Protecting travellers from vaccine-preventable diseases

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Background
Protecting travellers from vaccine-preventable diseases is an essential part of pre-travel healthcare. With new vaccines available and others in development, the options for travellers are expanding.

Objective
This review focuses on pre-travel vaccination principles; outlines routine, required and recommended vaccines for travellers; and highlights emerging options.

Discussion
General practitioners play a crucial part in preparing travellers. This article outlines a comprehensive approach to pre-travel vaccination that considers individual needs, trip-related factors and recent updates to vaccine recommendations. It emphasises the importance of disease prevention over treatment and addresses practical aspects of pre-travel consultations, including administration of multiple vaccines, timing of doses and management of complex travel itineraries. A case study is included to illustrate the application of these principles in a real-world scenario.

MILLIONS OF AUSTRALIANS travel overseas every year, and vaccination is crucial for protection.[1] The global resurgence of vaccine-preventable diseases (VPDs) such as measles underscores the importance of pre-travel vaccination discussions to safeguard individual and community health.[2] General practitioners (GPs) play a vital part in guiding vaccine decisions.[3] Tailoring vaccination recommendations to each traveller's needs is essential. This article outlines how to assess pre-travel vaccination needs, discusses recent updates to vaccine recommendations and highlights new and emerging vaccines for travellers.

Framework for pre-travel vaccination

Discussing VPDs is a key component of any pre-travel consultation. Globalisation and gaps in vaccination coverage mean that VPDs can occur anywhere. Travel vaccines fall into three categories:

- routine: recommended regardless of travel (eg influenza, tetanus, measles)
- recommended: advised on the basis of itinerary, activities and exposure risk (eg hepatitis A, typhoid, rabies, Japanese encephalitis)
- required: mandated by International Health Regulations or for entry into specific countries (eg yellow fever, meningococcal ACWY).

There is no single 'correct' list of vaccines for any destination. Appropriate vaccines depend on an individual risk–benefit assessment that considers the traveller's characteristics (eg age, medical history), risk tolerance, itinerary and travel duration; VPD epidemiology at the destination; and the attributes of each disease and vaccine.[4] Taking a detailed vaccine history, including checking the Australian Immunisation Register and handheld records, is crucial to identify gaps and avoid unnecessary vaccines. Serology can also be helpful for certain diseases, especially when vaccination history is uncertain.[5]

Risk–benefit assessment

Evaluating disease risks involves considering both the likelihood of disease and its potential outcomes. Although COVID-19 and influenza are common, low-incidence diseases such as Japanese encephalitis can have a greater impact. Public health agencies provide up-to-date information on disease risks and outbreaks (Table 1). Visual aids can guide discussions (Figure 1).[6]

Specific traveller or itinerary factors that increase exposure risk or disease severity should be considered.[7] For example, typhoid poses a greater risk for travellers visiting South Asia, particularly those visiting friends and relatives (VFR).[7,8]

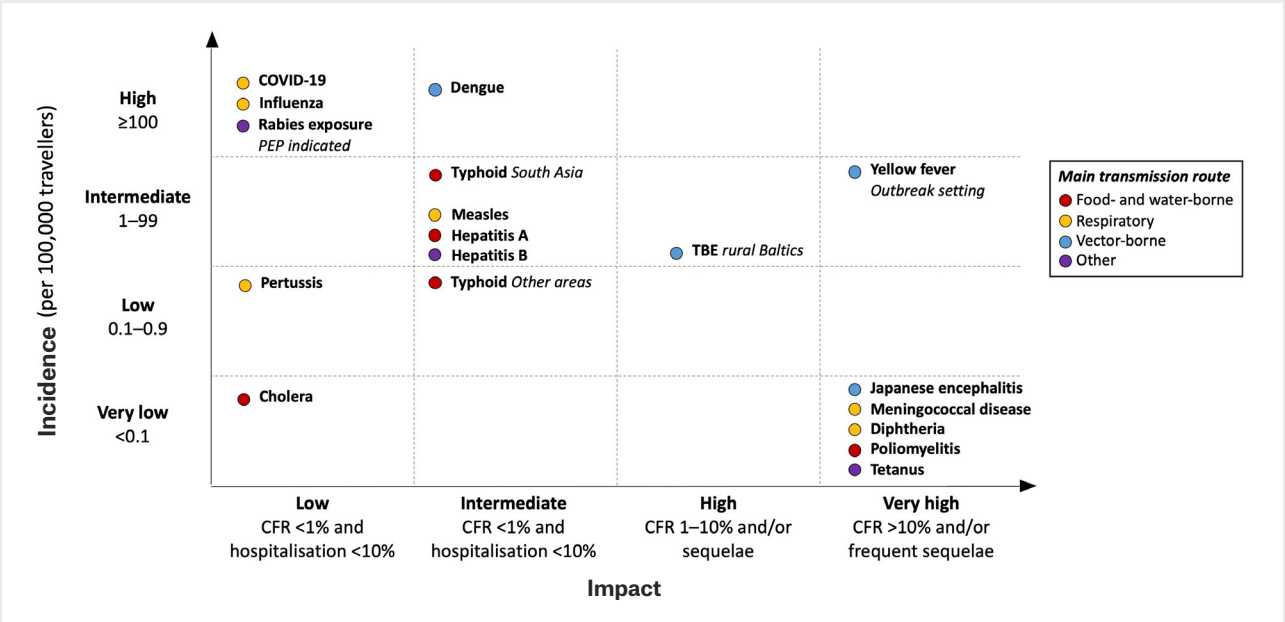

Figure 1. Incidence versus impact of symptomatic vaccine-preventable diseases (VPDs) in travellers.[6]

Adapted from Steffen R, Chen LH, Leggat PA. Travel vaccines-priorities determined by incidence and impact. J Travel Med 2023;30(7):taad085. doi: 10.1093/jtm/taad085, with permission from Oxford University Press.

CFR, case-fatality rate; PEP, post-exposure prophylaxis; TBE, tick-borne encephalitis.

Public health implications, such as the risk of spreading the disease on return, are especially important for diseases such as measles. The availability (or lack) of treatment for a disease also influences decision making.

Vaccine risk–benefit considerations include adverse events, cost, duration and level of protection. For example, the yellow fever vaccine, although highly effective, can rarely cause serious adverse events, requiring careful screening for precautions (eg older age) and contraindications (eg immunocompromise). Travel vaccines often involve significant out-of-pocket costs. Some vaccines, such as hepatitis A, yellow fever, Japanese encephalitis and rabies, provide long-term protection and can be seen as long-term investments.[9] Others, such as influenza and typhoid, require periodic re-vaccination if there is ongoing risk of exposure. Conducting a multi-trip assessment that considers future travel risks might be appropriate.[9] Understanding the traveller's risk tolerance helps tailor recommendations, as some might be more willing to accept certain risks whereas others prefer to take every possible precaution.

Table 1. Disease risk and outbreak information

Resource	Details
CDC Travel Health Notices	wwwnc.cdc.gov/travel/notices
CDC information by country	wwwnc.cdc.gov/travel/destinations/list
CDC Yellow Book (information by disease/traveller group)	www.cdc.gov/yellow-book/index.html
Travel Health Pro information by country	travelhealthpro.org.uk/countries
Travel Health Pro outbreak surveillance	travelhealthpro.org.uk/outbreaks
WHO Disease Outbreak News	www.who.int/emergencies/disease-outbreak-news
WHO travel information	www.who.int/travel-advice
WHO yellow fever country list	www.who.int/publications/m/item/countries-with-risk-of-yellow-fever-transmission-and-countries-requiring-yellow-fever-vaccination-(november-2022)

CDC, Centers for Disease Control and Prevention; WHO, World Health Organization.

Practical considerations

A wide range of vaccines is relevant to travellers, including commonly available ones (Table 2) and those harder to source (Table 3).[10] Travellers might need multiple vaccines, so practical considerations include timing and co-administration. Many vaccines have lower-age limits,

Table 2. Commonly available vaccines for Australian travellers, with Australian Immunisation Handbook recommendations[10]

Transmission category	Disease	Vaccine type	Route	Lower-age limit[A]	Population recommendations
Food- and water-borne/ faecal–oral	Cholera	Inactivated whole-cell recombinant	Oral	2 years	Travellers at increased exposure risk (eg aid workers) or risk of severe disease (eg those with inflammatory bowel disease) visiting cholera-endemic or outbreak areas
		Live-attenuated	Oral	2 years	
	Hepatitis A[B]	Inactivated	IM	1 year	Travellers to moderately to highly endemic areas for hepatitis A
	Poliomyelitis[C]	Inactivated	SC	6 weeks	Travellers to areas where polio is circulating; booster every 10 years
	Typhoid[B]	Inactivated	IM	2 years	Travellers to typhoid-endemic areas
		Live-attenuated	Oral	6 years	
Vector-borne	Japanese encephalitis	Live-attenuated	SC	9 months	Travellers spending 1 month or more in endemic areas during transmission season; consider for shorter-term travellers
		Inactivated	IM	2 months	
	Yellow fever[D]	Live-attenuated	IM or SC	9 months	Travellers to an area with yellow fever virus transmission risk
Aerosol- or droplet-borne	COVID-19	Inactivated	IM	6 months	As per routine recommendations; may be given earlier than recommended interval if travel is imminent
	Diphtheria[C]	Inactivated toxoid	IM	6 weeks	As per routine recommendations; booster for travellers to countries with limited health services if their last dose >10 years ago, or >5 years ago for high-risk areas (eg Southeast Asia)
	Influenza	Inactivated	IM	6 months	As per routine recommendations; can have a second dose if travelling to the Northern Hemisphere during influenza season (October–May)
	Meningococcal ACWY disease	Inactivated	IM	6 weeks	Travellers to the 'meningitis belt' of Sub-Saharan Africa or those attending mass gatherings (eg pilgrims to Hajj or Umra in Saudi Arabia)
	Meningococcal B disease	Recombinant (inactivated)	IM	6 weeks	As per routine recommendations
	Measles[C]	Live-attenuated	IM or SC	6 months	Travellers born during or since 1966 should receive 2 doses of measles-containing vaccine unless they have documented evidence of prior vaccination or serological evidence of immunity
	Mumps[C]	Live-attenuated	IM or SC	6 months	As per routine recommendations
	Pertussis[C]	Acellular (inactivated)	IM	6 weeks	As per routine recommendations; booster if last dose >10 years ago
	RSV	Recombinant (inactivated)	IM	50 years[E]	As per routine recommendations
	Rubella[D]	Live-attenuated	IM or SC	6 months	As per routine recommendations
	Varicella (chickenpox)	Live-attenuated	IM	9 months	As per routine recommendations
	Zoster (shingles)	Recombinant (inactivated)	IM	18 years	As per routine recommendations

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Table 2. Commonly available vaccines for Australian travellers, with Australian Immunisation Handbook recommendations[10] (cont'd)

Blood-borne and sexually transmitted	Hepatitis B	Recombinant (inactivated)	IM	Birth	Travellers to intermediate/high-endemicity regions at increased risk of exposure or who are travelling long term or frequently
	Human papillomavirus	Recombinant (inactivated)	IM	9/10 years	As per routine recommendations
Animal and environmental exposures	Rabies	Inactivated	IM or ID	Birth	Travellers to rabies-enzootic regions on the basis of risk assessment considering likelihood of animal interaction and access to emergency medical attention
	Tetanus[C]	Inactivated toxoid	IM	6 weeks	As per routine recommendations; booster if last dose >10 years ago; those at high risk of a tetanus-prone wound should have booster if last dose >5 years ago

[A] Age listed is the minimum for all brands of specified vaccine type. For some vaccines, different brands have different limits. Providers should be aware that administering vaccines at the minimum age or interval might affect eligibility for recording in the Australian Immunisation Register and compliance with childcare subsidy requirements. For detailed guidance, refer to the AIH table of minimum acceptable ages for the first dose of scheduled National Immunisation Program (NIP)-funded vaccines in infants (https://immunisationhandbook.health.gov.au/resources/tables/table-minimum-acceptable-age-for-the-1st-dose-of-scheduled-nip-funded-vaccines-in-infants).[10]

[B] The combination hepatitis A-typhoid vaccine was removed from the Australian market in 2024, but monovalent options remain available.

[C] Available in combination formulation (eg diphtheria-tetanus-pertussis-polio; measles-mumps-rubella).

[D] Only approved clinics can administer yellow fever vaccination. Refer to the Australian Government's yellow fever information page for further details (www.health.gov.au/diseases/yellow-fever).

[E] Also available on the NIP schedule for pregnant women between 28 and 36 weeks gestation.

ID, intradermal; IM, intramuscular; RSV, respiratory syncytial virus; SC, subcutaneous.

and different formulations might be used for different groups. Most vaccines are given intramuscularly (IM), but some are administered subcutaneously, orally or intradermally (ID).

For optimal protection, vaccines should be administered well in advance of travel. Some vaccines require multiple doses over weeks or months. Travellers should consult with their GPs at least 4–6 weeks before travel. However, even last-minute travellers can benefit. For example, a single dose of hepatitis A vaccine is effective even on the day of departure, and yellow fever certificates are valid from 10 days after vaccination.

Vaccine co-administration can minimise healthcare visits and prevent delays in protection. The choice of injection site depends on age, with the deltoid muscle the recommended IM site in those aged 12 months or older. Up to two injections can be given per site, separated by 2.5 cm.[10] Although studies support the safety and immunogenicity of co-administering vaccines such as influenza and COVID-19, research on co-administering certain travel vaccines remains limited.[11]

Live injectable viral vaccines, such as measles-mumps-rubella (MMR), yellow fever and Japanese encephalitis vaccines, should be administered simultaneously or spaced four weeks apart. Bacille Calmette–Guérin (BCG) vaccine can be given at the same time as, or at any time after, other vaccines, including MMR.[12] Combination vaccines, such as diphtheria-tetanus-pertussis with or without polio, can help deliver protection against multiple diseases in a single injection.[13]

When to refer

Referral to a specialist travel medicine clinic might be necessary where patient or itinerary factors complicate risk assessment and vaccine decisions. For example, patients who are immunosuppressed, pregnant or at the extremes of age might need specialist input, especially for live vaccines such as yellow fever. Patients with complex travel itineraries that require a thorough discussion of vaccine options and prioritisation, especially vaccines less familiar to the GP, might also benefit from a referral.

Recent changes

Rabies

Over 150 countries, particularly in Asia and Africa, remain endemic for rabies. Globally, the approach to rabies pre-exposure prophylaxis has evolved with a shift towards shorter schedules.[14,15] Australian recommendations now support a two-visit schedule (days 0 and 7) for short-term protection of immunocompetent travellers to rabies-enzootic areas.[10] As a result of uncertainty regarding long-term durability, a single IM booster dose is recommended if further protection is required after one year.

Japanese encephalitis

Japanese encephalitis is a risk for travellers to Asia and certain areas of Australia. Local transmission in south-eastern Australia was first documented in 2022.[16] Australians living and working in some regional and rural areas may be eligible for funded vaccination. Recently developed tools such as decision aids (www.monash.edu/vaccinedecisionaids-je/home) and risk calculators (www.vaxical.com) can assist in assessing Japanese encephalitis vaccination risks and benefits.

Table 3. Vaccines that are new, emerging or hard to source for travellers[10]

Transmission category	Disease	Vaccine type	Route	Lower-age limit[A]	Status in Australia and considerations
Vector-borne	Chikungunya	Live-attenuated[B]	IM	18 years	Not registered, but available through the TGA's Special Access Scheme (SAS). Consider for travellers to areas with an outbreak, particularly longer-stay travellers and those at higher risk of severe disease
		Inactivated[B]	IM	12 years	Not registered in Australia
	Dengue	Live-attenuated[B]	SC	4 years	Not registered, but available through the SAS. Consider for travellers with laboratory evidence of previous dengue infection travelling to dengue risk areas for >4 weeks or undertaking frequent trips
	Tick-borne encephalitis (TBE)	Inactivated[B]	IM	1 year	Not registered, but available through the SAS. Consider for travellers with a high risk of exposure (eg hiking or camping in forested areas) in endemic regions during spring or summer months or going to reside in an area where TBE is endemic or epidemic
Close contact	Mpox	Non-replicating live-attenuated	SC	Birth	Available only via state and territory health departments. Recommended for groups at risk of exposure (eg gay, bisexual or other men who have sex with men)
Aerosol- or droplet-borne	Tuberculosis (TB)	Bacille Calmette–Guérin vaccine	ID	Birth	Licensed vaccine not currently available; other vaccines available under a special prescribing arrangement. Recommended for children aged <5 years, particularly VFR travellers, travelling to countries with high TB incidence (>40 cases/100,000 population per year), on the basis of an individual risk assessment

[A] Minimum age at which the vaccine is approved or recommended for use on the basis of product information and international public health guidance.

[B] Not currently licensed in Australia; considerations are based on guidance from public health authorities in other high-income regions (eg UK Health Security Agency, US Centers for Disease Control)

TGA, Therapeutic Goods Administration; VFR, visiting friends and relatives.

Mpox

Mpox, caused by the monkeypox virus (MPXV), emerged globally in 2022 with a large outbreak, introduced by travellers, primarily affecting gay, bisexual and other men who have sex with men (GBMSM). Two distinct clades of MPXV exist: clade I and II. Clade II has been circulating globally since 2022, with clade I cases detected beyond Africa since late 2024. Mpox vaccination is recommended for people at risk of exposure such as GBMSM and sex workers. Other travellers may be eligible if they might undertake sexual risk activities in countries with clade I mpox transmission.

Respiratory syncytial virus

Respiratory syncytial virus (RSV) vaccines (Abrysvo [Pfizer] and Arexvy [GSK]) became available in Australia in 2024.[10] Abrysvo is registered for use in adults aged 60 years and older and in pregnancy. Arexvy is registered for use in adults aged 50 years and older with risk conditions. Vaccination is recommended for adults aged 75 years and older, and those aged 60–74 years with additional risk factors, but it must be paid for privately. As of early 2025, pregnant women can access RSV vaccine for free under the National Immunisation Program.

Dengue

A new live-attenuated vaccine for dengue (Qdenga [Takeda]), administered in two doses three months apart, is available in Europe. Although not registered in Australia, it can be accessed via the Therapeutic Goods Administration's Special Access Scheme. In the UK, Qdenga is considered for those aged four years and older with a history of dengue infection planning to travel to dengue risk areas. The previously available dengue vaccine (Dengvaxia [Sanofi Pasteur]) will be discontinued in 2026 because of low global demand.

Chikungunya

Two single-dose chikungunya vaccines are now available in Europe and the US: a live-attenuated vaccine (Ixchiq [Valneva]) for adults aged 18 years and older, and a virus-like particle vaccine (Vimkunya [Bavarian Nordic]) for those aged 12 years and older. Neither vaccine is currently registered in Australia. In the US, either vaccine is recommended for travellers to areas with chikungunya outbreaks and may be considered for those relocating or staying

long term (six months or more) in areas with elevated risk. Following reports of severe adverse events, use of Ixchiq was temporarily paused in older adults in both the US and Europe in 2025. The pause was lifted after a safety review, with revised recommendations retaining age ≥65 years as a precaution.

CASE STUDY

Priya, aged 35 years, and her son Rohan, aged eight months, present three weeks before a four-week trip to Karachi, Pakistan, to attend a wedding and visit relatives. Rohan, born in Australia, is up to date with routine vaccinations and is still breastfeeding. Priya, born in Pakistan, has a BCG scar but lacks access to her childhood vaccine records. Recent vaccine records and serology results are available (Table 4). Both are healthy with no chronic conditions or medications.

As VFR travellers, they face different health risks when compared with typical tourist travellers, particularly for infections such as tuberculosis.[17] MMR vaccination is important, as Priya might not have received two doses in childhood, and Rohan is yet to receive a dose. Polio vaccination is recommended for all travellers because of ongoing poliovirus circulation.[18] Other relevant vaccine advice is shown in Table 4. Vector-borne diseases are an important consideration for this itinerary, and mosquito bite avoidance strategies should be discussed. Dengue is a risk, including in urban areas, but as neither has a history of infection, vaccination is not indicated. Recent chikungunya outbreaks in Karachi

Table 4. Relevant history of exposure, vaccination or serology, and advice for Priya and Rohan

Disease/vaccine	Relevant vaccination history and/or serology		Advice	
	Priya	**Rohan**	**Priya[A]**	**Rohan**
Cholera	Not known	Not immunised	Consider vaccination	Nil; vaccine is licensed from age 2 years
COVID-19	Primary series plus one booster	Not immunised	Consider booster dose	Not recommended unless immunocompromised
Diphtheria, tetanus, pertussis	dTpa booster within past 12 months	Three doses at 2, 4 and 6 months	Up to date	Up to date; next dose at age 18 months
Hepatitis A	Hepatitis A IgG and IgM negative	No known exposure	Not immune; should receive hepatitis A vaccine	Nil; vaccine is licensed from age 12 months
Hepatitis B	Primary series (3 doses); hepatitis B surface antibody positive, 25 mIU/mL	Four doses at birth, 2, 4 and 6 months	Nil; immune	Completed primary vaccination; no further doses
Influenza	Received last season	Not immunised	Flu vaccine dose recommended	Two doses at least 4 weeks apart (first time immunised)
Japanese encephalitis	Not known	Not immunised	Discuss and consider if travel to rural or agricultural areas is planned	
Measles, mumps, rubella (MMR)	Measles IgG negative, mumps IgG negative, rubella IgG positive	Not immunised	MMR recommended (2 doses at least 1 month apart); give first dose pre-travel	Early MMR dose recommended[B] (will still need routine doses at 12 and 18 months of age)
Poliomyelitis	Not known	Three doses at 2, 4, 6 months	Recommended (at least 1 dose pre-travel)	Up to date
Rabies	Not immunised	Not immunised	Discuss and recommend vaccination for this trip and for likely future travel	
Tuberculosis	BCG	No known exposure	Nil	BCG recommended
Typhoid	Not known	Not immunised	Recommended; injectable or oral	Nil; injectable vaccine licensed from age 2 years
Varicella	VZV IgG positive	Not immunised	Evidence of prior infection or vaccination	Not recommended for patients aged <12 months

[A] Most vaccines can safely be administered to breastfeeding women. However, the yellow fever vaccine should be avoided in women breastfeeding infants aged less than 9 months of age because of potential virus transfer through breastmilk.[15]

[B] Infants travelling to measles-endemic or outbreak areas may receive MMR vaccination from 6 months of age.[10]

dTpa, diphtheria, tetanus, acellular pertussis vaccine; BCG, Bacille Calmette–Guérin vaccine; Ig, immunoglobulin; VZV, varicella-zoster virus.

are a concern, but no vaccine is currently available in Australia.[19] Japanese encephalitis occurs in parts of Pakistan, though risk areas are poorly defined; vaccination should be considered if travel to rural or agricultural regions is planned. Malaria is also a potential risk, and a discussion about preventive strategies is recommended. Travellers' diarrhoea is a common concern, and advice should be given about managing accompanying dehydration, particularly for Rohan; breastfeeding is recommended to continue.

Key points

- Pre-travel vaccination is crucial for protecting against preventable diseases.
- GPs play a vital part in guiding pre-travel vaccine decisions.
- Vaccination recommendations should be tailored to each traveller's specific needs and plans.
- Co-administration of vaccines can minimise healthcare visits and prevent delays in protection.
- Recent updates include new vaccines for rabies, mpox, RSV, dengue and chikungunya.

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Competing interests: None.

Funding: No funding was received for this work. Dr McGuinness is supported by a National Health and Medical Research Council (NHMRC) Investigator Grant (2017229).

Provenance and peer review: Commissioned, externally peer reviewed.

AI declaration: The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

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