



WHO GUIDELINES

Summary of WHO infection prevention and control guideline for Ebola and Marburg disease: a call for evidence based practice

Victoria Willet,¹ Devika Dixit,^{1,2} Dale Fisher,³ Daniel G Bausch,^{4,5} Folasade Ogunsola,⁶ Joanne Khabbsa,⁷ Elie A Akl,^{8,9} April Baller¹, on behalf of the Guideline Development Group

Outbreaks of Ebola and Marburg disease have continued to occur since the *Zaire ebolavirus* outbreak in West Africa 2014-16. In response, the World Health Organisation (WHO) published a new infection prevention and control (IPC) guideline for both diseases in August 2023,¹ which replaces those issued in 2014 and 2016.²⁻⁴ This article summarises the process involved in developing the updated guideline

and includes an infographic (fig 1) to highlight key IPC recommendations from the guideline, following the patient care pathway from the community to a healthcare facility to discharge. The full guideline is available as a downloadable PDF on both the WHO website ([Infection prevention and control guideline for Ebola and Marburg disease, August 2023, who.int](https://www.who.int/publications/m/item/infection-prevention-and-control-guideline-for-ebola-and-marburg-disease-august-2023)) and the web based [MAGICapp platform](https://www.magicapp.org/).

¹ World Health Organization, Geneva, Switzerland

² Cumming School of Medicine, University of Calgary, Alberta, Canada

³ Yong Loo Lin School of Medicine, National University of Singapore, Singapore

⁴ FIND, Geneva, Switzerland

⁵ London School of Hygiene and Tropical Medicine, London, UK

⁶ College of Medicine, University of Lagos, Nigeria

⁷ Clinical Research Institute, American University of Beirut, Beirut, Lebanon

⁸ Department of Internal Medicine, American University of Beirut, Lebanon

⁹ Department of Health Research Methods, Evidence, and Impact, McMaster University, Ontario, Canada

Correspondence to: V Willet
willetv@who.int

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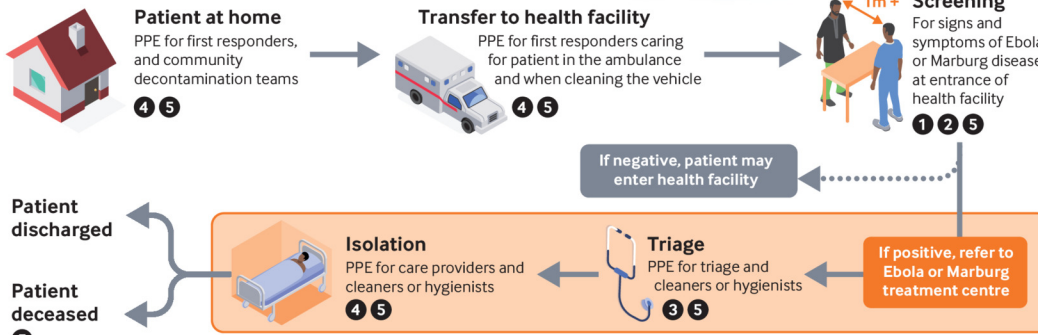
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Ebola and Marburg disease

Infection prevention and control

Limiting the spread of Ebola and Marburg disease requires a coordinated infection prevention and control response. This includes practices throughout the patient journey, such as maintaining appropriate distances where possible, isolating people with suspected or confirmed disease, and wearing appropriate personal protective equipment (PPE).

This graphic summarises some key points from the updated World Health Organization (WHO) guidance, published in August 2023. At each step in the patient journey the black circles indicate the suggested PPE for health and care workers as they interact with the patient and their environment, as shown in the table at the bottom of the graphic.



	Body	Face	Hands	Feet
1 Screening Minimum 1 metre distance, use "no-touch technique"	Scrub			Closed-toe shoes Doesn't have to be waterproof rubber boots in this setting but could be based on availability
2 Screening Minimum 1 metre distance cannot be maintained	Scrub + fluid-resistant gown	Medical mask Mask should be fluid resistant and non-collapsible	One pair of gloves Nitrile preferred	
3 Triage Likely patient contact	Scrub + fluid-resistant coverall If no coverall available use: Gown + head and neck covering	Eye protection Face shield or goggles	Two pairs of gloves Nitrile preferred	Triage more likely to wear rubber boots
4 Patient care Direct or indirect contact with patients	Scrub + fluid-resistant coverall + disposable or reusable apron			Usually waterproof rubber boots
5 Environmental services and burial teams Cleaners, hygienists, and waste handlers (health facilities and community settings). Safe and dignified burial teams	Scrub + fluid-resistant coverall + heavy duty apron	Use respirator for aerosol generating procedures	Two pairs of gloves Nitrile preferred inside, with a heavy duty outer glove	Waterproof rubber boots

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Fig 1 | Key infection prevention and control measures in the World Health Organisation guideline for Ebola and Marburg disease

What you need to know

- The use of engineering and administrative controls should be prioritised when implementing infection prevention and control (IPC)

measures, for *Ebolavirus* and *Marburgvirus* and although appropriate personal protective equipment (PPE) is important, it is the last protective measure in the hierarchy of controls.

- During filovirus outbreaks, attention should be paid to the cross cutting nature of IPC when implementing guidelines, along with the associated risk of interactions between health and care workers and patients and the environment; consideration should also be given to maintaining minimal distances, as well as judicious and appropriate PPE use.
- Strong evidence is required to shift IPC recommendations for Ebola and Marburg disease to transmission based precautions.

Consistently and rigorously applied IPC measures against potentially highly fatal *Ebolavirus* and *Marburgvirus* are essential to halt transmission of the diseases caused by these viruses. Both viruses belong to the *Filoviridae* family. IPC is a cross cutting area of work that requires collaboration among different agencies as part of a cohesive outbreak response. In addition to IPC practitioners, the many stakeholders and individuals with different roles in outbreak response—logistics teams, clinical and community health and care workers—should be aware of the latest IPC principles and recommendations for Ebola and Marburg disease because this directly affects their practices.

Cumulative experience during past outbreaks justified a review of existing IPC recommendations as experts observed inappropriate practices. Examples include the notion that more personal protective equipment (PPE) is always better than less personal PPE, as well as the routine spraying of chlorine for disinfection despite previous WHO recommendations against this practice.^{1,2} Another common observation was lack of standardised IPC approaches and practices by national (country) and partner organisations involved in implementing IPC measures during outbreaks, which resulted in confusion among health and care workers. Up to date, evidence based IPC guidelines for Ebola and Marburg disease are thus critical to ensuring a safe, systematic, and standardised approach during outbreaks.

WHO guideline development

The new guideline follows the Grading of Recommendations Assessment, Development and Evaluation⁵ and Evidence to Decision processes as described in the WHO handbook for guideline development,^{6,7} and reflects the knowledge and experience garnered from multiple outbreaks of Ebola and Marburg disease since 2014. A group of experts in IPC for filoviruses and a patient representative developed the new guideline, supported by the WHO secretariat. The updated guideline includes 11 new recommendations, 10 new good practice statements, and nine recommendations from previous guidelines.

The guideline development group prioritised 13 key questions^{7,8} and five background questions, and WHO commissioned systematic reviews to inform the formulation of the recommendations. A rapid scoping review on the modes of transmission of *Ebolavirus* and *Marburgvirus* was also conducted. Finally, a mixed methods study was undertaken to examine health and care workers' evaluation of outcomes and to understand their perspectives on contextual factors related to IPC measures.⁹ The guideline development group also carefully considered the balance between desirable and undesirable effects of interventions, the certainty of evidence, the evaluation of outcomes, resource use, the acceptability and feasibility of interventions to affected populations, and the impact of interventions on equity. Although the recommendations pertain to all healthcare settings, some are also relevant to community settings—for example, when interacting in homes of individuals suspected or confirmed to have had Ebola or Marburg disease.

Evidence base for recommendations

The systematic reviews identified only a limited number of studies directly dealing with the questions identified by the guideline development group. Consequently, the certainty of evidence underpinning the new recommendations is generally very low (indirect evidence was often used), and most recommendations are conditional. Where appropriate, recommendations are complemented by good practice statements to help consolidate practices considered acceptable.^{7,8}

The guideline should be viewed in full to understand the many nuances and contexts that have been considered, to ensure optimal implementation in different settings. For example, the recommendation that health and care workers who have been exposed to *Ebolavirus* or *Marburgvirus* should be excluded from work includes a consideration of safe staffing levels and ongoing operations. Although the reader is referred to the full guideline, key points are summarised below and in the infographic (see [fig 1](#)).

Highlights from the guideline

During an infectious disease outbreak, the focus is often on availability and use of PPE. Although important, PPE is at the bottom of the hierarchy of controls.¹⁰ Furthermore, excessive use of PPE is associated with adverse effects for health and care workers—notably loss of dexterity and skin irritation¹¹—and negative impacts on the environment.^{12,13} The hierarchy of controls instead emphasises engineering and administrative controls to create a barrier between the source of the hazard (the infected patient) and the health and care worker.¹⁰ For this reason, the new guideline deals with PPE that should be worn for specific activities or risk (such as screening, triage, direct or indirect patient care, cleaning or other hygiene activities, and safe and dignified burial) and also considers workers' ability to maintain a distance of at least 1 m from patients during the activity. The guideline also includes new recommendations on the IPC ring approach (rapidly mobilising teams to enhance IPC activities in geographical “at risk” areas around infected individuals), screening and early recognition and isolation, triage, patient placement in single rooms while promoting patient wellbeing and safe interactions with family members and visitors, and management of potential exposure of health and care workers. Concepts such as the importance of hand hygiene using alcohol based hand rub or soap and water is re-emphasised.

For many years, WHO guidance on the management of filoviruses has advised against spraying disinfectants such as chlorine, including for disinfecting the deceased.^{1,2} Spraying chlorine in the presence of patients, visitors, and health and care workers has been shown to cause adverse ocular, respiratory, and skin reactions.¹⁴ Nevertheless, spraying chlorine or other disinfectants is still common. The new guideline includes a strong recommendation against such spraying of health and care workers. For the environment, the focus is on cleaning followed by disinfection, with wiping surfaces preferable to spraying.

Although contact precautions call for using a single pair of gloves and changing gloves between patients, some facilities caring for patients with Ebola and Marburg disease practise double gloving with varying approaches to glove disinfection, and the changing of gloves between patients. The new guideline provides specific details of when to use single or double gloves (including heavy duty gloves) on the basis of activity risk, methods for glove disinfection, and changing of gloves between patients.

A call for evidence

Although the new guideline represents an advance, it also highlights the need for more evidence to inform effective IPC measures during outbreaks of filoviruses. Adopting a transmission based precautions approach instead of pathogen based recommendations was discussed during development of the guideline. Ultimately, some pathogen based recommendations rather than an immediate shift to transmission based precautions were endorsed as the latter would represent a major change to current practice and hence would require a strong rationale and evidence base. For example, transmission based precautions¹⁵ do not include covering the head and neck or wearing heavy duty footwear or double gloves with glove disinfection and reuse, but all are widely practised in the management of filoviruses. Such practices, whether indicated or not, have become ingrained in responses to outbreaks of filoviruses and may not be easily modified unless strong evidence supports a change.

WHO calls for greater investment and engagement in research that will provide a stronger evidence base for IPC for Ebola and Marburg disease, and thus help direct future guidelines away from deep seated practices towards stronger evidence based practices.

Guidelines into practice

- What challenges do you foresee with the implementation of the updated World Health Organization guideline for Ebola and Marburg disease, and how can these be mitigated in advance of potential outbreaks?
- Recommendations for infection prevention and control in the guideline relate to the modes of transmission of Ebola and Marburg disease. On this basis, can you explain the rationale for the recommendations in this guideline?

How patients were involved in the creation of this article

A patient representative who is both a survivor of Ebola disease and a health and care worker was a member of the guideline development group.

Further information on the guidance

The full guideline including references can be accessed at <https://www.who.int/publications/i/item/WHO-WPE-CRS-HCR-2023.1> (Infection prevention and control guideline for Ebola and Marburg disease, August 2023) and on the MAGICapp platform. Full details of the guideline development process are described in section 8 (see Methods section) of the guideline.

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Guideline development group: Maya Chávez (Médecins Sans Frontières, Barcelona, Spain); May Chu (Colorado School of Public Health, Denver, USA), Nizam Damani (Southern Health and Social Services Trust, Belfast, Northern Ireland, UK); Claire Dorion (Médecins Sans Frontières, Geneva, Switzerland); Gwen Eamer (International Federation of the Red Cross and Red Crescent Societies, Geneva, Switzerland); Robert Fowler (Department of Medicine and Interdepartmental Division of Critical Care Medicine, University of Toronto, Toronto, Canada); Joost Hopman (Radboud University Medical Center, Nijmegen, The Netherlands); Emilio Hornsey (UK Public Health Rapid Support Team, UK Health Security Agency, London, UK); Richard Kojan (Alliance for International Medical Action), Kinshasa, Democratic Republic of the Congo); Daniele Lantagne (Tufts University, Boston, USA); Gillian McKay (London School of Hygiene and Tropical Medicine, London, UK); Shaheen Mehtar (Infection Control Africa Network, Cape Town, South Africa); Mercy Njeru (Centers for Disease Control and Prevention, Nairobi, Kenya); Tochi Okwor (Nigeria Centre for Disease Control, Lagos, Nigeria); Sorie Samura (Patient Representative, Freetown, Sierra Leone); Sridhar Venkatapuram (King's Global Health Institute, London, UK), Katie Wilson (US Centers for Disease Control and Prevention, Atlanta, USA).

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