One Health and Vaccines

Australian Vaccinology Course
21 October 2026

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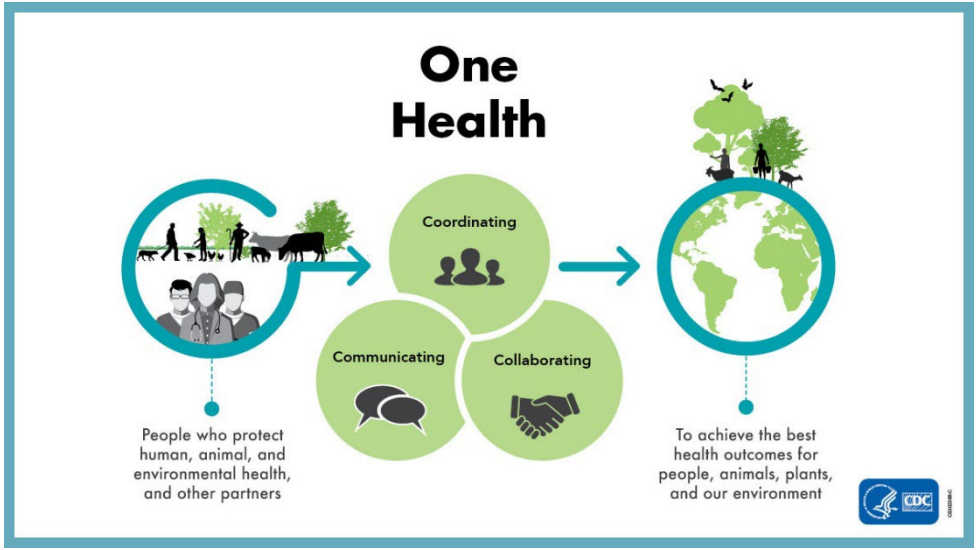


Declaration of Interests

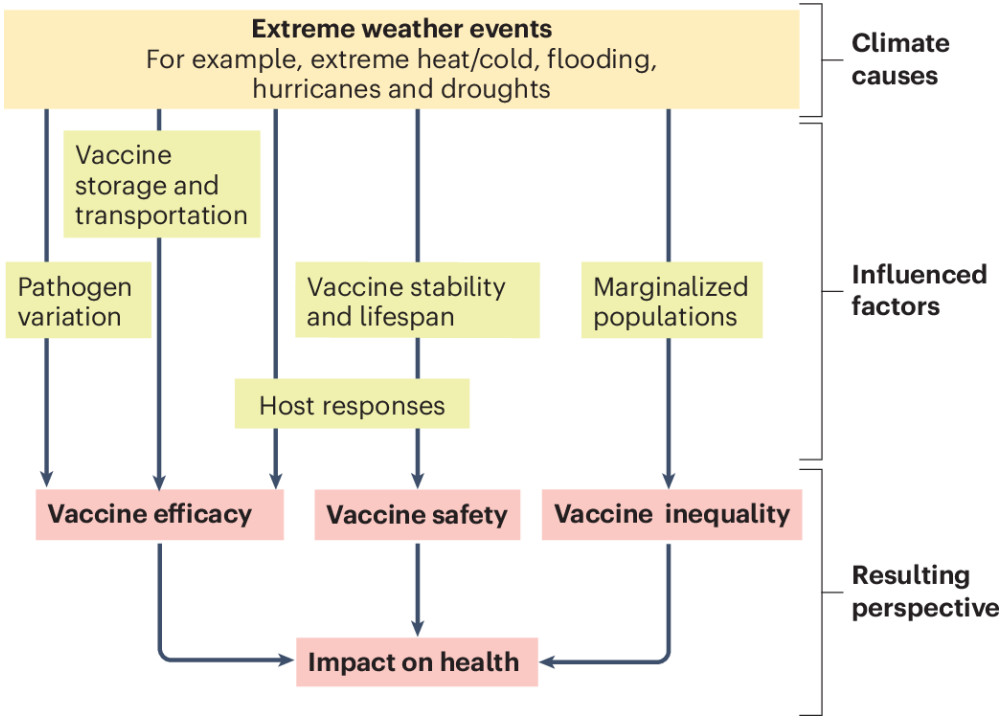
- Current Advisory Committee Roles
  - Co-Chair Immunization Agenda 2030 SP7 (Research and Innovation)/ Member of DSUWG
  - Immunization and Vaccine Implementation Research Advisory Committee (IVIRAC)
  - Immunization Agenda 2030 Data Use and Strengthening Working Group
  - WHO Public Health And Emergency Response Workforce
- Consultant to World Health Organization/ GOARN
- Chair, Australian Regional Immunisation Alliance (ARIA)
- Presenting in personal capacity

One Health

Integrated, unifying approach that aims to sustainably balance and optimise the health of people, animals and ecosystems.



Climate change, vaccines & immunisation

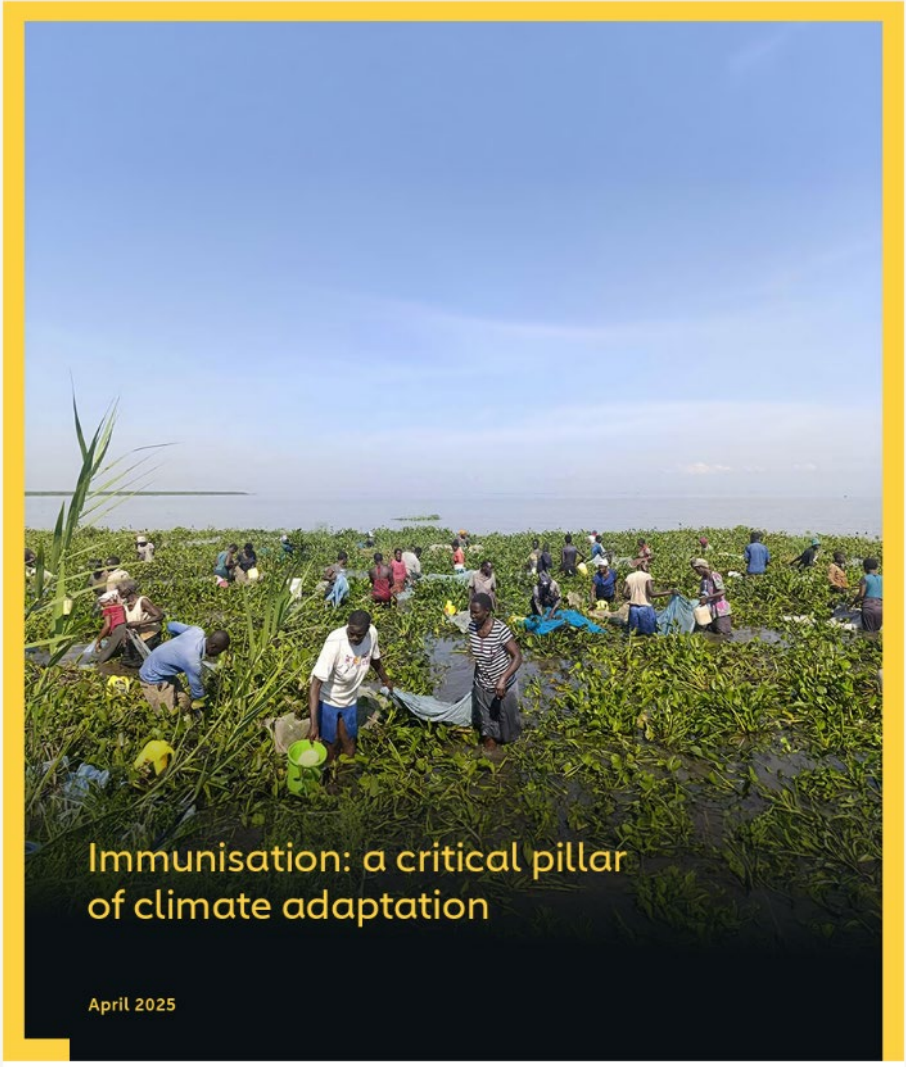


Zhang et al, 2024, Nature climate change



The Intergovernmental Panel on Climate Change recognises immunisation as a critical tool for climate adaptation

- Climate change is expanding the territory of infectious disease - but health gets less than 0.5% of climate adaptation funding.
- Disease burden, supply change, vaccine costs, health workforce



Immunisation and Climate Adaptation, Gavi 2025: https://www.gavi.org/our-alliance/global-health-development/climate-health-immunisation/immunisation-climate-adaptation

One Health and Vaccines



Vector borne diseases

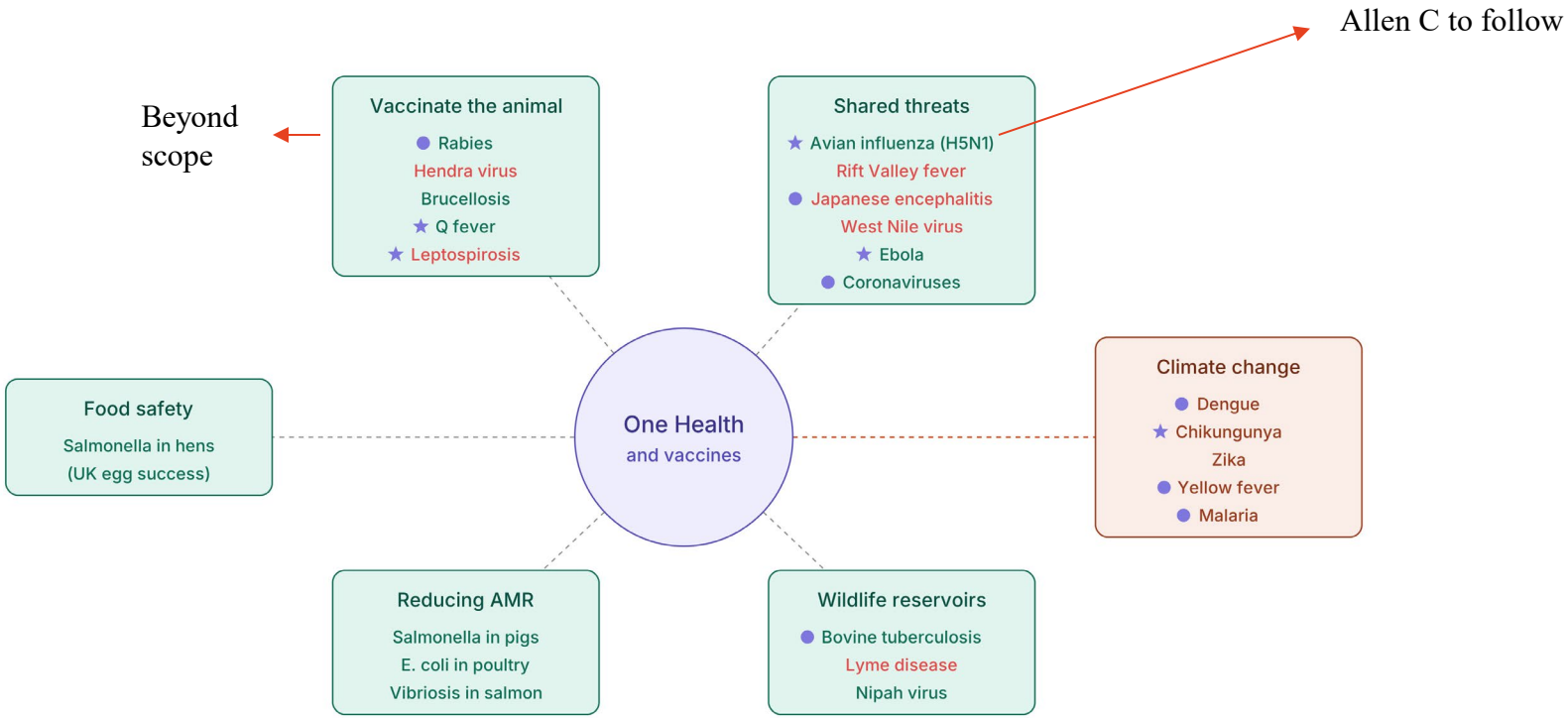


Zoonotic infections



Anti-microbial resistance

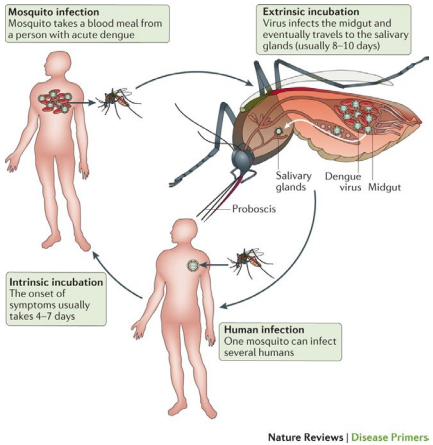
Vaccines across the One Health landscape



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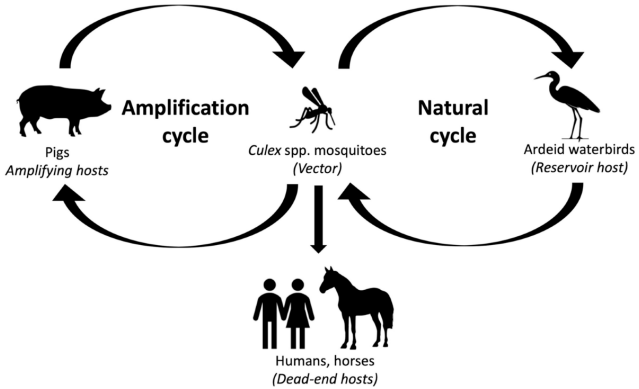
Dengue





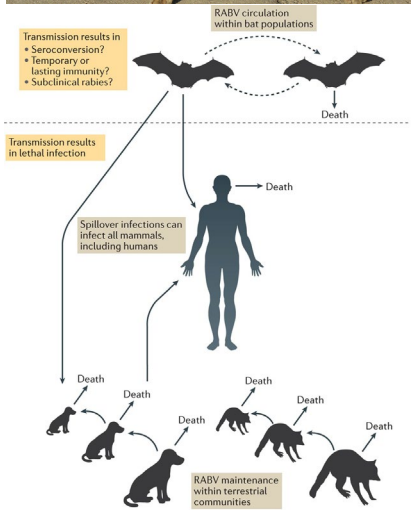
Japanese Encephalitis





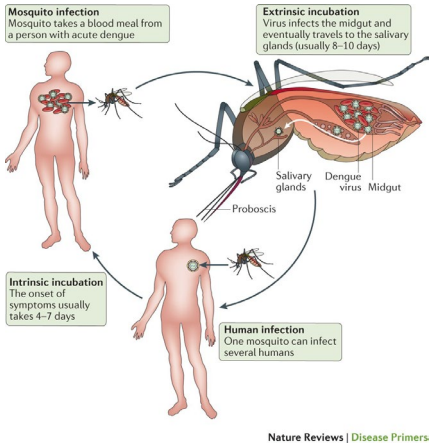
Rabies





Dengue




Mosquito infection
Mosquito takes a blood meal from a person with acute dengue
Extrinsic incubation
Virus infects the midgut and eventually travels to the salivary glands (usually 8–10 days)
Salivary glands
Dengue virus
Midgut
Proboscis
Intrinsic incubation
The onset of symptoms usually takes 4–7 days
Human infection
One mosquito can infect several humans
Nature Reviews | Disease Primers

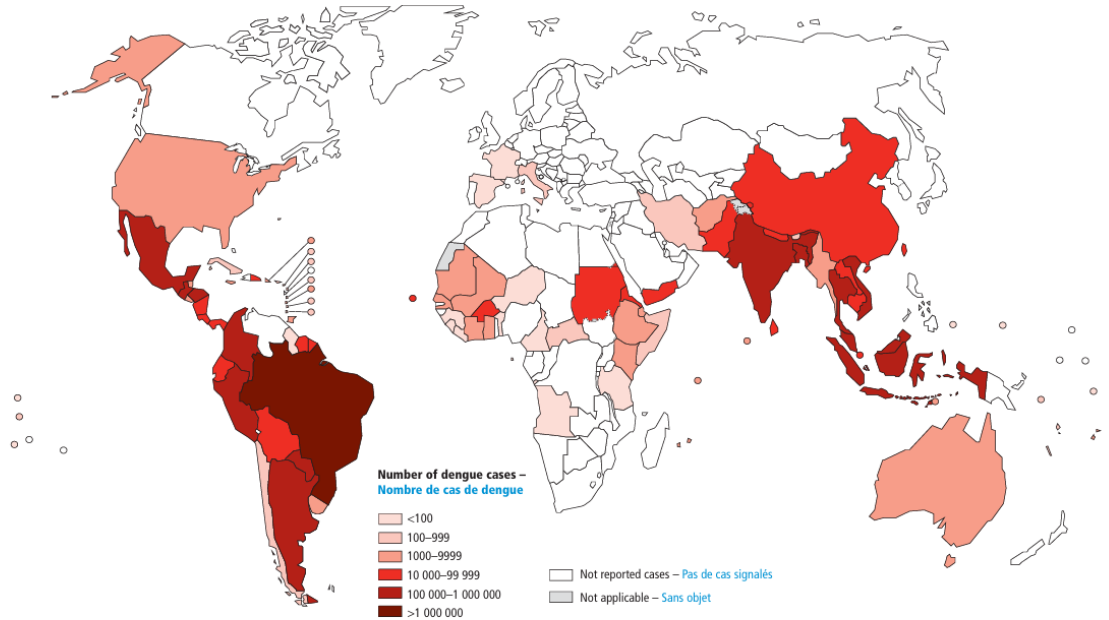
Global distribution of dengue cases, by country, 2024

(as reported by 10 December 2025)

RELEVÉ ÉPIDÉMIOLOGIQUE HEBDOMADAIRE, N° 52, 26 DECEMBRE 2025

Map 1 **Global distribution of dengue cases, by country, 2024 (as reported by 10 December 2025)**

Carte 1 **Répartition des cas de dengue dans le monde, par pays, 2024 (données en date du 10 décembre 2025)**



The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement. © World Health Organization (WHO), 2025. All rights reserved. – Les limites et appellations figurant sur cette carte ou les désignations employées n'impliquent de la part de l'Organisation mondiale de la Santé aucune prise de position quant au statut juridique des pays, territoires, villes ou zones, ou de leurs autorités, ni quant au tracé de leurs frontières ou limites. Les lignes en pointillé sur les cartes représentent des frontières approximatives dont le tracé peut ne pas avoir fait l'objet d'un accord définitif.© Organisation mondiale de la Santé (OMS), 2025. Tous droits réservés.

Data source: World Health Organization. – Source des données: Organisation mondiale de la Santé.

Map production: Malaria & Neglected Tropical Diseases (MNT), World Health Organization. – Production de la carte: Paludisme & maladies tropicales négligées (MNT), Organisation mondiale de la Santé.

https://www.who.int/publications/i/item/who-wer10052-665-678

Dengue vaccines

Vaccine	Maker	Doses	Status
Dengvaxia (CYD-TDV)	Sanofi	3	Being discontinued (low global demand, not safety). Only for people with confirmed previous dengue infection.[1,2]
Qdenga (TAK-003)	Takeda	2 (0 and 3 months)	TGA-approved March 2026 for ages ≥4 years; no pre-vaccination screening; not for use in pregnancy. WHO recommends it for ages 6–16 in high-transmission settings.[3,4]
Butantan-DV	Instituto Butantan (Brazil)	1	First single-dose dengue vaccine, approved in Brazil November 2025 for ages 12–59. Efficacy 74.7% overall, 91.6% against severe dengue.[5,6] Paused in June 2026.
V181 *(pipeline)*	MSD	1	Phase 3 trial (MOBILIZE-1) in ~12,000 children aged 2–17 in Indonesia, Malaysia, the Philippines, Singapore, Thailand and Vietnam.[7]

1. Singapore Ministry of Health. Discontinuation of Dengvaxia and ongoing monitoring of dengue vaccines, 2025.
2. Sridhar S, et al. Effect of dengue serostatus on dengue vaccine safety and efficacy. N Engl J Med 2018;379:327–40.
3. TGA. Australian Public Assessment Report for Qdenga, June 2026; ATAGI statement on the clinical use of Qdenga, Sept 2026.
4. WHO. Dengue vaccines: WHO position paper, May 2024. Wkly Epidemiol Rec 2024.
5. Kallás EG, et al. Live, attenuated, tetravalent Butantan–dengue vaccine in children and adults. N Engl J Med 2024;390:397–408.
6. Instituto Butantan / Anvisa approval announcement, 26 November 2025 (five-year follow-up efficacy).
7. ClinicalTrials.gov NCT07013487 (V181-005, MOBILIZE-1); MSD press release, 12 June 2025.

AI generated table

Qdenga: the only WHO-recommended dengue vaccine still in production, ≥6yo, 60% seroprevalence



Australian Government
Department of Health, Disability and Ageing
Therapeutic Goods Administration

Home | Product regulation | Safety and shortages | Resources and guidance | Business services

Home > Resources and guidance > Australian prescription medicine decision summaries

Qdenga dengue tetravalent vaccine (live, attenuated) dengue virus serotypes 1, 2, 3, and 4.

Australian Prescription Medicine Decision Summary

Qdenga is a vaccine approved to provide protection against dengue disease for adults, adolescents, and children aged 4 years and over. Qdenga contains the active ingredients dengue virus serotype 1, 2, 3 and 4 (live, attenuated).

Published: 20 April 2026

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Australian Government
Department of Health, Disability and Ageing

AUSTRALIAN TECHNICAL ADVISORY GROUP ON IMMUNISATION (ATAGI) | **CLINICAL ADVICE**

Version 1 Issue date: 24 September 2026

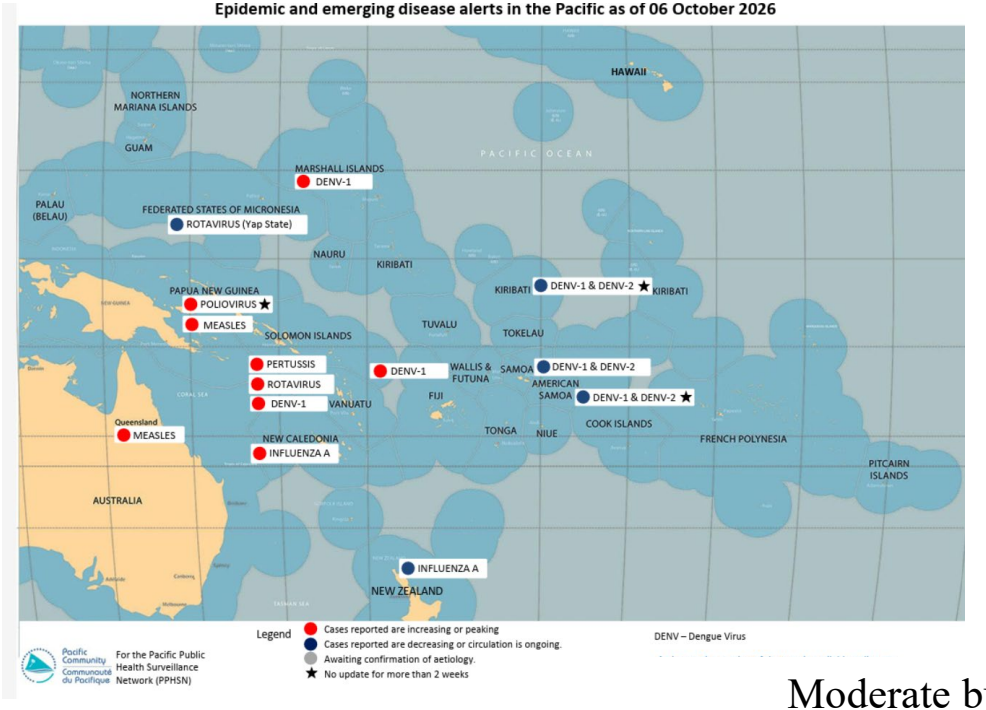
STATEMENT ON THE CLINICAL USE OF THE DENGUE VACCINE QDENGA FOR AUSTRALIANS

A new dengue chapter is being developed for the Australian Immunisation Handbook. In the interim, refer to this statement, complemented by the Australian Immunisation Handbook, for clinical practice guidance.

Key Points

- Qdenga is the only dengue vaccine available in Australia to protect against serious disease caused by the dengue virus (Table 1).
- Qdenga is a **live-attenuated tetravalent dengue vaccine** registered for use in **people aged ≥4 years**.
- Qdenga is **contraindicated in people who are immunocompromised** (see Vaccination for people who are immunocompromised), including those who will be receiving immunosuppressive treatment within 4 weeks of vaccination. People living with HIV who are not immunocompromised can receive Qdenga (see Table. Levels of immunocompromise in children and adults with HIV).

Repeated Pacific outbreaks



This article is more than **1 year old**

Rise in dengue fever outbreaks across the Pacific driven by the climate crisis, experts say

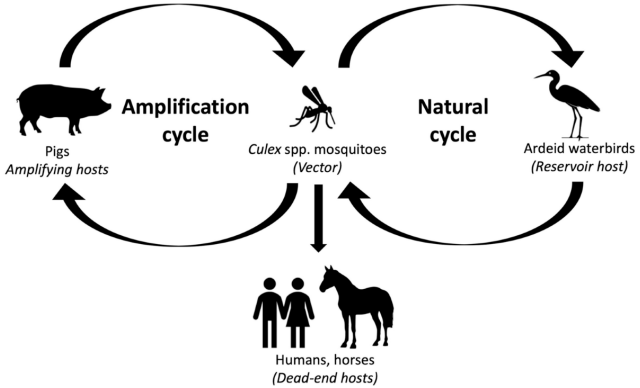
Samoa, Fiji and Tonga among the worst affected amid warning the disease and others will become 'more common and more serious' as the planet warms



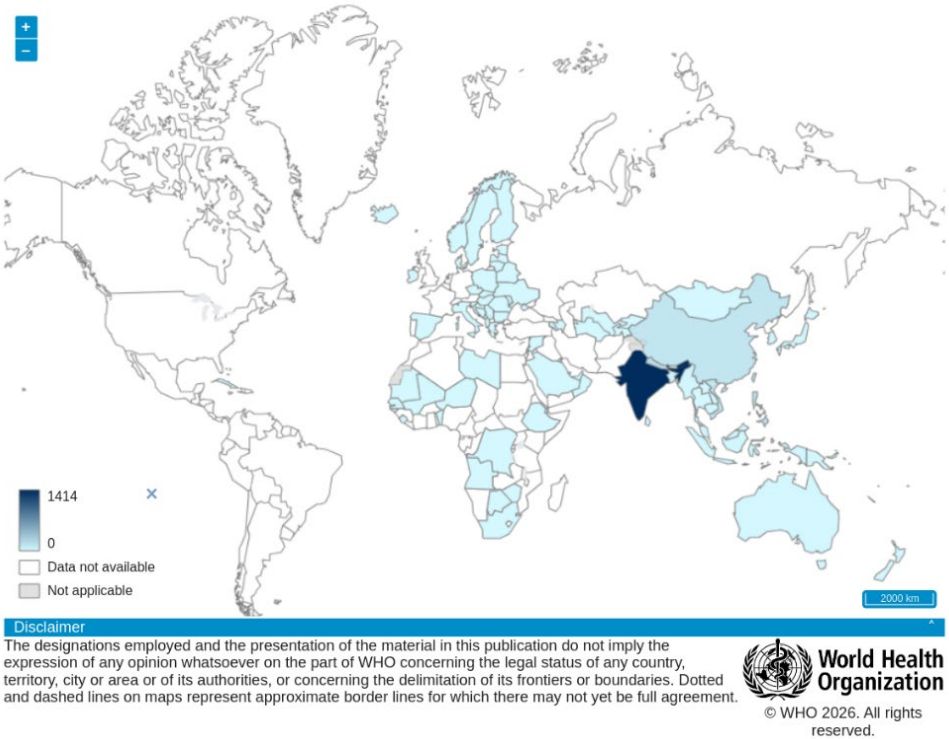
Moderate burden? Lack of evidence to support vaccine introduction? data against serotype 3 and subsequent infections

Japanese Encephalitis





Japanese Encephalitis number of reported cases



- 24 countries in SEA/WPR
- Up to 30% of people with symptoms die.
- 20–30% of survivors have lasting neurological effects, such as seizures, hearing or vision loss, memory and speech problems, or limb weakness.

Downloaded 20/10/26

2022 JEV outbreak in Australia

Warning about mosquito-borne viruses in SA, Victoria and NSW after one person dies and seven sent to hospital

By Eugene Boisvert | By Eden Hynninen | By Charmayne Allison | Insects

Mon 28 Feb 2022



People are urged to use

This article is more than **3 years old**

Three people in Victoria in hospital with Japanese encephalitis after virus found in pigs

Victoria reports four cases of virus that spreads through mosquito bites and cannot be caught by eating pig product

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Australian Government
Department of Health, Disability and Ageing

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Japanese encephalitis virus situation declared a Communicable Disease Incident of National Significance

Dr Mark Schipp, Australia's Chief Veterinary Officer and Dr Sonya Bennet, Australia's Acting Chief Medical Officer have today declared the Japanese encephalitis virus situation a Communicable Disease Incident of National Significance (CDINS).

Date published: 4 March 2022

The NEW ENGLAND JOURNAL of MEDICINE

CURRENT ISSUE SPECIALTIES TOPICS

CORRESPONDENCE

Japanese Encephalitis in Australia — A Sentinel Case

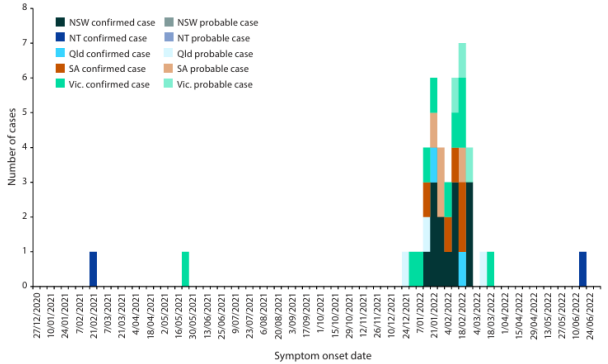
Published August 17, 2022 | N Engl J Med 2022;387:661-662 | DOI: 10.1056/NEJMc2207004 | VOL. 387 NO. 7

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TO THE EDITOR:

On March 4, 2022, Japanese ence
of national significance" in Austr
encephalitis virus (JEV) in mumn
commercial piggeries across four
recognition of human cases of Ja
of infection that had led to 5 deat

Figure 1: Japanese encephalitis virus cases (confirmed and probable) in Australia by jurisdiction of residence and symptom onset week,[a,b] 1 January 2021 – 30 June 2022

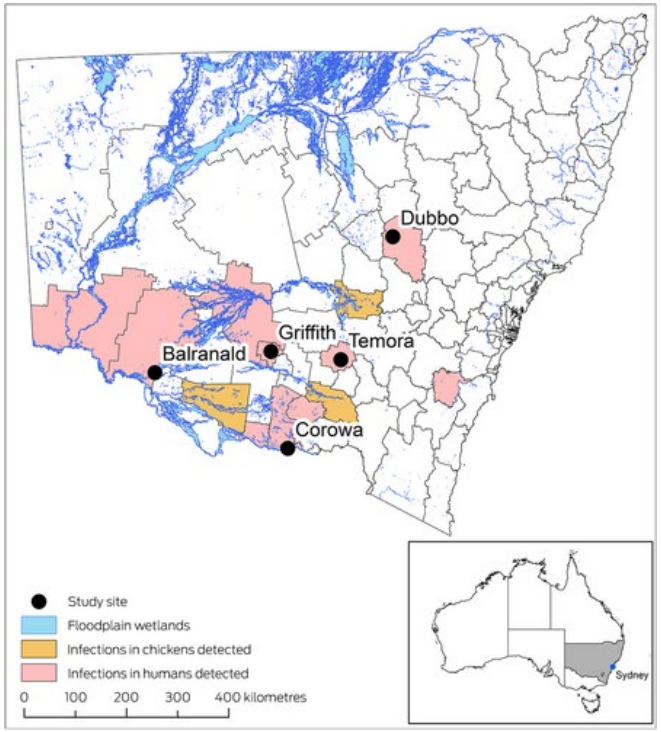


a Source: Australian Government Department of Health and Aged Care Japanese Encephalitis Virus Outbreak REDCap Database.
b Date of symptom onset or date of first specimen collection if date of symptom onset is missing.

https://www.health.gov.au/news/japanese-encephalitis-virus-situation-declared-a-communicable-disease-incident-of-national-significance

Commun Dis Intell (2018) 2025;49 (https://doi.org/10.33321/cdi.2025.49.005)

2022 JEV outbreak in New South Wales, Australia



The University of Sydney

The seroprevalence of antibodies to Japanese encephalitis virus in five New South Wales towns at high risk of infection, 2022: a cross-sectional serosurvey

Zoe Baldwin, Linda Hueston, April Roberts-Witteveen, Priscilla Stanley, Meru Sheel, Noni Winkler, Archana Koirala, Kristine Macartney, Jennifer Case, Kirsty Hope, Keira M Glasgow

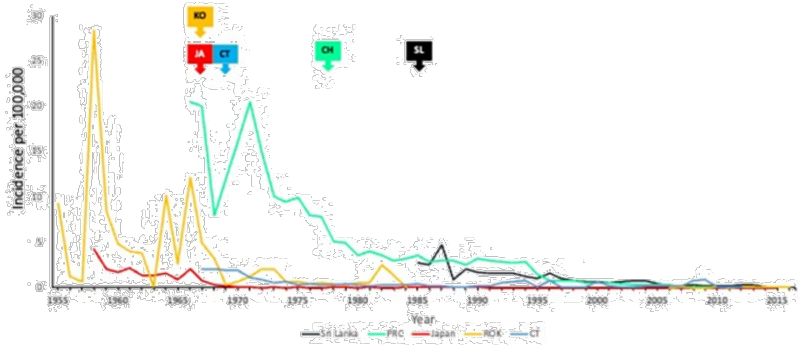
- About 1 in 11 participants (9%) at ecological risk had JEV antibodies, suggesting unrecognised infection in the previous season
- Vaccination against JEV in areas of NSW at particular risk of JEV accompanied with mosquito control & communication campaigns
- One Health approach

Current recommendations: high-risk & travellers
https://immunisationhandbook.health.gov.au/contents/vaccine-preventable-diseases/japanese-encephalitis

JEV Vaccines

Age at vaccination	Vaccine	Number of doses	Booster
≥2 months to <18 years	JEspect	2 doses (4 weeks apart)	1–2 years after primary vaccination if ongoing risk of JE virus exposure
≥9 months to <18 years	Imojev	1 dose	1–2 years after primary dose if ongoing risk of JE virus exposure
≥18 years	Imojev	1 dose	Not required
	JEspect	2 doses (4 weeks apart)	1–2 years after primary vaccination if ongoing risk of JE virus exposure

Impact of vaccination against Japanese encephalitis in endemic countries



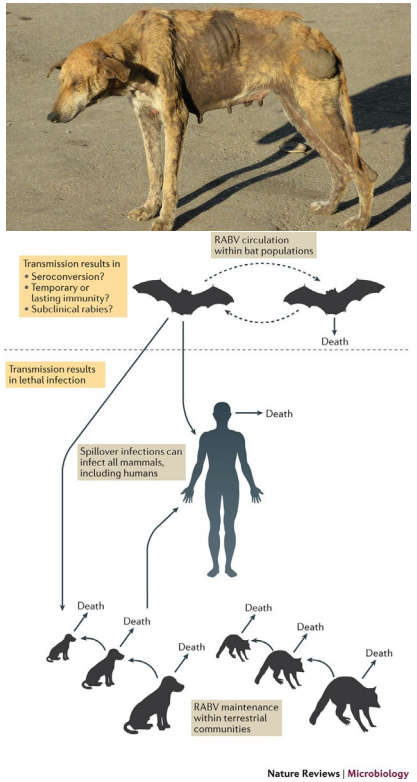
National or sub-national programs - Sri Lanka (SL), People's Republic of China (CH), Japan (JA), Chinese Taipei (CT), and the Republic of Korea (KO)

(Leston et al, 2024, PLoS NTD; Vannice et al, 2021, npj vaccines)

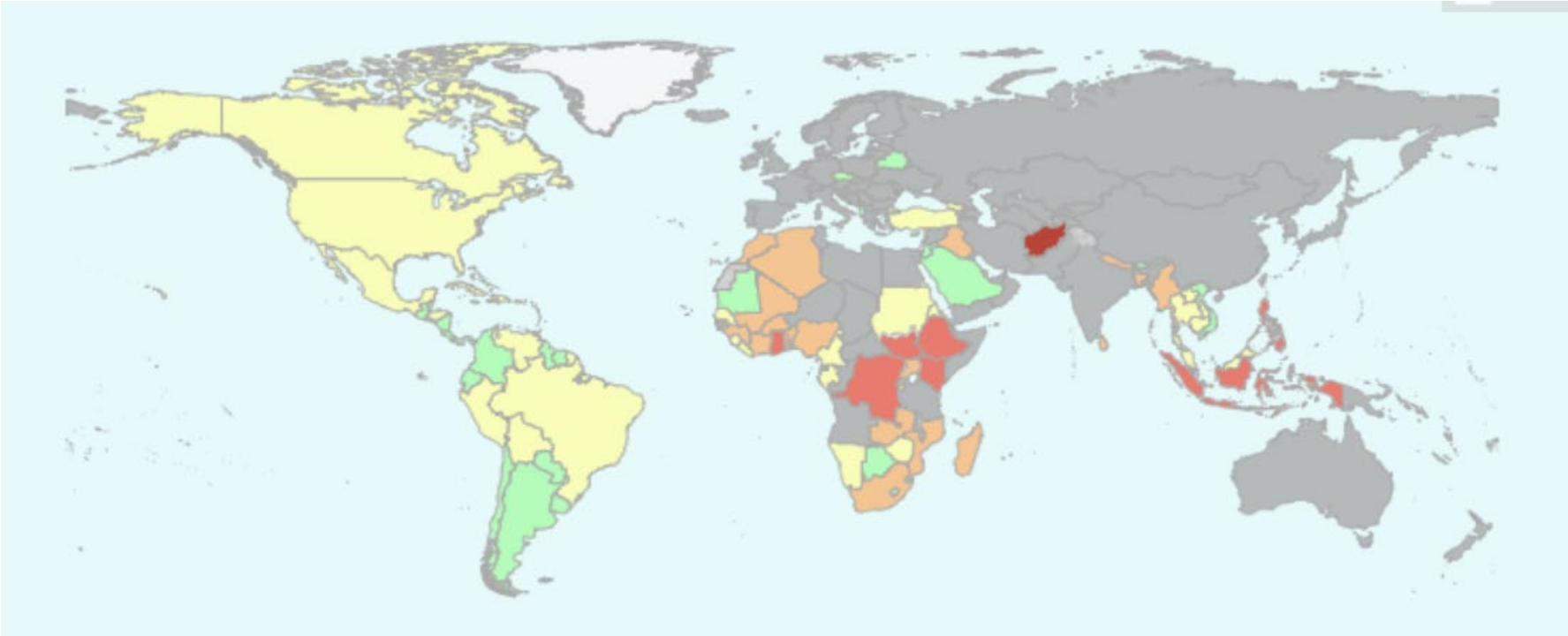
Other countries with JE vaccination – India, Lao PDR

- Imojev live JE vaccine and JEspect inactivated JE vaccine.
- Recommended for those living and working in high-risk areas/ activities, travellers

Rabies

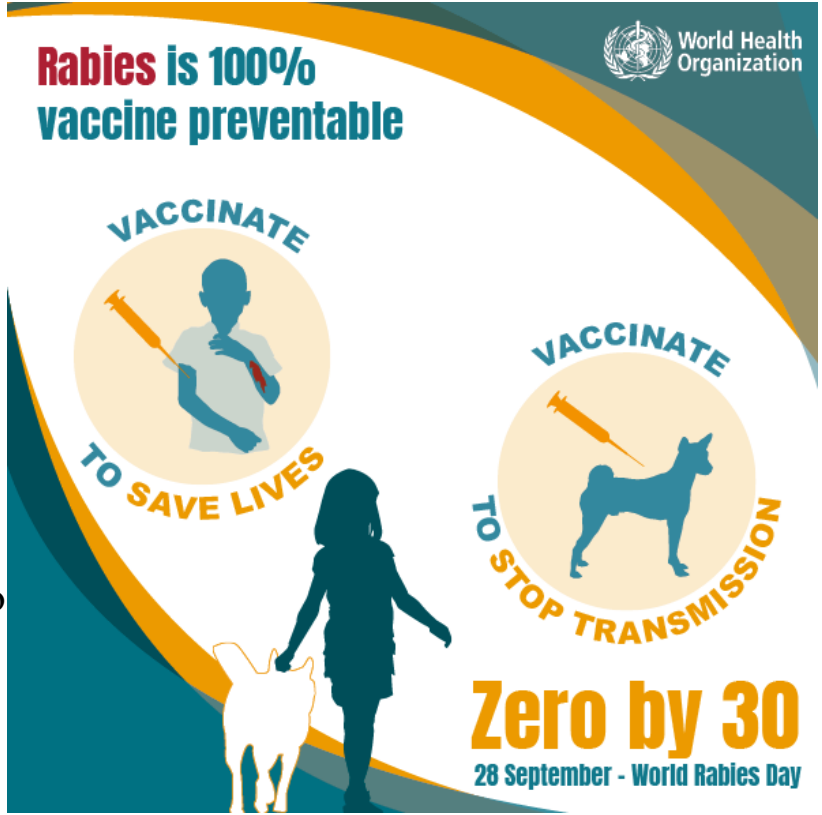

RABV circulation within bat populations
Transmission results in
• Seroconversion?
• Temporary or lasting immunity?
• Subclinical rabies?
Death
Transmission results in lethal infection
Death
Spillover infections can infect all mammals, including humans
Death
Death
Death
Death
Death
Death
RABV maintenance within terrestrial communities
Nature Reviews | Microbiology

Reported human rabies deaths, 2024



Rabies vaccines

- Vaccination of dogs
  - Cost effective, aimed at transmission
- Vaccination of humans
  - Pre-exposure prophylaxis (PrEP)
    - High-risk occupational groups
    - Travel
  - Post-exposure prophylaxis (PEP)
    - Still needed after PrEP (fewer doses, no RIG)
    - Stops virus entering the central nervous system
    - For terrestrial animal and bat exposures



https://immunisationhandbook.health.gov.au/contents/vaccine-preventable-diseases/rabies-and-other-lyssaviruses

Rabies vaccines, a key tool in elimination by 2030

Home > News releases

Gavi to boost access to life-saving human rabies vaccines in over 50 countries



Gavi The Vaccine Alliance | United Against Rabies | World Health Organization

Sept 2026: WHO validated Bhutan as the first country in South-East Asia to eliminate dog-mediated human rabies

WHO SEARO news release, September 2026

WHO and OIE updated and harmonized global standards on best practice in rabies prevention with a One Health approach

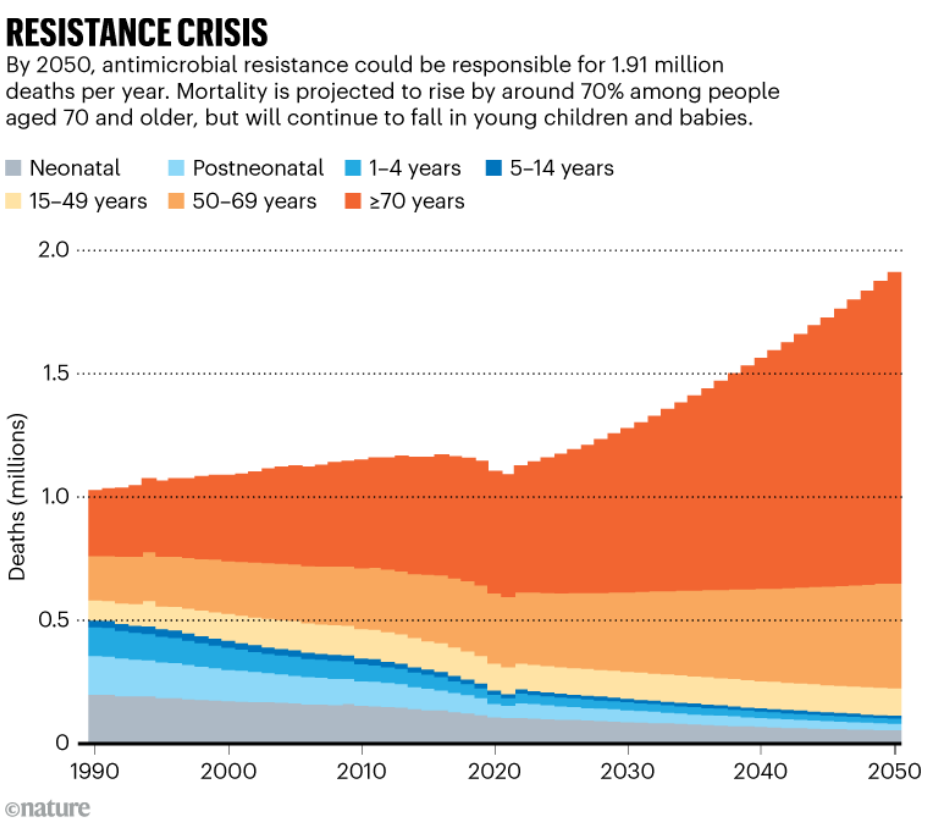
Case definition	Human case	Animal case				
Diagnostic methods	Diagnostic methods humans	Diagnostic methods animals				
Surveillance	Human rabies surveillance	Animal rabies surveillance	Notification and data reporting			
Prevention and control	Human rabies prevention and palliative care	Animal rabies prevention and control	Dog population management	Cross-border animal / animal product movement	Animal welfare	
Vaccines	Human rabies vaccines and RIG and potency	Animal vaccines and potency	Oral animal vaccines			
Vaccine production standards	Human rabies vaccines and RIG production	Animal vaccines production				
Elimination phases	Definition country freedom	Validation (0 human rabies deaths)	Verification (no dog rabies transmission)	OIE endorsed official control programme	OIE self-declaration of freedom	

Topic reflected in WHO standards (main focus: public health)

Topic reflected in OIE standards (main focus: animal health and prevention)

https://www.thelancet.com/journals/lancet/article/PIIS0140-6736%2824%2902141-X/fulltext
https://iris.who.int/items/96e1d995-3439-48b5-a2cb-103c7a770647

AMR



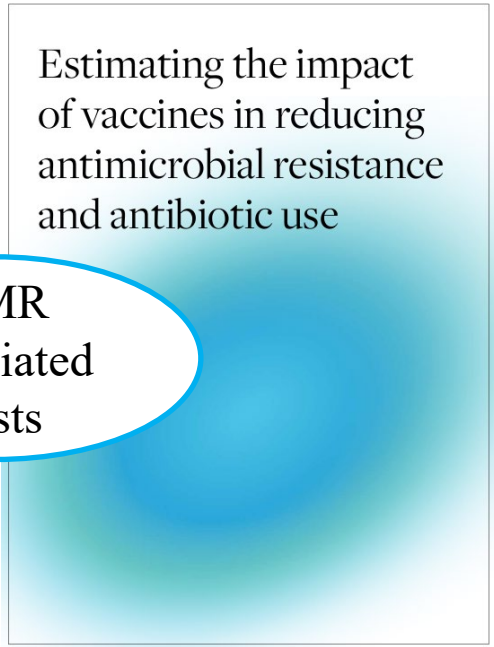
Source: GBD 2021 Antimicrobial Resistance Collaborators, Lancet 2024 (figure via Nature). Projected 39 million AMR-attributable deaths, 2025–2050; 1.91 million per year by 2050.

WHO report: Estimating the impact of vaccines in reducing antimicrobial resistance and use

- Vaccines in early and late-stage clinical development have the potential to annually avert up to:
- **515,000 deaths**
- **28 million DALYs**
- **US $30 billion in hospital costs**
- **US $20 billion in productivity losses**

AMR associated costs

- These vaccines could also help to reduce antibiotic use by **2.5 billion doses**



World Health Organization

AMR, antimicrobial resistance; DALY, disability-adjusted life years

World Health Organization (WHO), 2024. Estimating the impact of vaccines in reducing antimicrobial resistance and antibiotic use

Acknowledgement: Dr Hasso-Agopsowicz

PCV and rotavirus vaccines reduce *antibiotic use* in LMICs

Analysis of Demographic Health Surveys (DHS) and Multiple Indicator Cluster Surveys (MICS)

VACCINE IMPACT WITH RECENT COVERAGE

PCV prevents 23.8 million antibiotic treated episodes annually

Rotavirus vaccine prevents 13.7 million antibiotic treated episodes annually

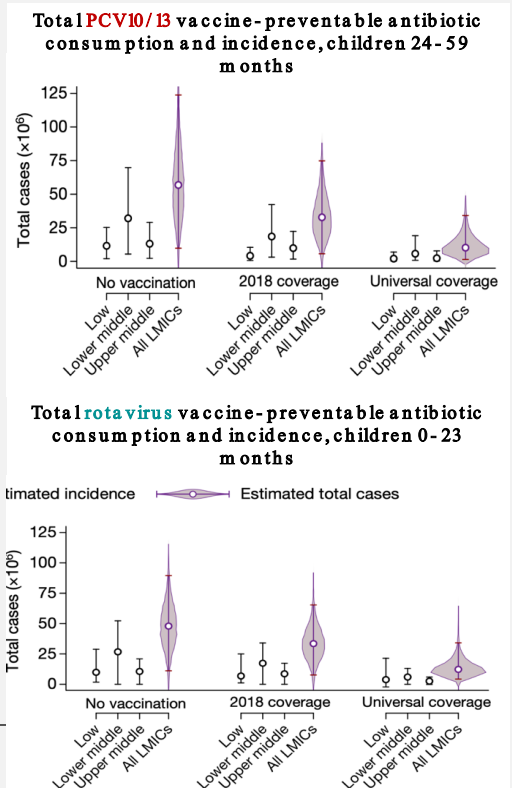
VACCINE IMPACT WITH 90% COVERAGE

PCV could avert additional 21.7 million antibiotic treated episodes

Rotavirus vaccines could avert additional 18.3 million antibiotic treated episodes

https://www.nature.com/articles/s41586-020-2238-4

Estimating the Impact of Vaccines in Reducing Antimicrobial Resistance and Antibiotic Use



Acknowledgement: Dr Hasso-Agopsowicz

Conclusion

- Climate change is expanding the reach of zoonotic and vector-borne diseases - immunisation is a climate adaptation tool but likely will also get impacted.
- One Health needs human, animal and environmental sectors – requires vaccine planning and funding together.
- Vaccines reduce antibiotic use and can help reduce AMR.