ASSESSMENT

Overview of available modelling evidence to inform the scale and potential spread of Bundibugyo virus in the current Ebola disease outbreak

17 June 2026

Key findings

- So far in the current outbreak of Ebola disease caused by Bundibugyo virus, international modelling efforts have focused on estimating the outbreak size and near-term trajectories, as well as the risk of regional and international spread.
- Multiple modelling groups suggest that the true size of the outbreak is larger than reported. One model estimated that cumulative infections as of 13 June were between 3.0 and 10.2 times the reported number of cases (90% credible interval).
- Epistorm estimated the relative risk of importation to be highest for Rwanda, Tanzania and Kenya, which together account for approximately 54% of the relative risk. ECDC has estimated the risk of importation into the EU/EEA to be low.
- The United States Centers for Disease Control and Prevention published scenario modelling analysis results that estimated a 65% probability that the outbreak will exceed 20 000 cases within three months under a scenario where 20% of individuals with Bundibugyo virus infection were isolated and no other interventions were implemented.
- Current modelling estimates are highly uncertain due to data limitations. Multiple epidemic trajectories remain compatible with the available surveillance data, limiting confidence in estimates of outbreak size and future trends.

Introduction

This assessment presents an overview and critical appraisal of the available modelling evidence to inform the scale and potential spread of Bundibugyo virus (BDBV) in the context of the ongoing Ebola disease outbreak in the Democratic Republic of the Congo (DRC) and Uganda. Such modelling efforts can support public health authorities, risk assessors and decision-makers to assess the risk of further spread of BDBV to neighbouring countries or importation into Europe. By summarising and critically reviewing the modelling evidence available at the time of writing, this review aims to inform public health preparedness and response planning efforts.

The assessment provides an overview of the identified modelling studies with three areas of focus:

- Estimating current outbreak size;
- Modelling the risk of geographical spread, including the potential for importation into the EU/EEA;
- Scenario modelling and mid-term projections.

To support interpretation of these findings, we summarise historical Ebola disease outbreaks, including their final size and the countries affected (see Table A, in the Annex).

Suggested citation: European Centre for Disease Prevention and Control. Overview of available modelling evidence to inform the scale and potential spread of Bundibugyo virus in the current Ebola disease outbreak. ECDC: Stockholm; 2026.

ISBN 978-92-9498-899-7; doi: 10.2900/3614787; Catalogue number TQ-01-26-044-EN-N

Methods

ECDC experts conducted a pragmatic assessment of the modelling evidence available at the time of writing. Given the rapidly evolving nature of the outbreak and the need to support situational awareness, a formal systematic or rapid review methodology was not used.

The assessment drew on the authors' participation in international modelling networks and communities of practice, discussions with subject-matter experts, engagement with modelling groups actively working on the outbreak, and monitoring of publicly available reports, preprints, publications and technical outputs relevant to the ongoing outbreak.

Models were identified through these expert networks and ongoing surveillance of the modelling landscape, rather than through a structured literature search. The assessment therefore aims to provide a timely overview of the principal modelling efforts known to the authors at the time of writing, including their objectives, assumptions, strengths, limitations and implications for public health preparedness and response.

This approach prioritised timeliness and relevance over completeness. Consequently, the review may not capture all modelling studies or analyses available globally, particularly unpublished work or outputs released after the review was completed.

Results

The results of this assessment provide an overview of international modelling work, with the following areas of focus: estimating current outbreak size, modelling risk of geographical spread, and scenario modelling and mid-term projections. Details of particular reports are summarised.

Estimating current outbreak size

The number of Ebola disease cases and deaths reported as part of the ongoing outbreak are likely to be an underestimation of the true values. The relevant studies observed the following:

- The MRC Centre for Global Infectious Disease Analysis at Imperial College London estimated that, as of 16 May 2026, the true number of infections was between 1.2 and 2.4 times the reported case count [1].
- The Epistorm group, led by Northeastern University in the United States (US) and supported by the US Centers for Disease Control and Prevention (US CDC), estimated the size of the outbreak around the same date to be 1.16 (90% credible interval (CrI): 0.4–2.7) times larger than reported [2].
- Epiforecasts, a consortium that includes modellers from the London School of Health and Tropical Medicine, has been continuously updating its estimates of the outbreak size. On 13 June, they estimated that the true number of infections was between 3.0 and 10.2 times higher than reported (90% CrI) [3] .

Below, we summarise the Epiforcasts study, as it was the only one with up-to-date outbreak size estimates.

Summary 1: Epiforecasts estimate of the current outbreak size

Epiforecasts published '[Estimating the current size of the 2026 DRC Bundibugyo virus outbreak]' [3]. The results as of 13 June 2026 can be summarised as follows:

Aim: Real-time estimate of the current size of the outbreak.

Methods: A model fitted to multiple surveillance data streams (suspected and confirmed cases and deaths in DRC, and exported cases and deaths in Uganda). The model estimates the number of infections and dates of symptom onsets over time. In addition, it estimates reporting rates, case fatality rates (CFR), and reproduction numbers (R_0), and provides short-term forecasts.

Conclusions: The outbreak is estimated to have caused 2 321 to 8 011 (90% CrI) infections to date, including reported and unreported cases. Compared with the 782 laboratory-confirmed cases reported as of 13 June, that is approximately 3.0 to 10.2 times as many infections. The R_0 is estimated to be 1.29 to 3.06 (90% CrI), and the CFR 0.28 to 0.61 (90% CrI).

Limitations: Modelling outputs are largely driven by parameter inputs and assumptions given limited data. Every estimate is a model-based extrapolation under strong assumptions. Data from situational reports are only available at the aggregated level, and later situation reports revise earlier figures.

Modelling risk of geographical spread

ECDC estimated the absolute importation risk of BDBV into the EU/EEA to be very low, while most other work focused on relative importation risk. The most extensive work of the latter type, carried out by Epistorm, reported the highest risk of importation to other African countries (i.e. Rwanda, Tanzania and Kenya), with low but unevenly distributed risk for Europe.

Absolute importation risk refers to the probability of an importation occurring in a specific country or locality. Relative importation risk represents the share of importation probability assigned to each location, with the sum of probabilities adding to one.

Below, we summarise the relevant studies.

Summary 2: ECDC estimate of the importation risk into the EU/EEA

ECDC published the assessment report 'Estimation of the importation risk of Bundibugyo virus into the EU/EEA' on 15 June 2026 [4]. The report can be summarised as follows:

Aim: Estimate risk of BDBV importation into the EU/EEA region.

Methods: Risk of BDBV importation into the EU/EEA was modelled based on: i) the prevalence of infection in the most affected provinces of DRC and ii) travel volumes from these provinces to the EU/EEA. A compartmental model was used to estimate the prevalence of infected individuals who were a) pre-symptomatic, b) mildly symptomatic, and c) severely symptomatic ('wet' symptoms). Reduced travel probabilities were assumed for symptomatic individuals (10% and 90% reductions, respectively).

Conclusions: Under a hypothetical scenario of 100 travellers, the probability of importing at least one infected individual was estimated at 0.41% (90% uncertainty interval (UI): 0.17–0.79%). On average, one infected traveller was expected per 26 000 passengers travelling from the affected area (90% UI: 14 000–63 000).

Limitations: Limited data were available to inform both prevalence estimates and travel volumes from the affected region. The risk of importation by healthcare workers was out of scope.

Summary 3: Epistorm risk assessment of international dissemination

Epistorm published 'Ebola Bundibugyo Virus — DRC · Spread Risk Assessment #3 · International Dissemination' [5] on 26 May 2026. The report can be summarised as follows:

Aim: Estimate relative risk of BDBV importation into other countries (globally).

Methods: This analysis describes conditional ranking. It does not assert that an export will occur, but in the event of at least one export occurring, it indicates where it is most likely to occur. Connectivity between countries is informed using global air travel patterns between international airports.

Conclusions: By country, Rwanda (23.5%), Tanzania (15.5%) and Kenya (14.8%) together account for approximately 54% of the conditional international risk. By city, Kigali, the capital city of Rwanda, accounts for 17.6% of this risk. Dubai, in the United Arab Emirates, is the second-ranked city, accounting for 10.0%; this reflects its role as a major intercontinental aviation hub. Saudi Arabia (3.2%) and Qatar (0.9%) follow. Beyond Africa and the Middle East, Europe (7.3%, led by London at 2.7%) and Asia (5.9%, led by Mumbai at 1.9% and Guangzhou at 0.9%) represent the bulk of the remaining conditional risk; the Americas represent roughly 2%.

Limitations: Limited data were available to inform travel volumes from the affected regions. The risk of importation by healthcare workers was out of scope. Results need to be adjusted if the outbreak evolves and BDBV spreads to areas other than Ituri, North Kivu and Kampala.

Summary 4: Epistorm risk assessment of regional dissemination

Epistorm published an 'Ebola Bundibugyo Virus – DRC · Spread Risk Assessment #2' [6] on 22 May 2026. The report can be summarised as follows:

Aim: Estimate relative risk of BDBV importation into regions in the DRC and Uganda.

Methods: Same methods as described in the previous Epistorm output on international dissemination presented above, complemented with commuting patterns across local regions.

Conclusions: Locations with the highest relative risk were Kasese (Uganda; 37%), Kigali (Rwanda; 17%), Pakuba (Uganda; 16%), Bukavu (South Kivu; 15%), Arua (Uganda; 7%) and Cyangugu (Rwanda; 7%), with smaller amounts of relative risk for multiple other regions.

Limitations: Limited data were available to inform travel volumes from the affected regions. Informal cross-border movement might not be fully captured. Results need to be adjusted, since the outbreak has evolved and commuting patterns were disrupted due to closure of airports and border controls.

Summary 5: SUMOC relative risk of importation into Europe

Sorbonne Université Modeling Outbreaks Center (SUMOC) posted the pre-print 'Shifting patterns of importation risk of Bundibugyo Ebola virus disease to Europe under outbreak expansion scenarios' [7] on 4 June 2026. The report can be summarised as follows:

Aim: Estimate relative importation risk of BDBV to Europe via air travel under different geographical spread scenarios.

Methods: Relative importation risk was assessed across six outbreak scenarios of progressive geographical spread: i) eastern DRC (reference), ii) eastern DRC with spillover to western Uganda, iii) eastern DRC and western Uganda with further spread to South Sudan, and for iv) to vi) the third scenario with additional amplification in a regional capital (Kampala, Kigali or Kinshasa, respectively). Importation risk was calculated as the proportion of travellers from affected 'seed' airports (selected per scenario) to European countries, using origin–destination passenger flow data.

Conclusions: BDBV spillover to western Uganda led to a small increase of relative importation risk to Europe, compared with the outbreak being contained to eastern DRC. Additional spread to South Sudan increased the relative importation risk to Europe ~5-fold. Spread to Kampala or Kigali had a larger impact on relative risk, especially to Northern Europe (up to ~120-fold and ~50-fold, respectively), with the United Kingdom (UK) being most at risk. Spread to Kinshasa predominantly increased risk in Western Europe (~80-fold), with Belgium most at risk. Across all scenarios, France, Italy, Belgium and the UK remained among the most exposed countries.

Limitations: The model equates risk with flight passenger proportions, ignoring between-country heterogeneity of intervention measures (e.g. screening, travel restrictions). Additionally, results are highly sensitive to the selection of airports, without accounting for how accessible they are to individuals with Ebola disease. Finally, the study estimates relative rather than absolute risk, which limits interpretability for public health decision-making.

Scenario modelling and mid-term projections

The US CDC published a report assessing the impact of different levels of case isolation on the cumulative number of cases and deaths over the coming three months. Estimates were based on an exponential growth model calibrated under different assumptions of cumulative number of deaths.

Scenario modelling provides estimates based on multiple plausible scenarios and mid-term projections seek to assess further than the immediate future, taking into consideration the limited accuracy of forecasting into the mid-term.

Below, we summarise the US CDC study.

Summary 6: US CDC mid-term scenario projections

US CDC published 'Modeled Scenario Projections for the Ebola Disease Outbreak Caused by Bundibugyo Virus, 2026' [7] on 5 June 2026. The report can be summarised as follows:

Aim: *Provide scenario projections of the outbreak size over three months, with different levels of isolation achieved. A secondary aim was to estimate the timing of initial introduction (spillover from animal reservoir).*

Methods: The model uses a branching process and is calibrated to three different cumulative death counts to account for uncertainty in reporting. Four isolation scenarios are considered, in which between 20% and 95% of individuals with BDBV infection are assumed to isolate perfectly two days after symptom onset.

Conclusions: Assuming 50 deaths for calibration purposes, results ranged from a 65% chance of over 20 000 cumulative cases within three months for the scenario with 20% effective isolation, to a 100% chance of under 10 000 infections in the scenario with 95% effective isolation. The date of the spillover event was estimated to be between the end of January and mid-February. The authors indicate that large-scale, rapid public health action is needed to control the current outbreak, already the largest known BDBV outbreak, from becoming one of the largest Ebola epidemics in history.

Limitations: The model uses a relatively high R_0 (i.e. median 2.51), compared with R_0 estimates from a previous outbreak of the same virus in the same and area (i.e. 1.37; 95% confidence interval (CI): 0.85–2.02) [8]. In turn, R_0 estimates by Epiforecasts for the current outbreak range from 1.29 to 3.06 (90% CrI). Therefore, the report potentially overestimates cumulative infections. Additionally, the model did not account for risk-reducing behavioural responses, such as avoiding contact with ill individuals, which could help constrain outbreak growth.

Assessment and conclusions

International modelling efforts related to the ongoing outbreak of Ebola virus disease caused by BDBV have primarily focused on estimating the current outbreak size, assessing the risk of geographical spread beyond the affected areas, and projecting mid-term outbreak trajectories under different assumptions regarding how effectively individuals with BDBV infection isolated.

Overall, the modelling studies conducted to date suggest that the current numbers of reported cases are likely to underestimate the true burden of the outbreak, with one estimate of the true number of infections ranging from 3.0 to 10.2 times the number of reported cases (90% CrI).

Relative risk of importation (i.e. the share of risk allocated to a location) is higher for the countries with the highest connectivity to the outbreak areas, with Rwanda, Tanzania and Kenya identified as the countries with the highest relative risk. Estimates of absolute risk of importation (i.e. the probability of risk to a particular country or locality) into the EU/EEA under current prevalence levels and assuming historical travel patterns suggest only a remote chance of importation in the next two-week period. European countries with the highest connectivity to the current outbreak areas are at higher relative risk of importation; these include the UK, Belgium, Germany France and Italy.

Mid-term scenario projections from US CDC suggest a 65% probability of over 20 000 infections over the next three months under the assumption that 20% of patients are effectively isolated and no other control measures are implemented. For context, the 2013–2016 Ebola outbreak in West Africa resulted in approximately 28 000 cases, while the 2018–2020 Ebola outbreak in the same region as the ongoing outbreak resulted in approximately 3 400 cases (see Annex). It is noteworthy that the methodology used by US CDC is best suited for the early stages of an outbreak and might overestimate cumulative infections over longer-term projections.

At this early stage of the outbreak, modelling is constrained by limited data and considerable uncertainty around key epidemiological parameters. Consequently, analyses rely on assumptions and parameter estimates derived from previous outbreaks, which may not fully reflect the current situation. Multiple combinations of parameter values can plausibly explain the available observations, meaning that a wide range of model projections may be consistent with the data. Such variation primarily reflects uncertainty about the outbreak itself rather than differences in model quality. In addition, modelling assumptions, parameter choices and the interpretation of results may be influenced by analysts' prior expectations, methodological preferences or the framing of the questions being addressed.

References

1. McCabe R, Ebbarnezh L, Okware S, Fotsing R, Koua E, Mbaka P, et al. Estimation of the size of the outbreak of Ebola disease caused by Bundibugyo virus in the Democratic Republic of the Congo. London: Imperial College London; 2026. Available at: https://doi.org/10.25560/130007
2. Epistorm Northeastern University and CFA–CDC Insight Net. Ebola Bundibugyo Virus — DRC · Spread Risk Assessment #1. 2026. Available at: https://epistorm.github.io/EBV2026/report_01_spread_risk.html
3. Abbott S, Sherratt K, Brand S, Funk S. Estimating the current size of the 2026 DRC Bundibugyo virus outbreak. Epiforecasts; 2026. Available at: https://epiforecasts.io/BVDOutbreakSize/dev
4. European Centre for Disease Prevention and Control (ECDC). Estimation of the importation risk of Bundibugyo virus into the EU/EEA in June 2026. ECDC: Stockholm; 2026; Available at: https://www.ecdc.europa.eu/en/publications-data/estimation-importation-risk-bundibugyo-virus-eueea-june-2026
5. Epistorm Northeastern University and CFA–CDC Insight Net. Ebola Bundibugyo Virus — DRC · Spread Risk Assessment #3 · International Dissemination. 2026. Available at: https://epistorm.github.io/EBV2026/report_03_international.html
6. Epistorm Northeastern University and CFA–CDC Insight Net. Ebola Bundibugyo Virus — DRC · Spread Risk Assessment #2. 2026. Available at: https://epistorm.github.io/EBV2026/report_02_spread_risk.html
7. Federico Fanelli FP, Poletto C, Colizza V. Shifting patterns of importation risk of Bundibugyo Ebola virus disease to Europe under outbreak expansion scenarios [preprint]. medRxiv; 2026. Available at: https://www.medrxiv.org/content/10.64898/2026.05.31.26354511v1
8. United States Centres for Disease Prevention and Control (US CDC). Modeled Scenario Projections for the Ebola Disease Outbreak Caused by Bundibugyo Virus, 2026. Atlanta: US CDC; 2026. Available at: https://www.cdc.gov/mmwr/volumes/75/wr/mm7522e1.htm
9. Choi B, Busch S, Kazadi D, Ilunga B, Okitolonda E, Dai Y, et al. Modeling outbreak data: Analysis of a 2012 Ebola virus disease epidemic in DRC. Biomath (Sofia). 2019;8(2):1910037. Available at: https://pmc.ncbi.nlm.nih.gov/articles/PMC7665115
10. World Health Organization (WHO). Ebola disease caused by Bundibugyo virus, Democratic Republic of the Congo & Uganda. Geneva: WHO; 2026. Available at: https://www.who.int/emergencies/disease-outbreak-news/item/2026-DON606
11. World Health Organization (WHO). Ebola outbreak 2022 – Uganda. Geneva: WHO; 2022. Available at: https://www.who.int/emergencies/situations/ebola-uganda-2022
12. World Health Organization Regional Office for Africa (WHO AFRO). 11th Ebola outbreak in the Democratic Republic of the Congo declared over. Brazzaville: WHO; 2020. Available from: https://www.afro.who.int/news/11th-ebola-outbreak-democratic-republic-congo-declared-over
13. World Health Organization (WHO). 10th Ebola outbreak in the Democratic Republic of the Congo declared over; vigilance against flare-ups and support for survivors must continue. Geneva: WHO; 2020. Available from: https://www.who.int/news/item/25-06-2020-10th-ebola-outbreak-in-the-democratic-republic-of-the-congo-declared-over-vigilance-against-flare-ups-and-support-for-survivors-must-continue
14. World Health Organization (WHO). Ebola virus disease Fact sheet, updated 2018 (archived). Geneva: WHO; 2018. Available at: https://web.archive.org/web/20180418095601/http://www.who.int/mediacentre/factsheets/fs103/en
15. United States Centres for Disease Prevention and Control (US CDC). History of Ebola Outbreaks. Atlanta: US CDC; 2026. Available at: https://www.cdc.gov/ebola/outbreaks/index.html
16. Okware SI, Omaswa FG, Zaramba S, Opio A, Lutwama JJ, Kamugisha J, et al. An outbreak of Ebola in Uganda. Trop Med Int Health. 2002;7(12):1068-75. Available at: https://doi.org/10.1046/j.1365-3156.2002.00944.x
17. Khan AS, Tshioko FK, Heymann DL, Le Guenno B, Nabeth P, Kerstiëns B, et al. The reemergence of Ebola hemorrhagic fever, Democratic Republic of the Congo, 1995. Commission de Lutte contre les Epidémies à Kikwit. J Infect Dis. 1999;179(suppl 1):S76-86. Available at: http://www.jstor.org/stable/30117606
18. World Health Organization (WHO). Report of an International Commission. Ebola haemorrhagic fever in Zaire, 1976. Bull World Health Organ. 1978;56(2):271-93. Available at: https://pmc.ncbi.nlm.nih.gov/articles/PMC2395567
19. World Health Organization International Study Team (WHO/International Study Team). Ebola haemorrhagic fever in Sudan, 1976. Geneva: WHO/International Study Team; 1978. Available at: https://iris.who.int/handle/10665/261727

Annex 1. Supplementary table

Table A. Past Ebola outbreaks with more than 100 cases (as of 6 June 2026)

Date	Origin country	Additional affected countries	Virus	No. of cases	No. of deaths	CFR	Reference
May 2026 to present	DRC	Uganda	BDBV	534	93	17.4%	[10]
Sep 2022 to Jan 2023	Uganda	None	SUDV	142	55	47%	[11]
May 2020 to Nov 2020	DRC	None	EBOV	119	55	42%	[12]
Aug 2018 to Jun 2020	DRC	Uganda	EBOV	3 470	2287	66%	[13]
Dec 2013 to Jun 2016	Guinea	Liberia, Sierra Leone, Nigeria, Mali, US, Senegal, Spain, UK, Italy	EBOV	28 712	11 372	Ranging from 0–75%	[14]
Dec 2007 to Jan 2008	Uganda	None	BDBV	131	42	32%	[15]
Aug to Nov 2007	DRC	None	EBOV	264	187	71%	[15]
Oct 2001 to Dec 2003	ROC	Gabon	EBOV	124	97	78%	[15]
Oct 2000 to Jan 2001	Uganda	None	SUDV	425	224	53%	[16]
May to Jul 1995	DRC	None	EBOV	315	254	81%	[17]
Aug 1976	DRC	None	EBOV	318	280	88%	[18]
Jun to Nov 1976	Sudan	None	SUDV	284	151	53%	[19]

BDBV: Bundibugyo virus; CFR: case fatality rate; DRC: Democratic Republic of the Congo; EBOV: Zaire ebolavirus; No: number; ROC: Republic of the Congo; SUDV: Sudan virus; UK: United Kingdom; US: United States.