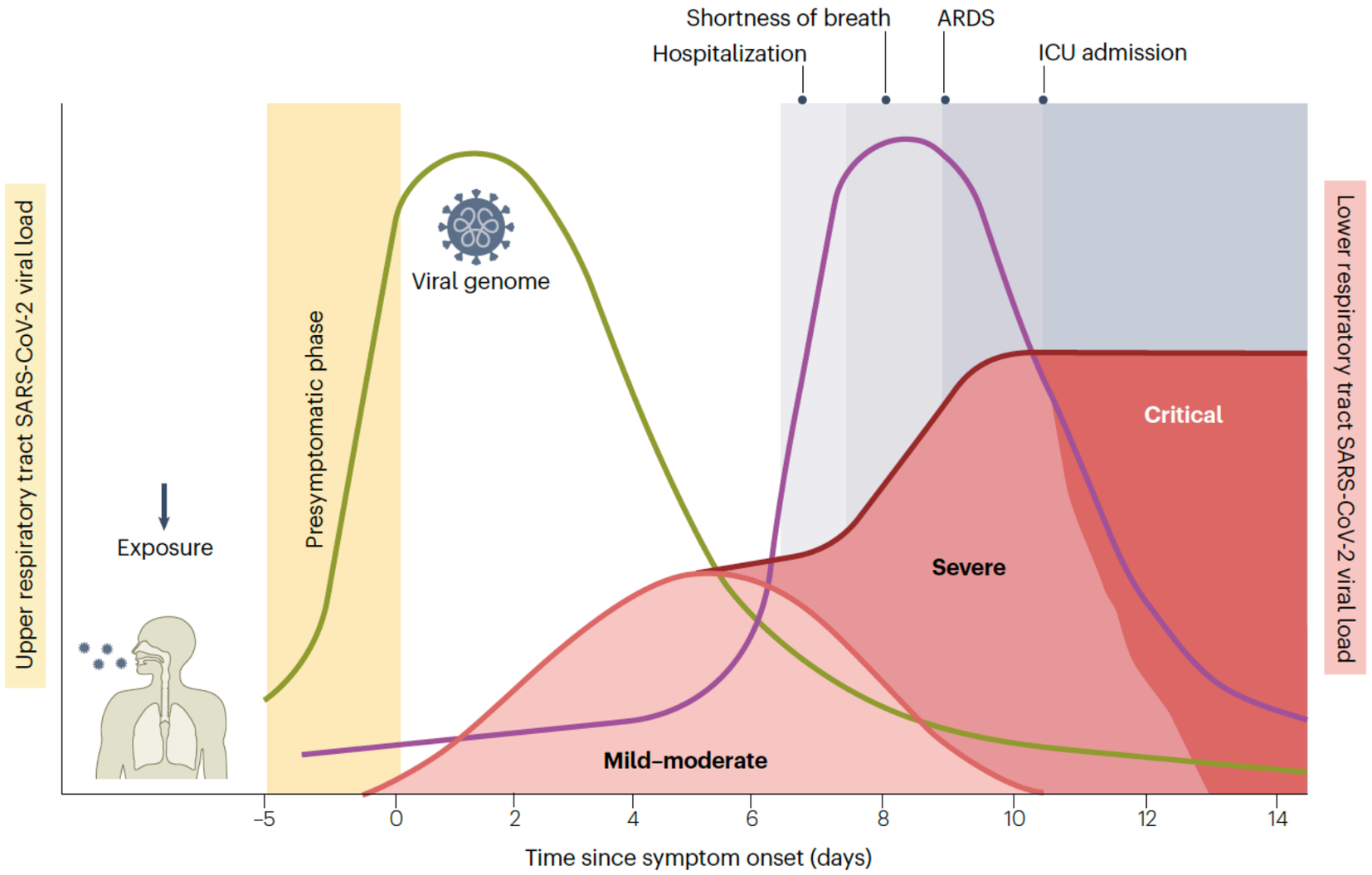
SARS-CoV-2 latest reviews

Clinical course of disease in relation to viral load

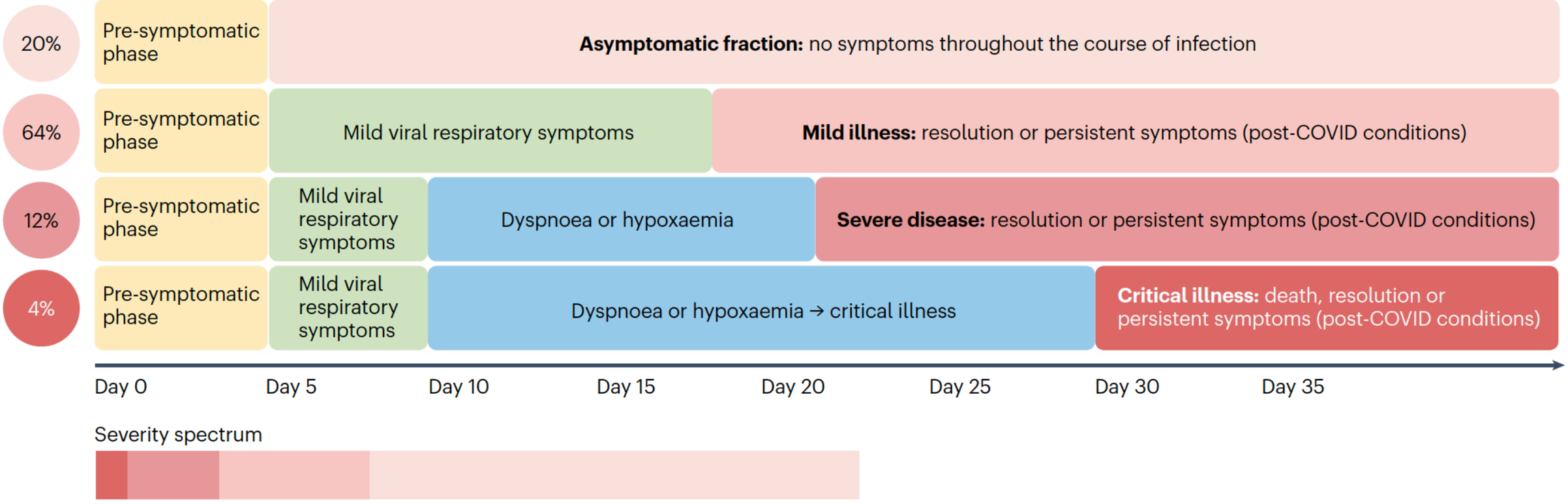
Shortness of breath, acute respiratory distress syndrome (ARDS) and require admission to the intensive care unit (ICU)



Days since symptom onset	Days 0–5	Days 5–10	During hospitalization
Treatment options available for COVID-19	Remdesivir	Remdesivir	Dexamethasone
	Paxlovid		Tocilizumab
			Baricitinib

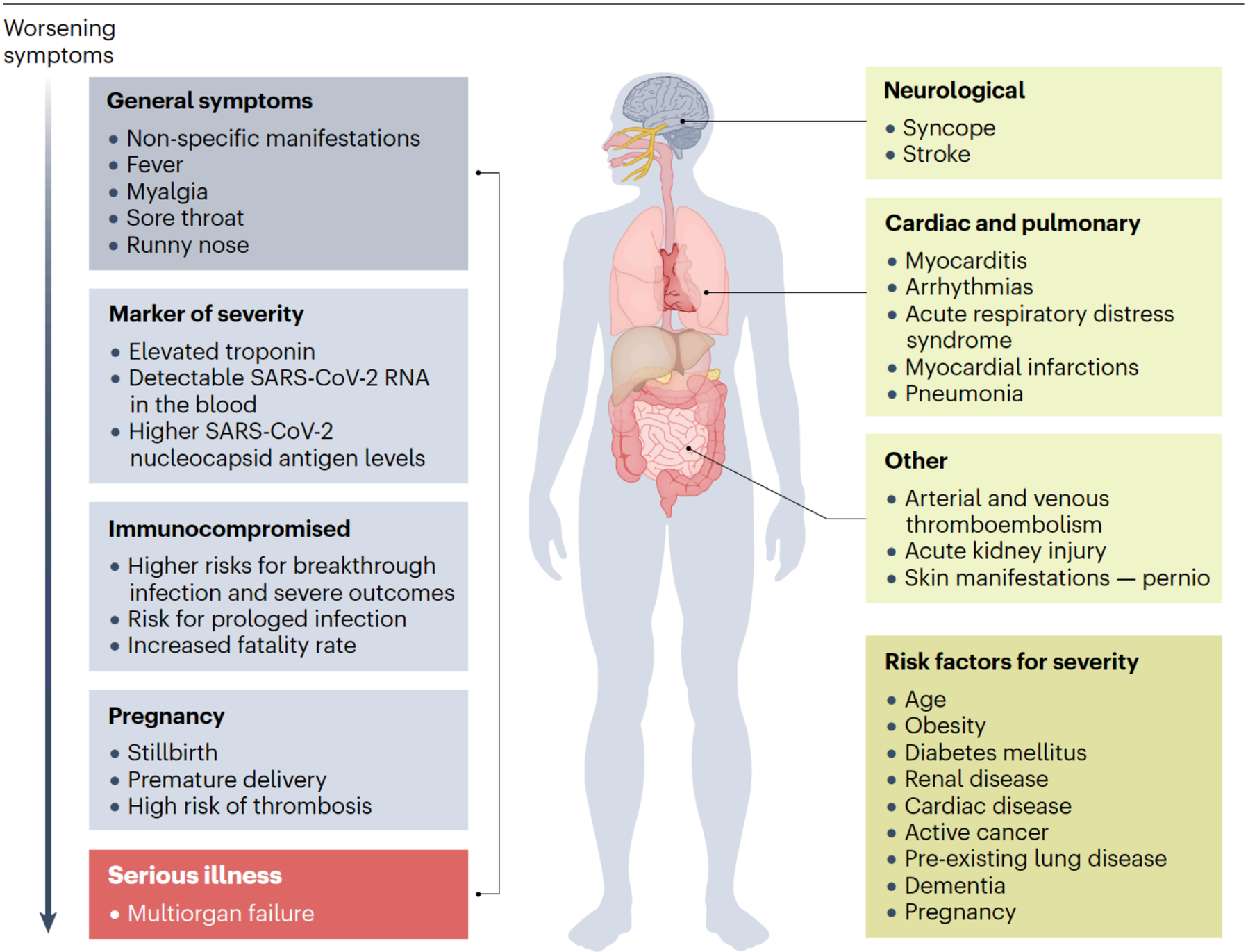
Meyerowitz et al., 2023

Illness course and severity spectrum for unvaccinated individuals with Wuhan-Hu-1 virus



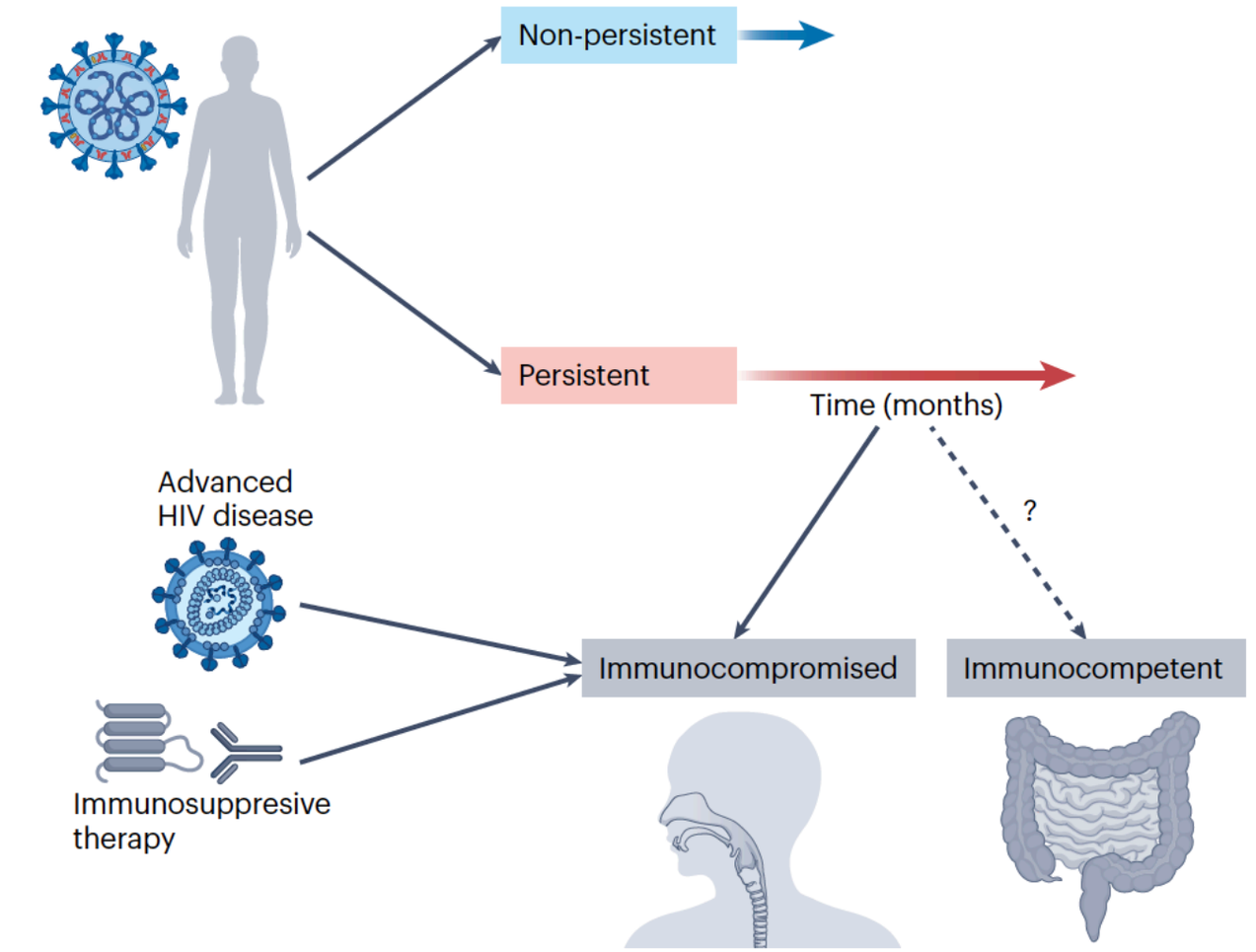
Meyerowitz et al., 2023

Clinical manifestations of COVID-19 in different patient groups



Meyerowitz et al., 2023

Mechanisms of SARS-CoV-2 persistence



Detected in the upper respiratory tract	✓	✗
Detected in other body compartments	✓	✓
Replicating virus	✓	?

Sigal et al., 2025

SARS-CoV-2 leads to either **non-persistent infections** with virus detected for up to a month or **persistent** infections with virus detected for months

Persistent infection is best understood in people who are **immunocompromised** with advanced HIV disease or in **people on immunosuppressive therapy** such as anti-CD20 B cell-depleting monoclonal antibodies (for example, rituximab).

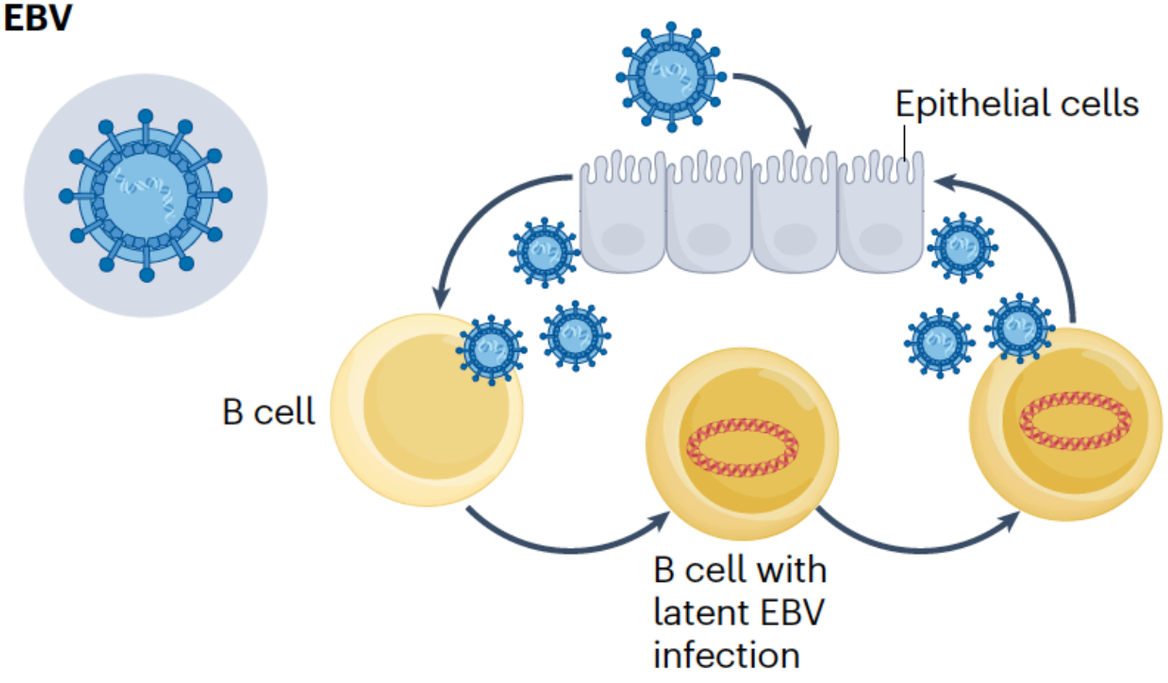
These mechanisms of immunocompromise weaken the adaptive immune response to the point where it cannot control or clear the infection.

In **persistent** infection in people who are **immunocompromised**, SARS-CoV-2 is readily detected in the **upper respiratory** tract and the virus can be cultured (viral outgrowth).

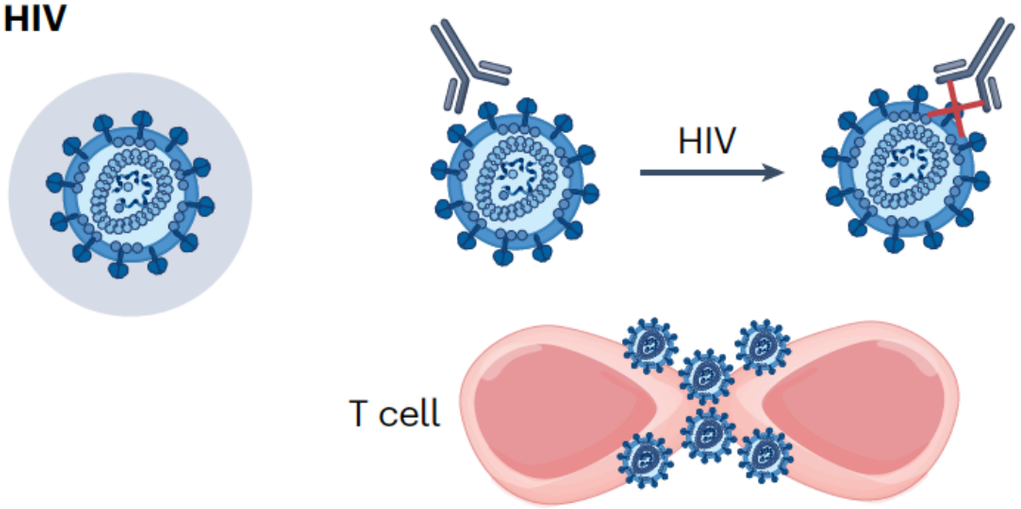
Less is understood about SARS-CoV-2 persistence in people who are **immunocompetent**, where infection is sometimes detected in the **gastrointestinal tract and other anatomical compartments** in the form of viral RNA and proteins.

Viral persistence by different viruses

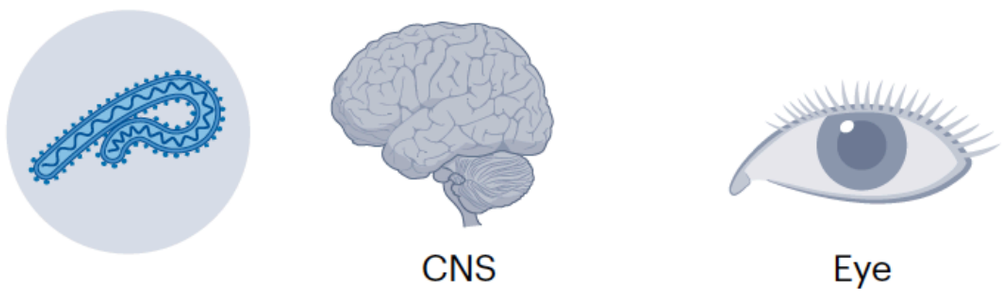
EBV



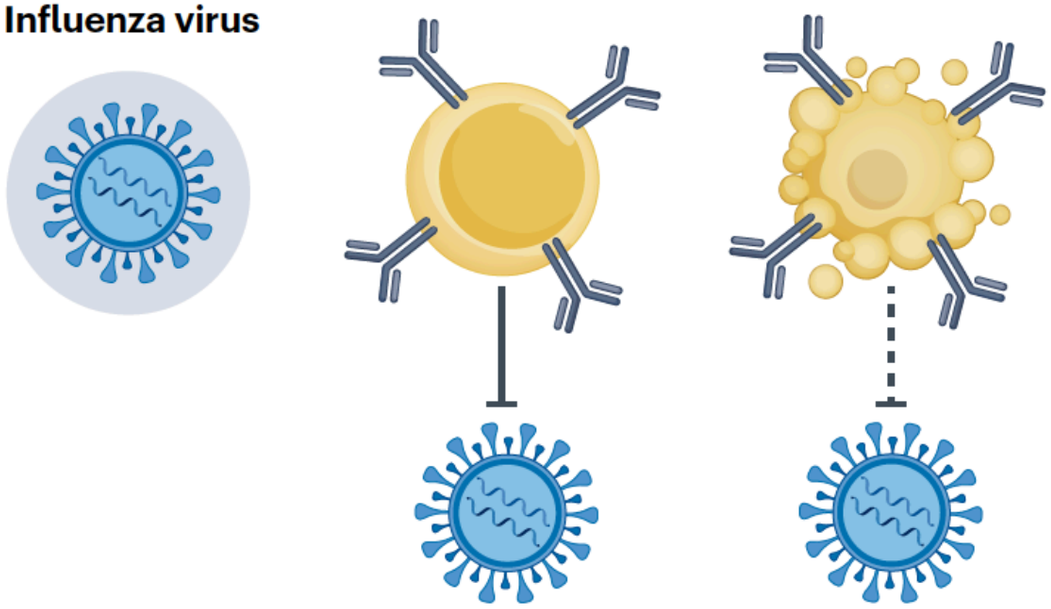
HIV



Ebola virus



Influenza virus



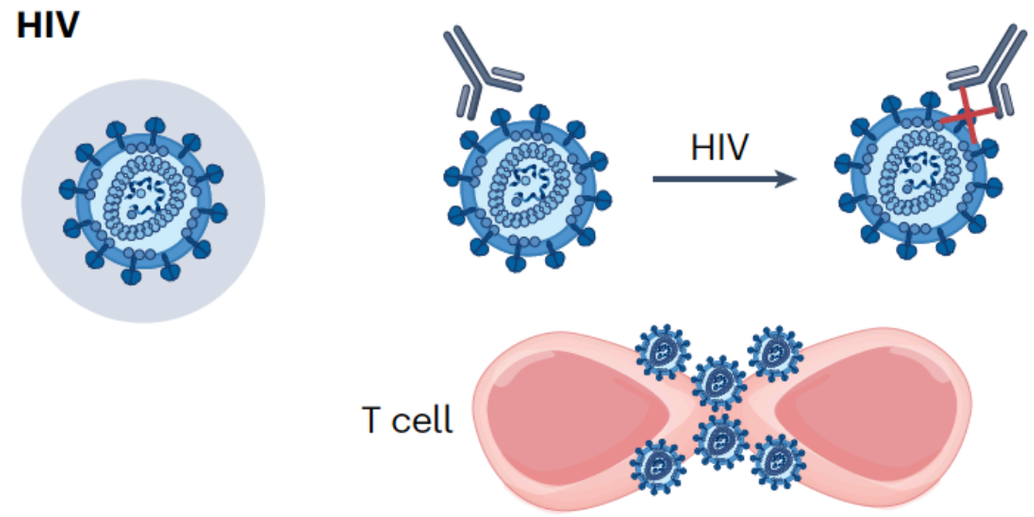
Sigal et al., 2025

Viral persistence by different viruses

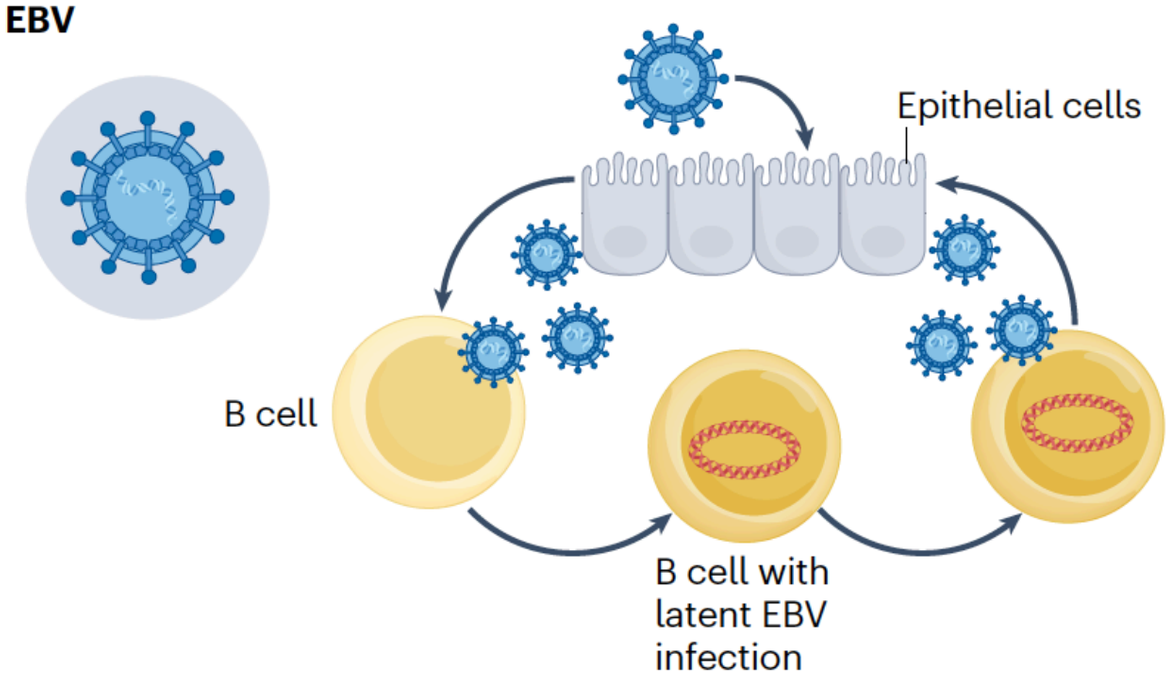
HIV is probably the best studied virus in terms of persistence. In the presence of antiretroviral therapy, which shuts down HIV replication, the latent HIV reservoir in CD4+ T cells and possibly other cell types likely drives persistence.

By contrast, **in untreated or poorly treated infection**, HIV **continues to replicate and mutate**, and this leads to selection of mutations that enable it to evade immune recognition.

The **high mutation rate is a result of error-prone reverse transcription** of the HIV genome during viral replication.

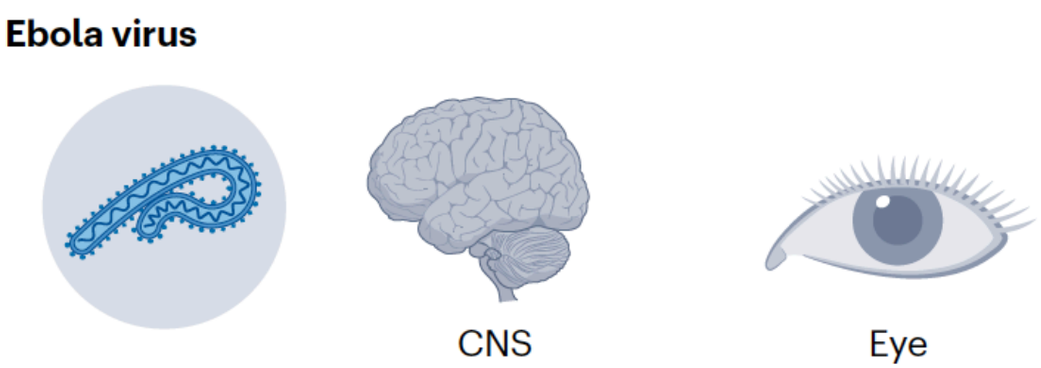


Selection of escape mutants leads to escape from neutralizing antibodies and T cell responses. These continuous genotypic changes are an indicator of HIV that is replicating. HIV has other ways to evade the antibody response. **The virus has few envelope proteins on its surface, making it weakly immunogenic**. It can also **transmit between cells through cell to cell spread**, an infection mode that is more difficult to inhibit than cell-free infection. **HIV can persist and infect cells even if it is bound (opsonized) by neutralizing antibodies**, provided the virus–antibody immune complexes are bound by follicular dendritic cells in the germinal centres. Lastly, HIV can infect and persist in immune privileged sites such as the central nervous system (CNS)



Herpesviruses such as **Epstein–Barr virus (EBV)** have evolved intricate strategies for lifelong persistence. EBV infects both **B cells and epithelial cells**.
It immortalizes and latently persists in the **B cells** as an **episome** that replicates as the cell divides.

Occasional **reactivation** gives the virus a chance to spread to other hosts and expand its reservoir of infected B cells in the original host



Ebola virus is usually thought of as a virus that does not persist but, **rather, kills** the host before the host can mount an effective adaptive immune response.

Yet if the infected person survives, this virus may have compartmentalized persistence in immune privileged anatomical sites: the **CNS, the eye and the reproductive tract**

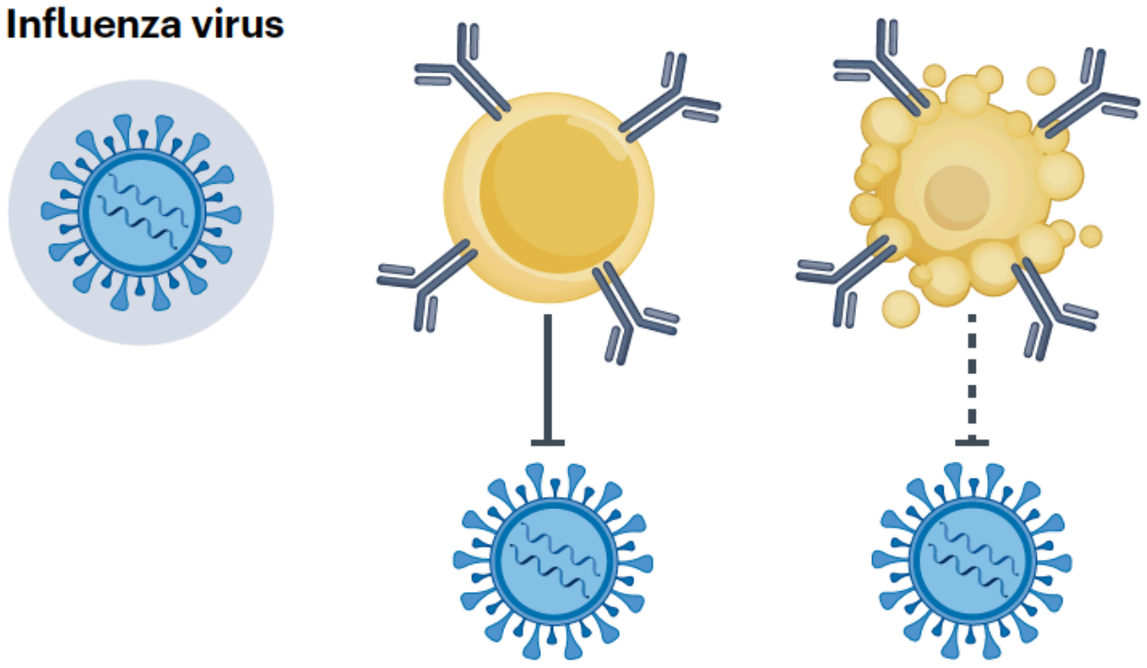
Sigal et al., 2025

Viral persistence by different viruses

Persistent viral infection in people who are **immunocompromised —>** described for respiratory viruses, including influenza virus, parainfluenza virus, rhinovirus, adenoviruses and other human coronaviruses (229E, OC43, NL63 and HKU1).

Genomic sequencing of isolates from cases of prolonged influenza virus infection have demonstrated **intra-host evolution similar to the evolution of the influenza** virus occurring at the **population level.**

Viral persistence in immunocompromise has also been described in multiple non-respiratory viruses that usually cause short infections (dengue virus, Zika virus and norovirus, with norovirus infections sometimes lasting years and showing rapid evolution).
In the recent mpox outbreak, immunocompromise due to advanced HIV disease (defined as a CD4+ T cell count of <200 cells μl–1) led to prolonged infections of the monkeypox virus, with devastating consequences for some of the individuals affected.



Sigal et al., 2025

https://www.issalute.it/index.php/la-salute-dalla-a-alla-z-menu/v/virus-di-epstein-barr-epv

https://www.issalute.it/index.php/la-salute-dalla-a-alla-z-menu/e/ebola?highlight=WyJlYm9sYSJd