. Furthermore, outbreak response strategies should be adapted to population mobility, displacement, insecurity, and barriers to healthcare access through flexible surveillance mechanisms, mobile response teams, and stronger collaboration with humanitarian actors. Community engagement and risk communication should be developed in collaboration with local leaders, community health workers, and trusted community representatives to strengthen public confidence and acceptance of response interventions. Finally, regional and cross-border collaboration should be reinforced through timely information exchange, coordinated surveillance, and joint preparedness planning. These priorities emphasize the importance of moving beyond reactive outbreak management towards resilient health systems capable of anticipating, detecting, and responding effectively to future Ebola virus disease outbreaks, particularly in conflict-affected and resource-constrained settings.

5. Conclusions

The 2026 Bundibugyo Ebola virus disease outbreak in the Democratic Republic of the Congo demonstrates the continuing difficulty of controlling high-consequence infectious disease emergencies in conflict-affected and highly mobile populations. The integration of June operational field observations and July secondary epidemiological analysis identified important progress in surveillance infrastructure, laboratory diagnostics, clinical response, and community engagement, but also revealed persistent deficiencies in contact tracing, case investigation, treatment capacity, IPC, data integration, and operational access. The findings indicate that effective outbreak control requires more than the availability

of technical interventions; it depends on resilient health systems, community trust, workforce protection, and coordinated regional preparedness.

Strengthening IHR (2005) core capacities through improved surveillance, laboratory networks, emergency coordination, workforce development, and implementation of preparedness assessment recommendations should be prioritized. At the operational level, particular attention should be given to community-based surveillance, timely clinical referral, reliable IPC supplies, genomic surveillance, and cross-border information sharing. Sustained collaboration between national health authorities, WHO, Africa CDC, and regional partners will be essential to improving preparedness across the Great Lakes region. Ultimately, investment in resilient, equitable, and community-centred health systems is fundamental to reducing mortality, interrupting transmission, and improving preparedness for future filovirus outbreaks and other emerging infectious disease threats.

List of Abbreviations

1. **BDBV** – Bundibugyo virus disease
2. **CFR** – Case fatality rate
3. **DRC** – Democratic Republic of the Congo
4. **EVD** – Ebola virus disease
5. **IPC** – Infection prevention and control
6. **RCCE** – Risk communication and community engagement
7. **WHO** – World Health Organization

Declarations

Abbreviations

EVD: Ebola virus disease; DRC: Democratic Republic of the Congo; WHO: World Health Organization; IPC: infection prevention and control; RCCE: risk communication and community engagement; INSP: Institut National de Santé Publique; MVE: Maladie à virus Ebola.

Ethics Approval and Consent to Participate

The study was conducted in accordance with relevant ethical guidelines and regulations and the principles of the Declaration of Helsinki. Ethical clearance for the outbreak investigation and the use of epidemiological and outbreak-response data was granted through the **Ministère de la Santé Publique, Hygiène et Prévoyance Sociale, Institut National de Santé Publique (INSP), Centre d'Opérations d'Urgence de Santé Publique, Système de gestion de l'incident MVE17**, as documented in **SitRep N°089/MVEBDB/11/08/2026**.

The study was based on routine public health surveillance and outbreak-response data collected as part of the Ebola virus disease response in the Democratic Republic of the Congo. No prospective recruitment of participants or direct collection of identifiable personal information for research purposes was undertaken. Accordingly, individual

informed consent was not required for the secondary analysis of these routine public health data, in accordance with applicable national public health procedures and ethical requirements.

Consent for Publication

Not applicable. The manuscript does not contain identifiable individual-level information or images requiring consent for publication.

Availability of Data and Materials

The data supporting the findings of this study are presented in the article and its tables. Additional aggregated epidemiological and operational data may be available from the corresponding author upon reasonable request, subject to authorization by the **Ministère de la Santé Publique, Hygiène et Prévoyance Sociale of the Democratic Republic of the Congo** and applicable data-access, confidentiality, and data-protection requirements.

Competing Interests

The author declares that there are no competing interests.

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Author's Contributions

MJP Milambo conceived the study, contributed to the study design, conducted the analysis and interpretation of the findings, and drafted and critically revised the manuscript. MJP Milambo read and approved the final manuscript.

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Informed Consent Statement

Not applicable. The study involved secondary analysis of routine public health surveillance and outbreak-response data and did not involve prospective recruitment or direct collection of identifiable personal information from

participants. The use of these data was covered by the applicable public health response and ethical framework documented under **SitRep N°089/MVEBDB/11/08/2026**.

Data Availability Statement

The data supporting the findings of this study are presented in the article and its tables. Additional aggregated epidemiological and operational data may be available from the corresponding author upon reasonable request, subject to authorization by the **Ministère de la Santé Publique, Hygiène et Prévoyance Sociale of the Democratic Republic of the Congo**, and compliance with applicable confidentiality, data protection, and public health information governance requirements.

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