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Keeping travellers safe: global trends
in vaccine preventable disease
epidemiology

10:20 am

Disclosures

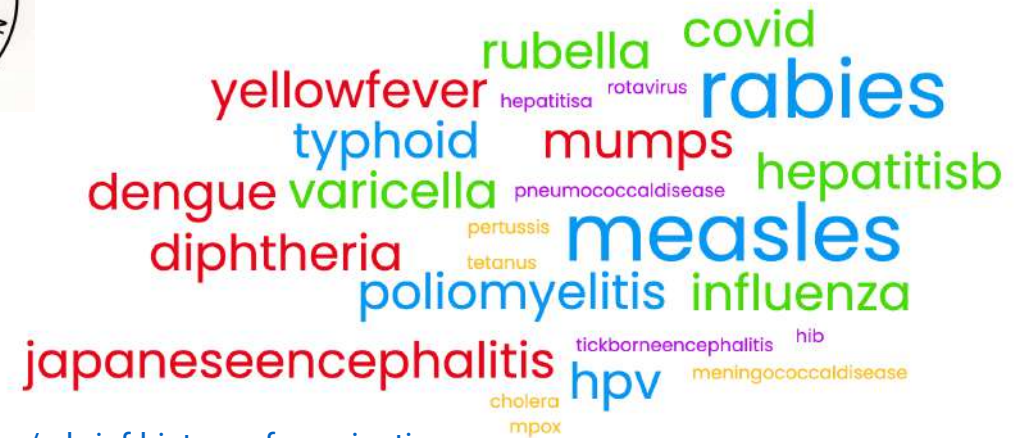
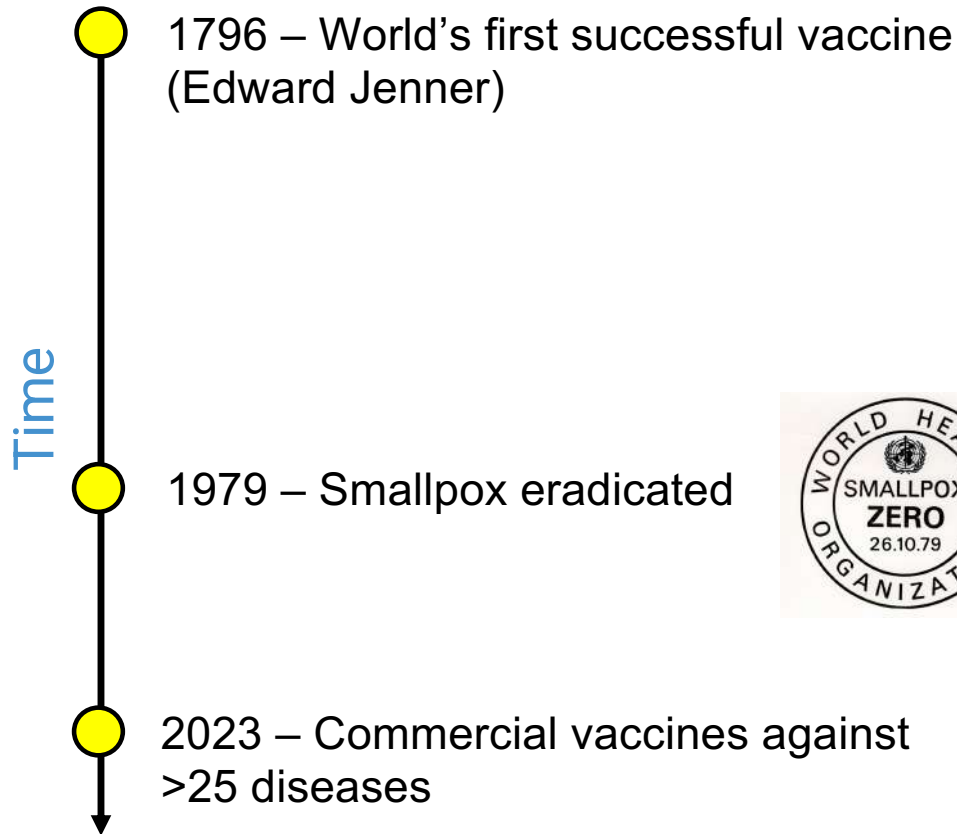


Recipient of research funding from the National Health and Medical Research Council (NHMRC), Royal Australasian College of Physicians (RACP), International Society of Travel Medicine (ISTM), GlaxoSmithKline (GSK)

Receive royalties for contributions to UpToDate (Potential health hazards in travellers to Oceania) and as author/editor of the Manual of Travel Medicine 4th Edition (Springer)

Co-facilitate a paid short course, the Travel Medicine Masterclass, at Monash University

Vaccine history



<https://www.who.int/news-room/spotlight/history-of-vaccination/a-brief-history-of-vaccination>

Why are we here to discuss VPD epidemiology?

Many VPDs continue to cause substantial global burdens



Inequity in access



Vaccine hesitancy



Pandemic-related
disruptions

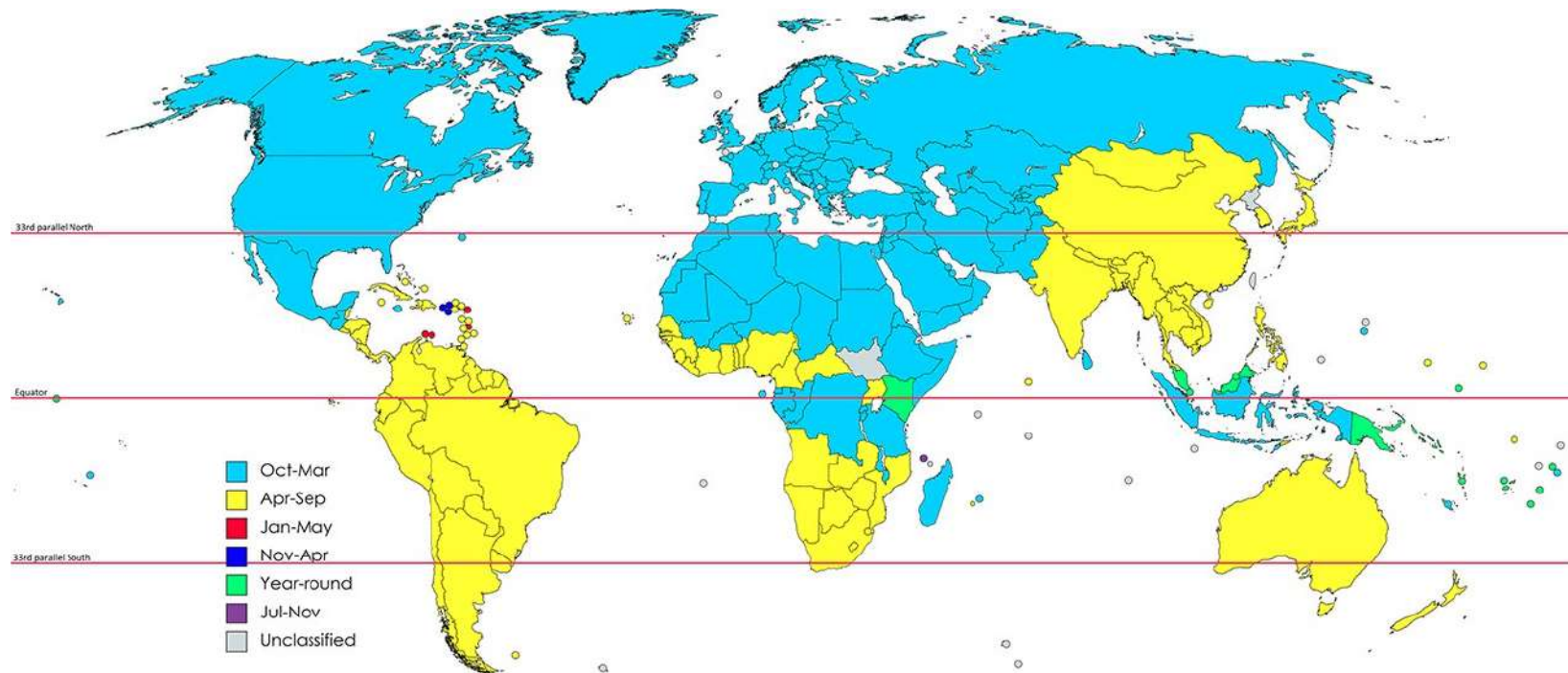
Today's talk



Global trends in 8 VPDs relevant to travellers

- Influenza
- Measles
- Rabies
- Mpox
- Yellow fever
- Hepatitis A
- Typhoid
- Poliomyelitis

Global seasonality of influenza

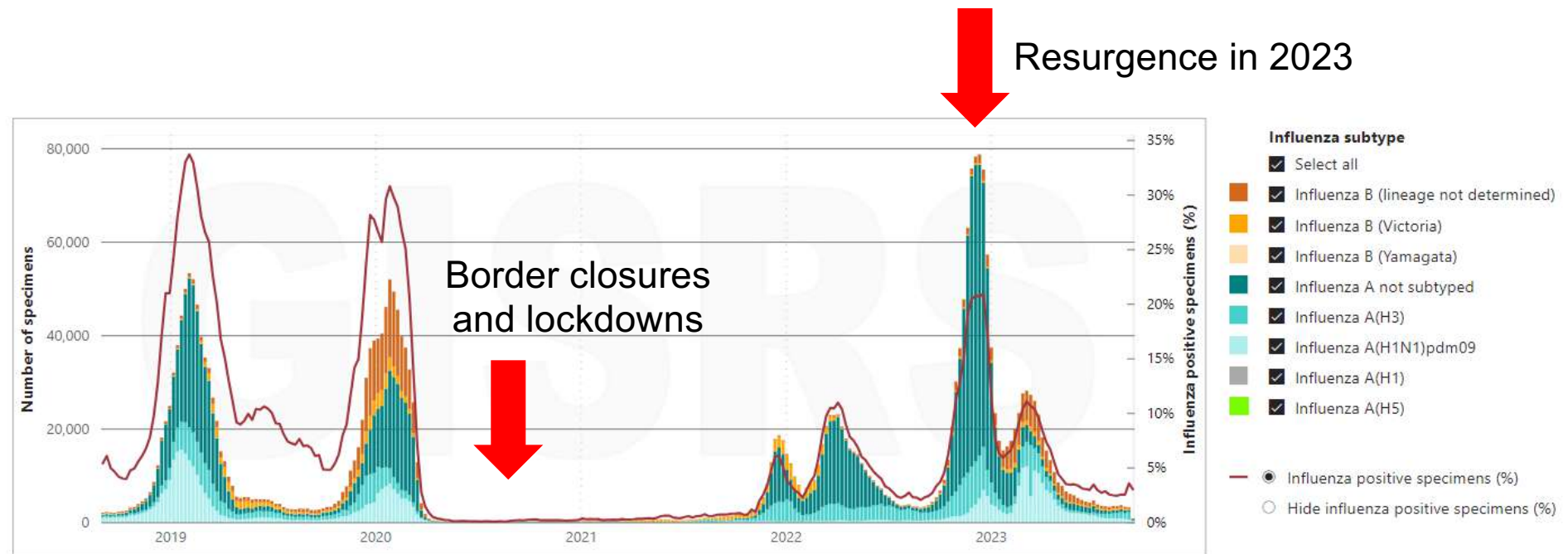


Common in travellers: incidence ~1-3 per 100 travellers/month

Global Influenza surveillance



INFLUENZA LABORATORY SURVEILLANCE INFORMATION Virus detections by subtype reported to FluNet



WHO Global Influenza Programme data: <https://www.who.int/teams/global-influenza-programme/surveillance-and-monitoring/influenza-surveillance-outputs>

Risk groups and environments

Risk factors for severe disease

- Older people
- Infants
- Pregnant women
- Immunocompromised
- Indigenous populations
- People with obesity
- People with chronic conditions
- People who smoke

Cruise ships = high-risk environment

- Mixing of passengers from different hemispheres
- Cool climate
- Close quarters
- Older age groups

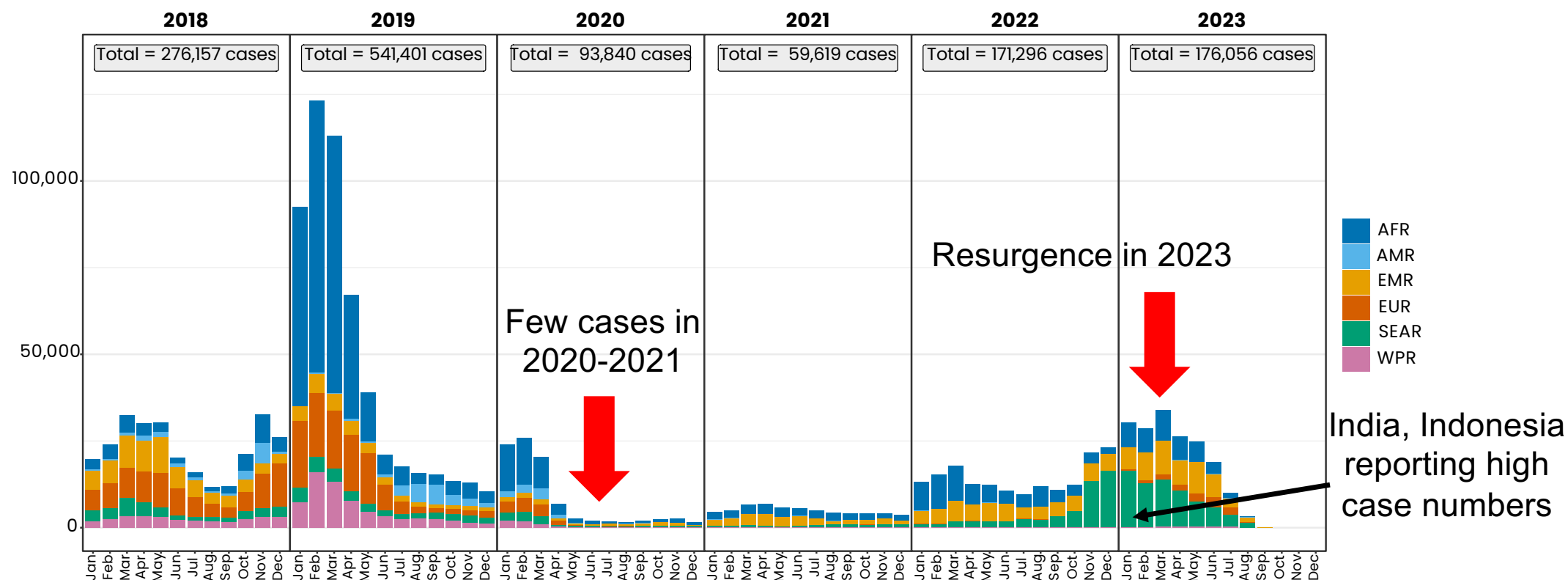


All people ≥ 6 months of age are recommended to receive annual influenza vaccine in Australia



Global Measles Epidemiology

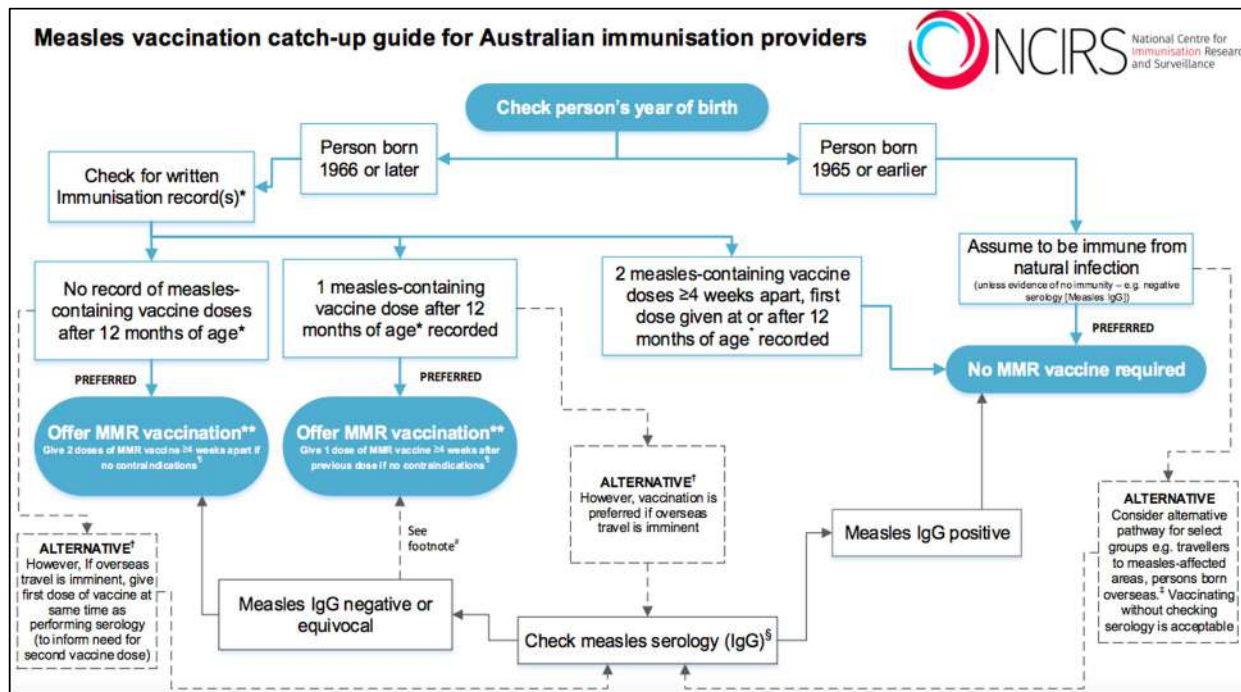
Monthly measles cases by WHO region, 2018-2023



WHO Global Measles and Rubella Monthly Update: <https://www.who.int/teams/immunization-vaccines-and-biologicals/immunization-analysis-and-insights/surveillance/monitoring/provisional-monthly-measles-and-rubella-data>

Measles vaccination

Key risk factor = under- or unvaccinated



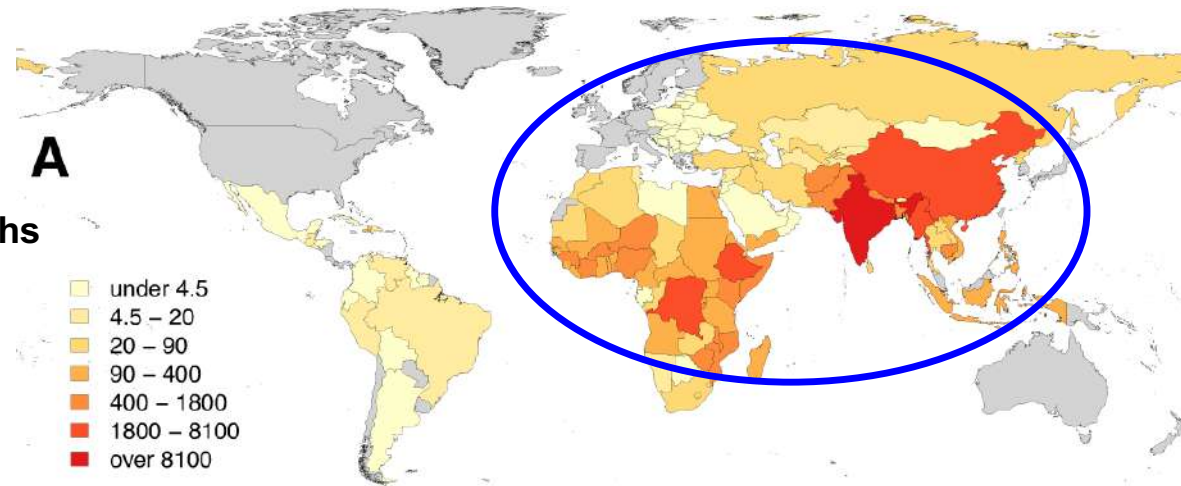
Australians born from **1966 to mid-1990s** more likely to be at risk

(second MMR dose recommended from 1992)

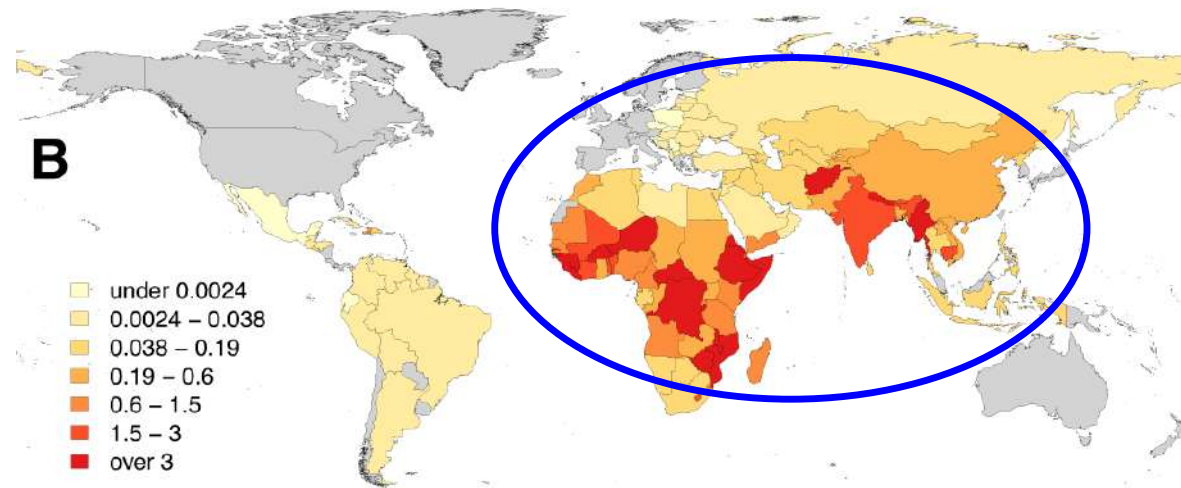
Offer MMR vaccine to anyone born after 1965 who does not have evidence of 2 doses / immunity

Global Rabies Epidemiology

A
Number of human rabies deaths
(total n= \sim 59,000)



B
Deaths per 100,000
population



Rabies in travellers

Potential exposures common

6 per 1000
per month
(1 in 170)



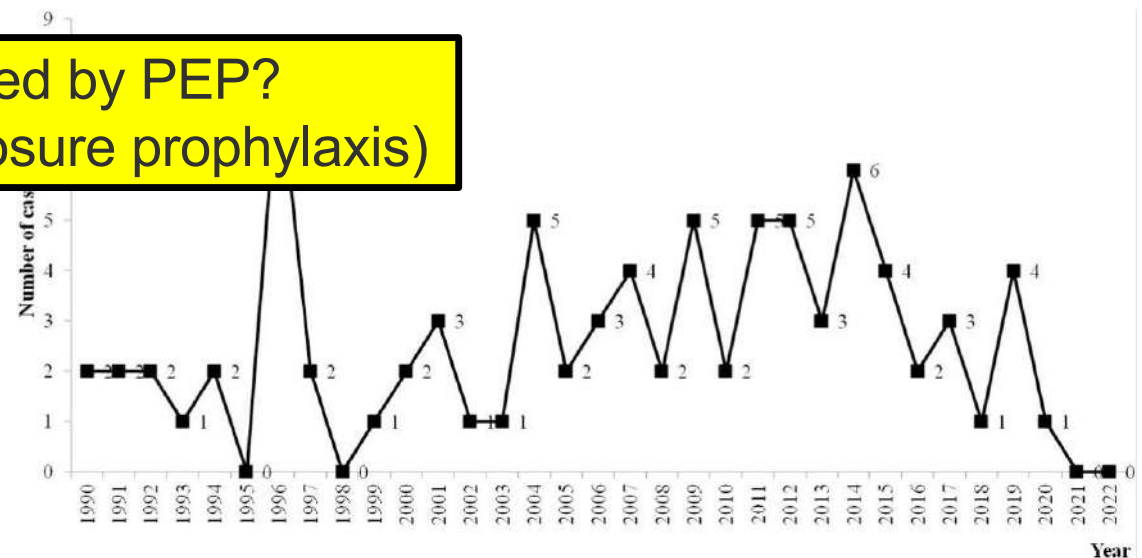
Relatively few deaths

83 fatal cases of imported rabies
reported from 1990-2019 (0-8 per year)

Saved by PEP?
(post-exposure prophylaxis)

Risk factors for exposure:

- Young age (0-15y)
- Male sex
- Travel to Asia
- Pet owner



Access to life-saving PEP limited in many countries

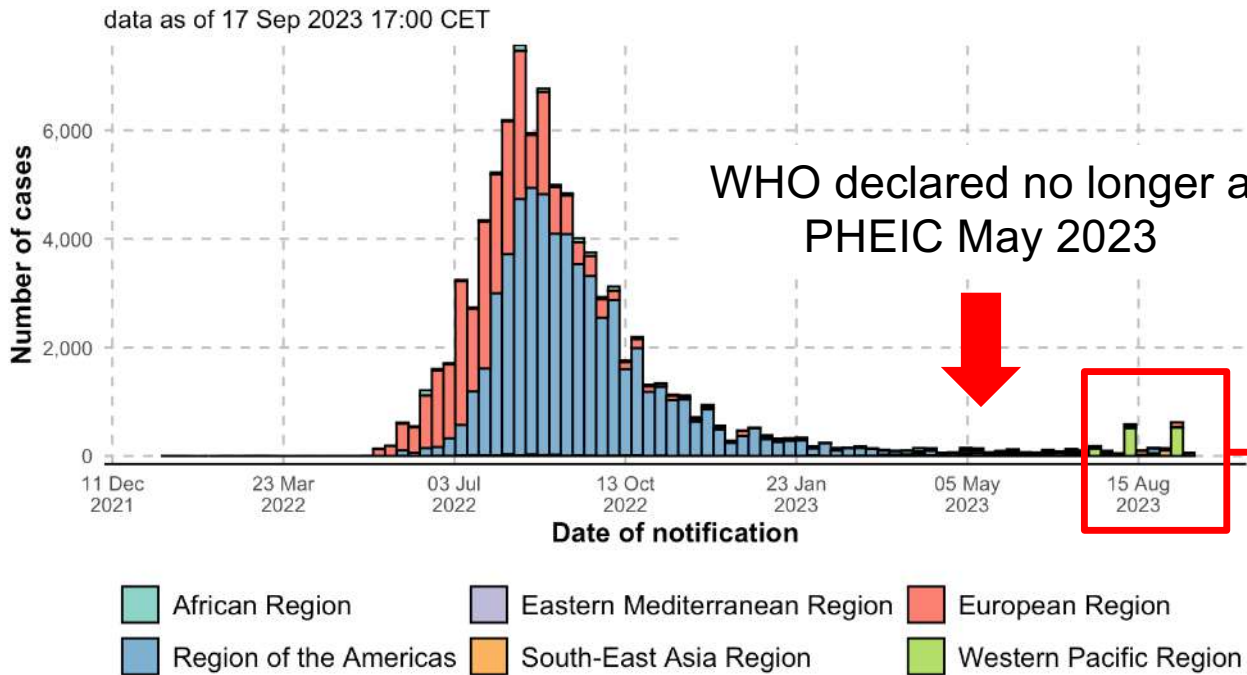


Consider pre-exposure vaccination for any traveller going to rabies-endemic areas

Global Mpox Epidemiology



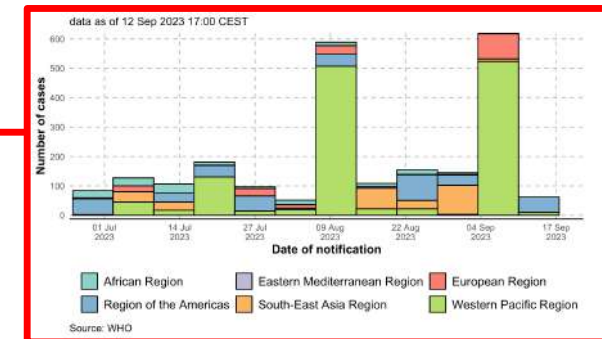
Historically zoonotic disease in Africa



Source: WHO

Different epidemiology

- Low CFR
- Mainly males, MSM

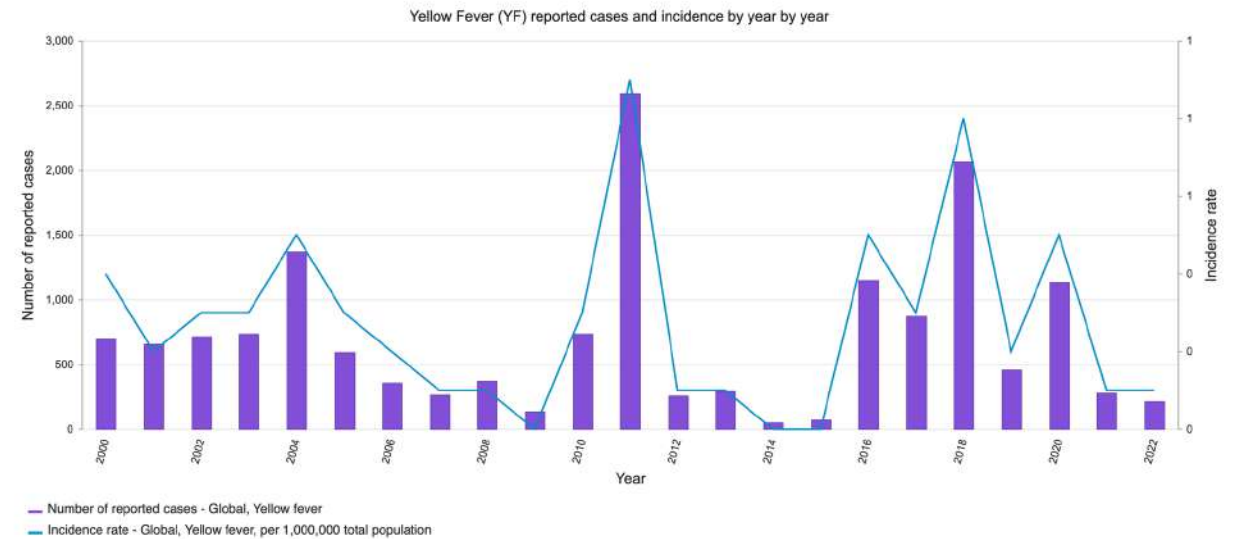


Vaccination recommended for groups at higher risk (e.g. MSM, PLHIV)

WHO 2022-23 Mpox Global Trends: https://worldhealthorg.shinyapps.io/mpx_global/
<https://www.health.gov.au/resources/collections/monkeypox-mpox-resources>

Yellow fever epidemiology

Risk areas – US CDC Yellow Book



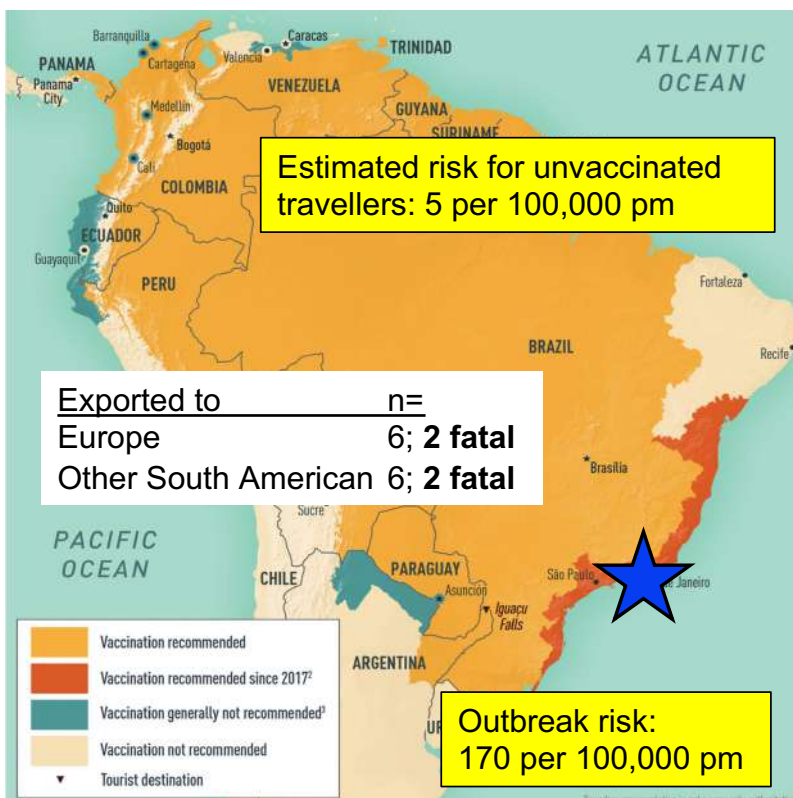
Source: WHO Immunization Data portal
 Date of export: 25/09/2023
 World Health Organization, WHO, 2023, All rights reserved

CDC Yellow Book 2024 <https://wwwnc.cdc.gov/travel/yellowbook/2024/infections-diseases/yellow-fever>;
 WHO: <https://immunizationdata.who.int/pages/incidence/YFEVER.html?CODE=Global&DISEASE=YFEVER>

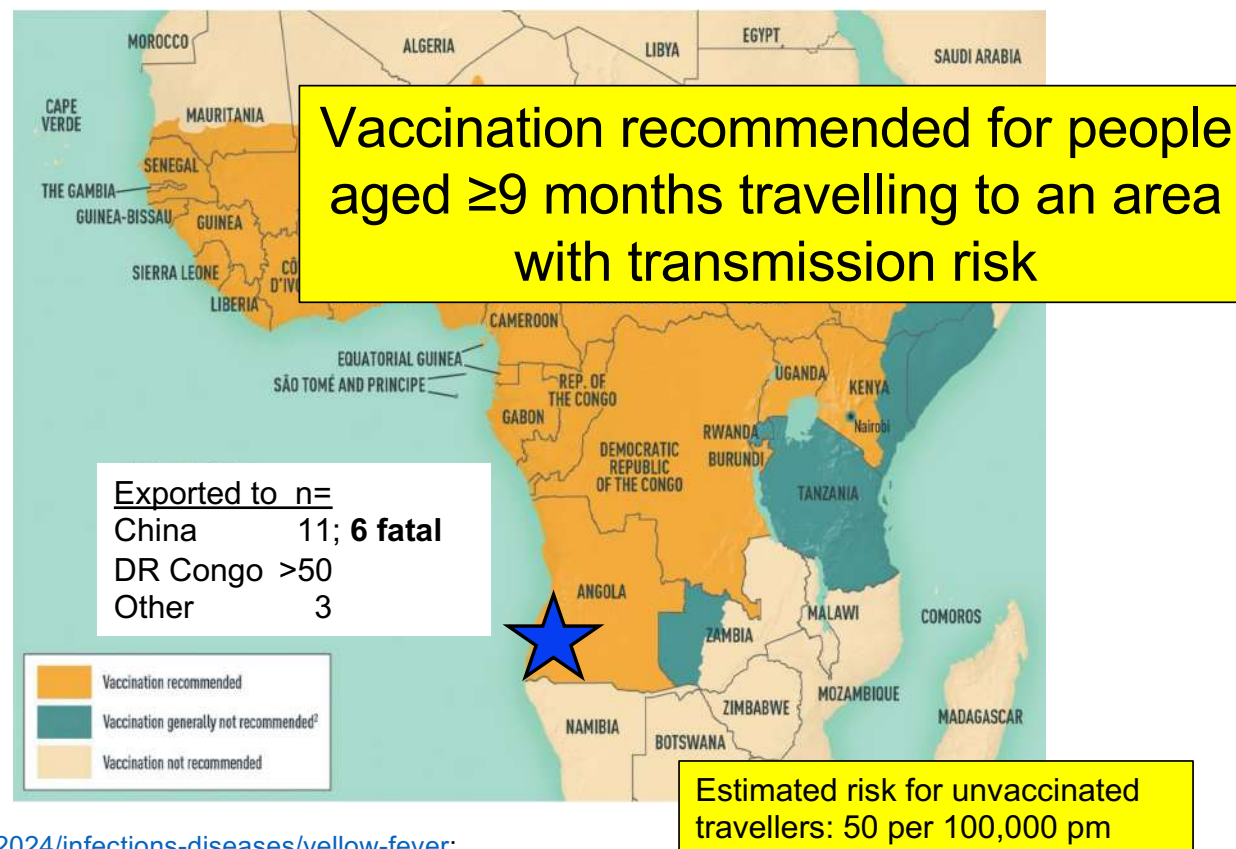


Yellow fever epidemiology

Risk areas – US CDC Yellow Book



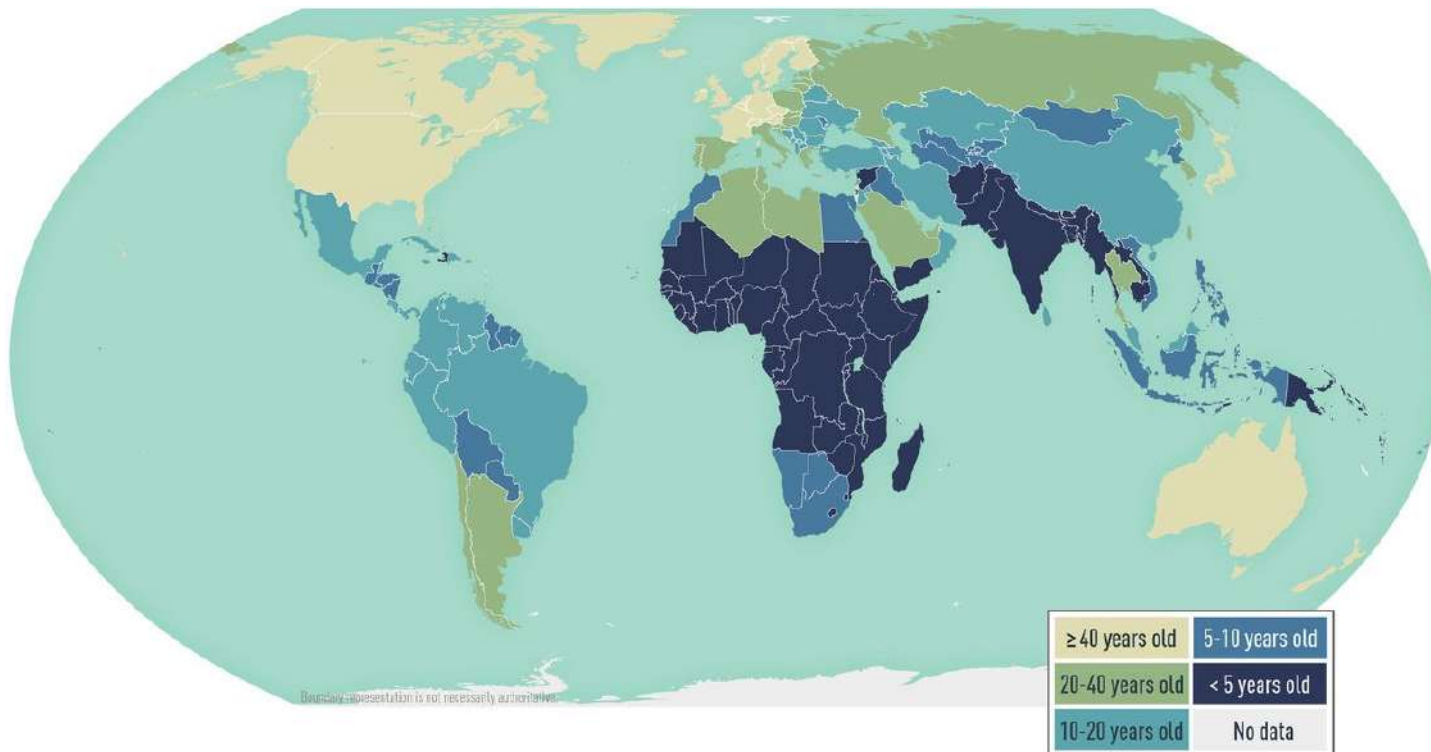
Numerous exported cases during outbreaks in 2016-2018



CDC Yellow Book 2024 <https://wwwnc.cdc.gov/travel/yellowbook/2024/infections-diseases/yellow-fever/>;
 Steffen R et al. *J Travel Med* 2023 <https://doi.org/10.1093/jtm/taad085>

Hepatitis A epidemiology

Estimated age at mid-point of population immunity to hepatitis A, by country



Top 3 countries of exposure in GeoSentinel analysis:

- Morocco
- India
- Pakistan

Occasional cases in travellers to high-income countries (foodborne, MSM)

Vaccination recommended for people aged ≥ 1 year who travel to endemic areas

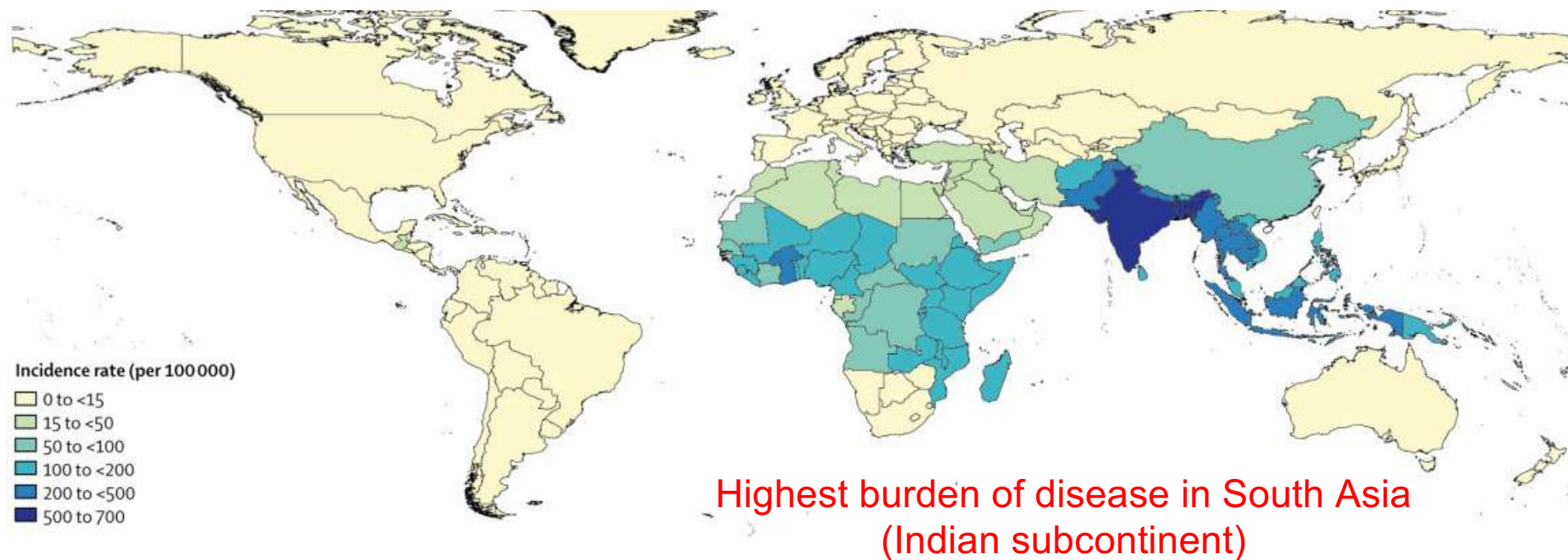
Australian Immunisation Handbook: <https://immunisationhandbook.health.gov.au/contents/vaccine-preventable-diseases/hepatitis-a>

Balogun O et al. *J Travel Med* 2022 <https://doi.org/10.1093/jtm/taac013>

CDC Yellow Book 2024 <https://wwwnc.cdc.gov/travel/yellowbook/2024/infections-diseases/hepatitis-a>

Typhoid (enteric fever) epidemiology

Incidence rates (per 100,000) of typhoid and paratyphoid fevers, by country (2017)



Typhoid risk in travellers

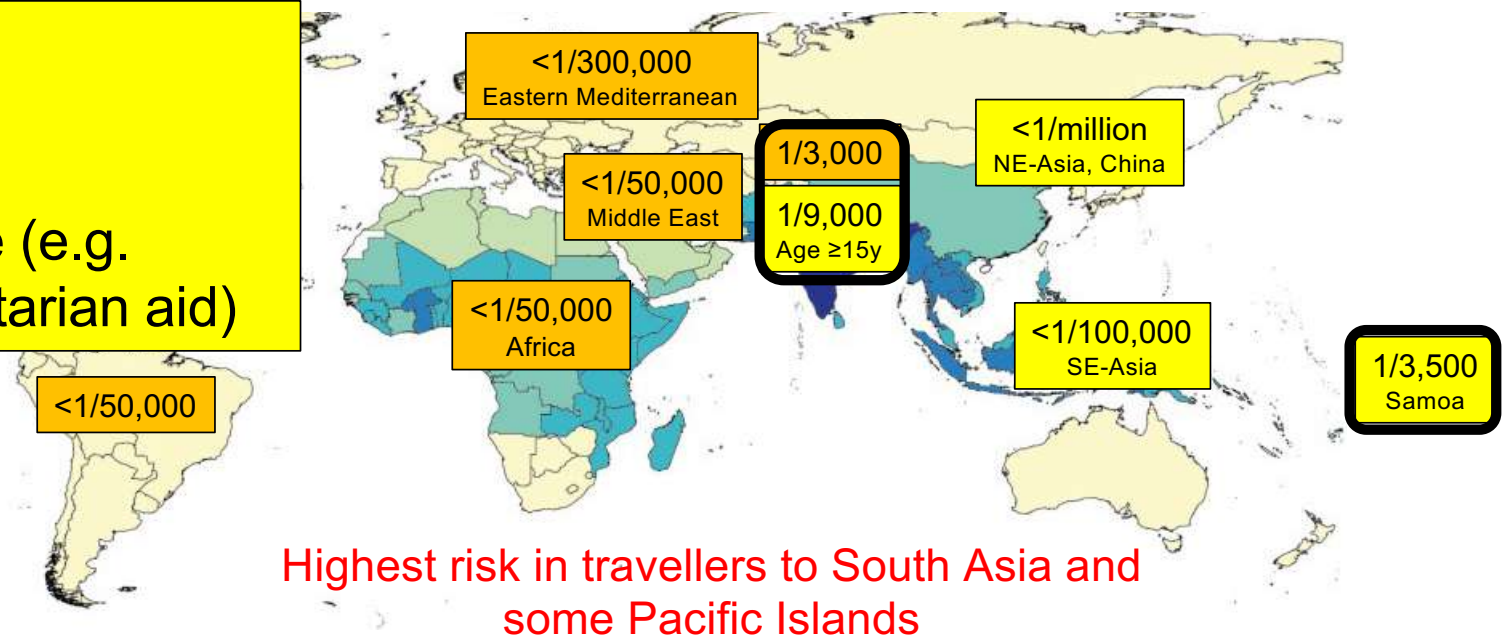
Slide credit: Prof. Robert Steffen, UZH



Incidence rates of typhoid in travellers (coloured boxed)

Risk groups:

- VFR travellers
- Children
- Prolonged exposure (e.g. expatriates, humanitarian aid)



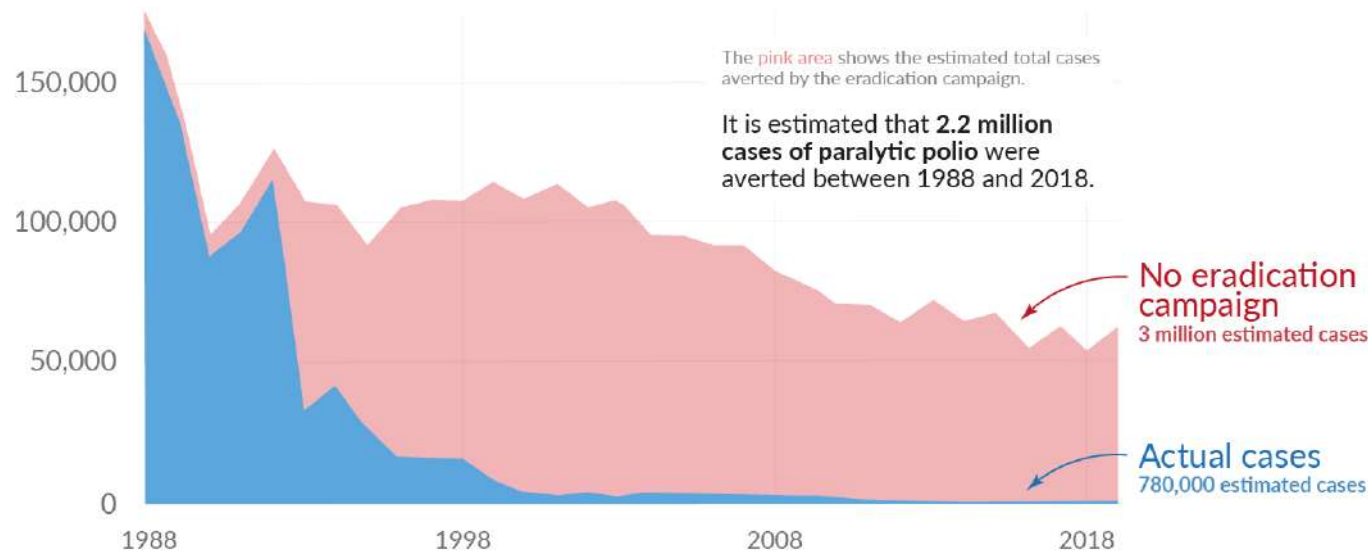
Vaccination recommended for people aged ≥2 years who travel to endemic areas

Greenaway C et al. CATMAT CCDR 2014 (attack rates per trip); Forster DP et al. J Travel Med 2021 <https://doi.org/10.1093/jtm/taab150>

AIH: <https://immunisationhandbook.health.gov.au/contents/vaccine-preventable-diseases/typhoid-fever#recommendations>

Poliomyelitis epidemiology

Estimated global number of paralytic polio cases/yr



Note: The researchers estimated the number of polio cases that would have occurred if polio vaccination followed the same coverage rates as other routine vaccinations.

Source: Kimberly M Thompson and Dominika A Kalkowska (2021). An updated economic analysis of the Global Polio Eradication Initiative (GPEI). *Risk Analysis*.

OurWorldinData.org - Research and data to make progress against the world's largest problems.

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Since 1988:

- >99% decrease in WPV
- ~2.2 million cases averted
- WPV endemic in Pakistan & Afghanistan



Largely thanks to OPV

Poliomyelitis epidemiology

Most reported cases due to circulating vaccine-derived poliovirus (cVDPV)

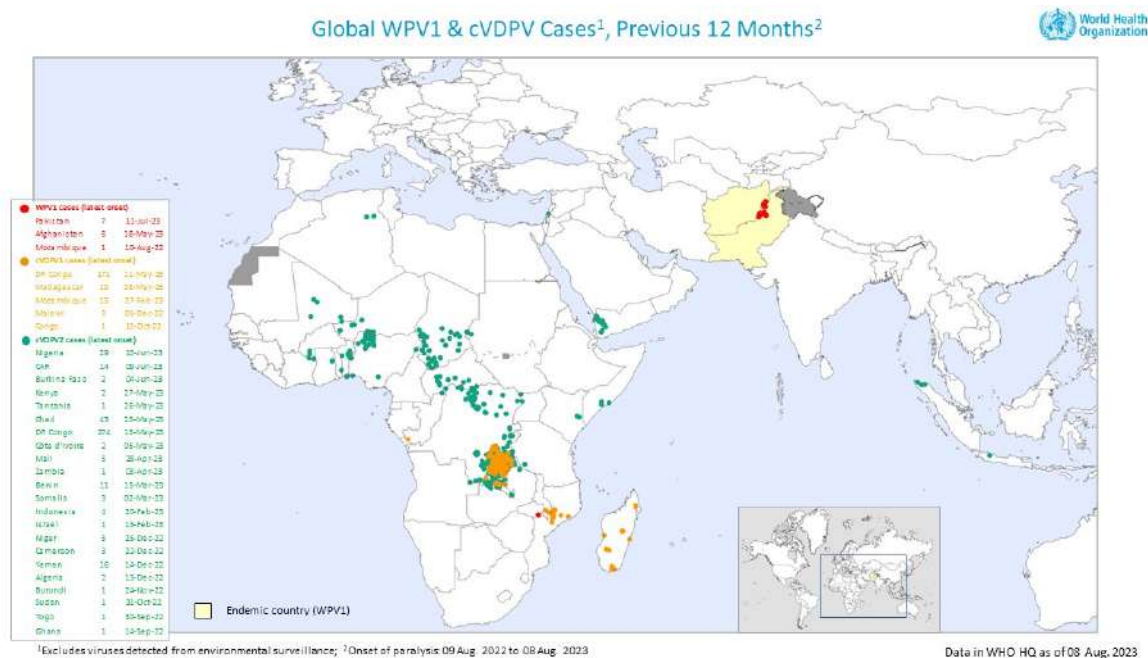
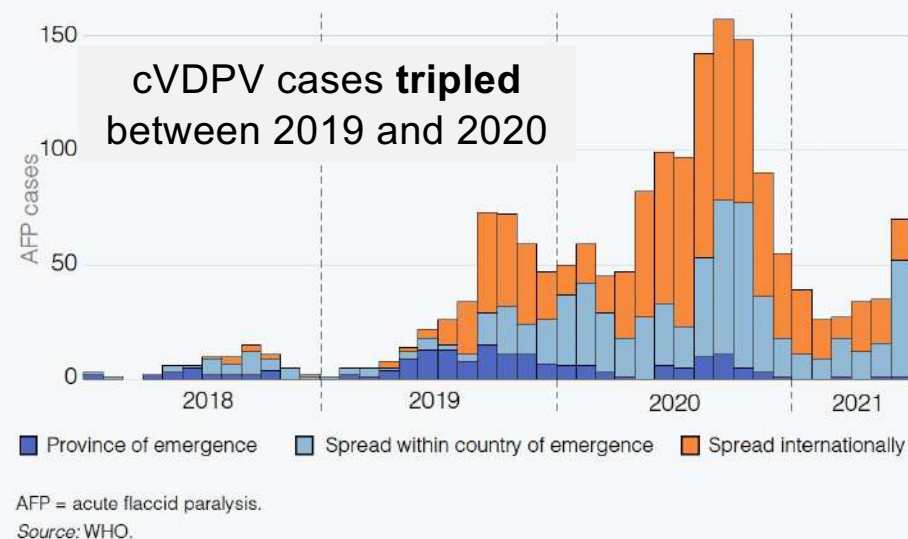


Fig. B3. Monthly cVDPV2 cases, by area of case, January 2018–June 2021



Travellers to areas with polio cases recommended to receive a polio booster (IPV) every 10 years

Global Polio Eradication Initiative: <https://polioeradication.org/polio-today/polio-now/>

Australian Immunisation Handbook: <https://immunisationhandbook.health.gov.au/contents/vaccine-preventable-diseases/poliomyelitis>

Take home messages

- VPDs cause a substantial health burden in travellers
- Resurgence of some VPDs in 2023
- Risk varies by disease and destination
- Ensure travellers are up-to-date with routine vaccines (e.g. measles) and recommended 'travel' vaccines (especially those at higher risk)