

## Possible future pandemics

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Name	Current status	Vaccine/ treatment?	Vulnerable groups	Geographical range	Severity (est. Morbidity/ mortality)	Likelihood
<b>Monkey pox</b>	The Director-General of WHO declared on 23 July 2022 that the multi-country outbreak of monkeypox is a public health emergency of international concern (WHO)	A vaccine was recently approved for preventing monkeypox. Only people who are at risk (e.g., someone who has been a close contact of someone who has monkeypox) should be considered for vaccination. Mass vaccination is now not recommended (WHO)	Engaging communities of gay, bisexual, and men who have sex with men (WHO)	Occurs primarily in tropical rainforest areas of central and west Africa and is occasionally exported to other regions. In May 2022, multiple cases of monkeypox were identified in several non-endemic countries (WHO)	In some people, an infection leads to medical complications and death. In recent times, the case fatality ratio has been around 3–6%. Newborn babies, children and people with underlying immune deficiencies may be at risk of more serious symptoms and death from monkeypox (WHO)	Ongoing (WHO)
<b>Nipah virus</b>	From 1998 to 2015, more than 600 cases of Nipah virus human infections were reported (WHO)	There are currently no drugs or vaccines specific for Nipah virus infection. Intensive supportive care is recommended to treat severe	Healthcare workers, geographic location, people in contact with contaminated fruits and infected animals ( <a href="https://www.cdc.g">https://www.cdc.g</a> )	Nipah virus was first recognized in 1999 during an outbreak among pig farmers in, Malaysia. It was also recognized in Bangladesh in 2001, and nearly annual outbreaks have occurred in that	The case fatality rate is 40% to 75%. Outbreaks in India and Bangladesh have occurred with	The 2018 annual review of the WHO R&D Blueprint list of priority diseases indicates that there is an urgent need for

		complications. Infection can be prevented by raising awareness of the risk factors and educating people about the measures they can take to reduce exposure to the virus (WHO)	<a href="https://www.who.int/news-room/fact-sheets/detail/nipah-virus">ov/vhf/nipah/prevention/index.html</a> )	country since. The disease has also been identified periodically in eastern India. Other regions may be at risk for infection, including Cambodia, Ghana, Indonesia, Madagascar, the Philippines, and Thailand (WHO)	high case fatality (WHO)	accelerated research and development for the Nipah virus (WHO)
<b>Ebola</b>	As per 2021 Ebola was ongoing in Guinea and Democratic Republic of the Congo (WHO)	Vaccines to protect against Ebola have been developed and used to help control the spread of Ebola outbreaks in Guinea and in the Democratic Republic of the Congo. Supportive care and treatment of specific symptoms improves survival. A range of potential treatments including blood products, immune therapies and drug therapies are being evaluated (WHO)	Healthcare staff and everyone who comes in direct/close contact with people with Ebola symptoms, particularly with their bodily fluids. At-risk countries (WHO)	The 2014–2016 outbreak in West Africa was the largest Ebola outbreak since the virus was first discovered in 1976. The outbreak started in Guinea and then moved across land borders to Sierra Leone and Liberia (WHO)	The average Ebola case fatality rate is around 50%. Case fatality rates have varied from 25% to 90% in past outbreaks (WHO)	The 2018 annual review of the WHO R&D Blueprint list of priority diseases indicates that there is an urgent need for accelerated research and development for Ebola (WHO)
<b>Marburg</b>	There were 2 confirmed fatal cases of Marburg virus in 2022 in Ghana. The risk of this outbreak is high at	There is no proven treatment/vaccine available for Marburg virus disease. A range of potential treatments including blood	Healthcare staff and everyone who comes in direct/close contact with people with Marburg virus symptoms,	Two large outbreaks that occurred in Marburg and Frankfurt in Germany, and in Belgrade, Serbia, in 1967, led to the initial recognition of the disease.	Fatality ratio of up to 88% (WHO)	The 2018 annual review of the WHO R&D Blueprint list of priority diseases indicates that there is an urgent

	the national level, moderate at the regional level, and low at the global level (WHO)	products, immune therapies and drug therapies are being evaluated. Supportive care – rehydration with oral or intravenous fluids – and treatment of specific symptoms improves survival (WHO)	particularly with their bodily fluids. At-risk countries (WHO)	Outbreaks and sporadic cases have been reported in Angola, Democratic Republic of the Congo, Kenya, South Africa (in a person with recent travel history to Zimbabwe) and Uganda (WHO)		need for accelerated research and development for Marburg virus (WHO)
<b>Lassa fever</b>	Lassa fever is endemic in several countries in West Africa and Guinea has previously reported outbreaks as well as sporadic cases. The risk for this outbreak at the national level (Guinea) is considered high, because Lassa virus is endemic in the country associated with the presence of the animal host reservoir, Mastomys rats. At the regional and global level, the risk of spread is considered low (WHO)	There is currently no licensed vaccine for Lassa fever, but several potential vaccines are in development. Despite not being licensed as a treatment for Lassa fever the antiviral drug ribavirin has been used in several countries as a therapeutic agent (WHO)	People who live in endemic regions (WHO)	Lassa fever is endemic in the West African countries of Benin, Ghana, Guinea, Liberia, Mali, Sierra Leone, and Nigeria, and is likely to occur in other West African countries (WHO)	Most cases (approximately 80%) are asymptomatic or mild, but the virus can cause severe disease in the remaining 20% of patients with a case fatality ratio of approximately 15% among severely ill patients (WHO)	The 2018 annual review of the WHO R&D Blueprint list of priority diseases indicates that there is an urgent need for accelerated research and development for Lassa fever (WHO)

<b>Hanta virus</b>	Hantaviruses are expanding in Europe: they are found in new areas and the incidence has increased in several established endemic regions <a href="https://www.ecdc.europa.eu/en/hantavirus-infection/facts">https://www.ecdc.europa.eu/en/hantavirus-infection/facts</a>	Ribavirin is the only drug used in severe hantavirus infections in Europe. There is currently no vaccine available in Europe <a href="https://www.ecdc.europa.eu/en/hantavirus-infection/facts">https://www.ecdc.europa.eu/en/hantavirus-infection/facts</a>	Occupations such as forestry workers and farmers have an increased risk of exposure <a href="https://www.ecdc.europa.eu/en/hantavirus-infection/facts">https://www.ecdc.europa.eu/en/hantavirus-infection/facts</a>	HPS is more common in South America than in North America. Cases have been identified in Argentina, Chile, Uruguay, Paraguay, Brazil, and Bolivia <a href="https://www.cdc.gov/hantavirus/technical/hps/ecology.html">https://www.cdc.gov/hantavirus/technical/hps/ecology.html</a>	The case-fatality rate can reach 35-50% (WHO)	The 2018 annual review of the WHO R&D Blueprint list of priority diseases indicates that there is an urgent need for accelerated research and development for Hanta virus (WHO)
<b>Rift valley fever</b>	2016 Niger outbreak (WHO)	An inactivated vaccine has been developed for human use. However, this vaccine is not licensed and is not commercially available. Most human cases of RVF are relatively mild and of short duration, no specific treatment is required. For the more severe cases, the predominant treatment is general supportive therapy (WHO)	Veterinary and laboratory personnel at high risk of exposure to RVF (WHO)	Republic of Niger, Republic of Mauritania, Republic of South Africa, Madagascar, Sudan, Kenya, Tanzania, Somalia, Egypt, Saudi Arabia, Yemen (WHO)	Fatality rate is less than 1% in those documented (WHO)	The 2018 annual review of the WHO R&D Blueprint list of priority diseases indicates that there is an urgent need for accelerated research and development for the Rift valley fever (WHO)
<b>Crimean-Congo Haemorrhagic Fever (CCHF)</b>	Recent cases of CCHF have been reported in Spain and global climate	There is currently no specific prophylaxis or vaccine against Crimean-Congo	Animal herders, livestock workers, and slaughterhouse workers in endemic	Cases of CCHF are reported throughout Eastern Europe, Africa, the Middle East and parts of Asia	Case fatality rate up to 40 % (WHO)	The 2018 annual review of the WHO R&D Blueprint list of

	<p>change can lead to introduction of CCHFV into new areas (Hawman, D.W., Ahlén, G., Appelberg, K.S. et al. A DNA-based vaccine protects against Crimean-Congo haemorrhagic fever virus disease in a Cynomolgus macaque model. Nat Microbiol 6, 187–195 (2021). <a href="https://doi.org/10.1038/s41564-020-00815-6">https://doi.org/10.1038/s41564-020-00815-6</a> )</p>	<p>haemorrhagic fever virus (CCHFV) Hawman, D.W., Ahlén, G., Appelberg, K.S. et al. A DNA-based vaccine protects against Crimean-Congo haemorrhagic fever virus disease in a Cynomolgus macaque model. Nat Microbiol 6, 187–195 (2021). <a href="https://doi.org/10.1038/s41564-020-00815-6">https://doi.org/10.1038/s41564-020-00815-6</a></p> <p>Treatment for CCHF is primarily supportive <a href="https://www.cdc.gov/vhf/cremean-congo/treatment/index.html">https://www.cdc.gov/vhf/cremean-congo/treatment/index.html</a></p>	<p>areas are at risk of CCHF. Healthcare workers in endemic areas are at risk of infection through unprotected contact with infectious blood and body fluids. Individuals and international travellers with contact to livestock in endemic regions may also be exposed (<a href="https://www.cdc.gov/vhf/cremean-congo/exposure/index.html">https://www.cdc.gov/vhf/cremean-congo/exposure/index.html</a>)</p>	<p>(<a href="https://www.cdc.gov/vhf/cremean-congo/outbreaks/distribution-map.html">https://www.cdc.gov/vhf/cremean-congo/outbreaks/distribution-map.html</a> )</p>		<p>priority diseases indicates that there is an urgent need for accelerated research and development for Crimean-Congo Haemorrhagic fever (WHO)</p>
<b>Chikungunya</b>	<p>Over 2 million cases have been reported since 2005 (WHO)</p>	<p>There is no specific drug or vaccine against Chikungunya (WHO)</p>	<p>The proximity of mosquito breeding sites to human habitation (WHO)</p>	<p>Africa and Asia, imported cases have been recorded in the WHO European Region and the Region of the Americas (WHO)</p>	<p>Chikungunya is rarely fatal (WHO)</p>	<p>The 2018 annual review of the WHO R&amp;D Blueprint list of priority diseases indicates that there is an urgent need for accelerated research and development for</p>

						Chikungunya (WHO)
<b>H5N1/H7N9 influenza</b>	Pandemic threat: High ( <a href="https://www.gavi.org/vaccineswork/next-pandemic/h5n1-and-h7n9-influenza">https://www.gavi.org/vaccineswork/next-pandemic/h5n1-and-h7n9-influenza</a> )	Anti-viral therapeutics, a large demand for vaccine development as seasonal influenza vaccines typically have an efficacy of 10-60% and are not readily available to many developing countries <a href="https://www.gavi.org/vaccineswork/next-pandemic/h5n1-and-h7n9-influenza">https://www.gavi.org/vaccineswork/next-pandemic/h5n1-and-h7n9-influenza</a>	Poultry farms, contact with animals in live poultry markets, entering areas where poultry may be slaughtered (WHO)	Asia, Europe, Africa, China (WHO)	H7N9 has fatality rate of 40% <a href="https://www.gavi.org/vaccineswork/next-pandemic/h5n1-and-h7n9-influenza">https://www.gavi.org/vaccineswork/next-pandemic/h5n1-and-h7n9-influenza</a> )	The 2018 annual review of the WHO R&D Blueprint list of priority diseases indicates that there is an urgent need for accelerated research and development for H5N1/H7N9 influenza (WHO)

Sources: <https://www.gavi.org/vaccineswork/tag/next-pandemic>, <https://www.who.int/health-topics/> (communicable diseases)