



Yellow fever



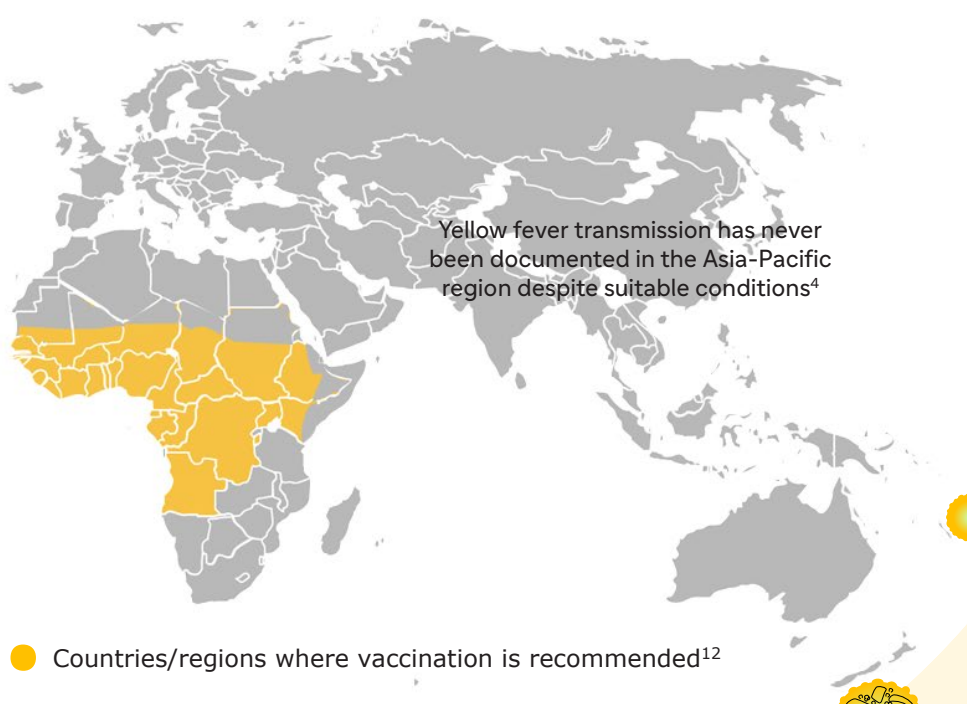
Yellow fever is a mosquito-borne disease transmitted to humans by *Aedes* and *Haemagogus* mosquitoes¹



29 countries in Africa and 13 countries in South America are at risk of Yellow Fever transmission² (WHO, as of November 2022)



109,000 severe infections and 51,000 deaths estimated in Africa and South America in 2018³



Yellow fever transmission has never been documented in the Asia-Pacific region despite suitable conditions⁴

● Countries/regions where vaccination is recommended¹²



Climate change, globalization, population growth, and urbanization may impact the spread of the virus⁵

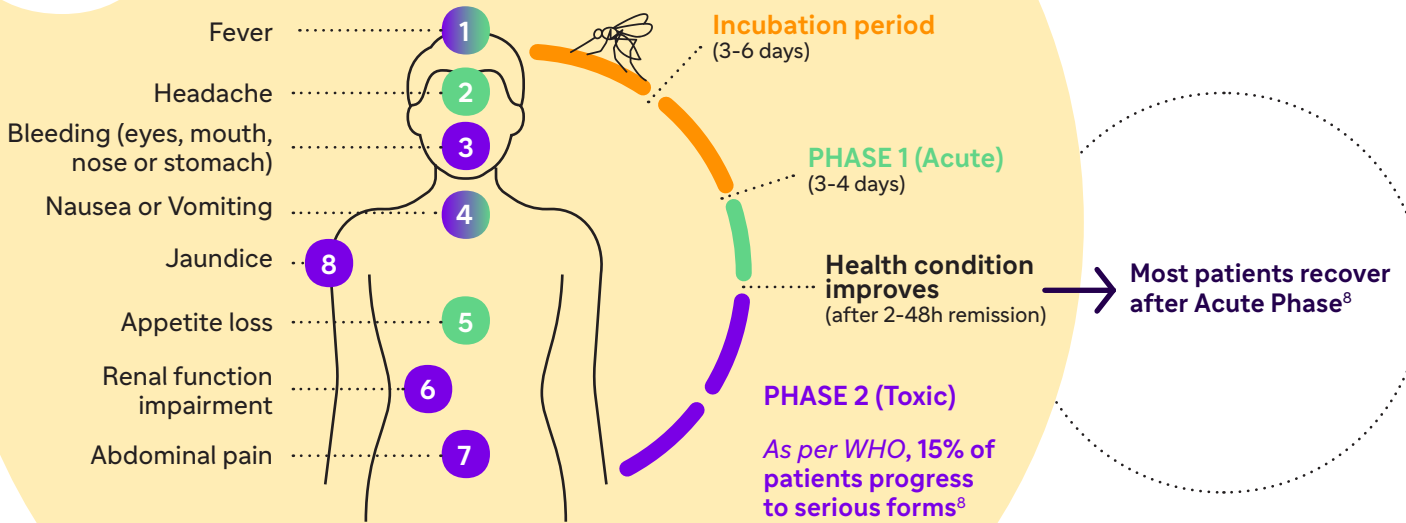


About half of the world's population may be exposed to potentially disease-spreading mosquitoes by 2050⁶



Yellow Fever Common Symptoms

Infection with the yellow fever virus can be asymptomatic or cause a wide spectrum of disease, from mild symptoms to severe illness⁷



Adapted from WHO, 2013⁸



Evolution among serious forms

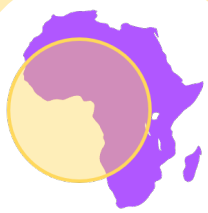


20-50% deaths⁹



Travel-risks

- Yellow fever is a **vaccine-preventable disease**
- As per US CDC¹⁰, for a 2-week stay in an endemic area, the estimated risks[†] for **illness** or **death** (per 100,000 people) due to yellow fever for an unvaccinated traveler are:

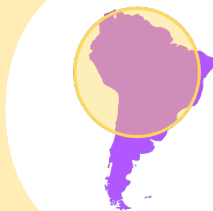


West Africa:

- 50 cases/100,000
- 10 deaths/100,000

South America:

- 5 cases/100,000
- 1 death/100,000



[†] Estimates based on the risk to indigenous populations



- According to WHO¹¹, Yellow fever is the only disease listed in the International Health Regulations for which **proof of YF vaccination** is required as a condition of entry in several **countries**² including airport transfers²

References

1. Staples JE, et al. 2018 Plotkin's Vaccines, 7th edition, Chapter 63 Yellow fever vaccines pp:1181-1265.e20. 2. World Health Organization. Countries with risk of yellow fever transmission and countries requiring yellow fever vaccination Nov 2022 (who.int) available at: [https://www.who.int/publications/m/item/countries-with-risk-of-yellow-fever-transmission-and-countries-requiring-yellow-fever-vaccination-\(november-2022\)](https://www.who.int/publications/m/item/countries-with-risk-of-yellow-fever-transmission-and-countries-requiring-yellow-fever-vaccination-(november-2022)). Accessed April 2023. 3. Gaythorpe K et al. The global burden of yellow fever. eLife 2021; 10:e64670c. 4. Kuno et al. The Absence of Yellow Fever in Asia: History, Hypotheses, Vector Dispersal, Possibility of YF in Asia, and Other enigmas. Viruses 2020, 12, 1349. 5. Giancetti E, et al. Yellow Fever: Origin, Epidemiology, Preventive Strategies and Future Prospects. Vaccines, 2022, 10, 372: 1-16. 6. Kremer M, et al. Past and future spread of the arbovirus vectors Aedes aegypti and Aedes albopictus. Nature Microbiol, 2019, 4: 854-63. 7. Garske T, et al. Yellow Fever in Africa: Estimating the Burden of Disease and Impact of Mass Vaccination from Outbreak and Serological Data. PLoS Med, 2014; 11(5): e1001638. 8. World Health Organization - WHO position paper on Yellow fever vaccines. Weekly epidemiological record, No. 27, 5 July 2013. 9. Monath TP. & Vasconcelos PF. Yellow fever. J clin Virol., 2015, 64:160-173. 10. CDC yellow book: Yellow Fever - Chapter 4 - 2020 Yellow Book | Travelers' Health | CDC. 11. World Health Organization. Yellow fever under International Health Regulations (IHR) available at: <https://www.who.int/groups/gryf> - Accessed April 2023. 12. CDC yellow book 2024: Yellow Fever available at <https://wwwncc.cdc.gov/travel/yellowbook/2024/infections-diseases/yellow-fever> - Accessed July 2023.