

05

Immunisations and Health Information for Travel

See the Bibliography for further information

In some circumstances, advice in these guidelines may differ from that in the Summary of Product Characteristics of the vaccines. When this occurs, the recommendations in these guidelines, which are based on current expert advice from NIAC, should be followed.

This chapter has the following sections:

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Introduction

Over the last 60 years international tourist arrivals increased from 25.3 million in 1950 to 1.2 billion in 2015. Changes in travel patterns include a continuing trend for visiting remote destinations and for longer stays.

Many people are unaware that exotic destinations include potential exposure to infections that are rare in their home environment and other infections such as malaria that they have never previously encountered. The resurgence of malaria in many parts of the world, with an increasing pattern of drug resistance, has led to an increase in the number of cases presenting in non-endemic areas. The emergence of new infections such as SARS, MERS, Ebola and Zika virus disease and the spread of dengue fever, chikungunya and West Nile Virus place an increasing responsibility on doctors to remain up-to-date with current advice.

Responsibilities that travellers need to accept before travel include:

- Seeking advice in good time
- Complying with recommended vaccines and other medications
- Carrying a medical kit
- Obtaining adequate health insurance cover.

Regulations regarding entry requirements such as the need for yellow fever certificates can be obtained from organisations such as [WHO](#).

All travellers (domestic and international) should be up to date with routine vaccinations.

A pre-travel consultation should address what vaccines are recommended, their potential side-effects and their suitability for each traveller. Knowledge of relative risks in particular destinations is essential, as is an assessment of the patient's overall medical health and current medications. Advice for those with pre-existing chronic illness should be included. Patients who are very young, those who are pregnant and the elderly warrant special consideration.

Factors influencing the risk of illness, and the need for specific vaccines include:

- Age, health status, and vaccination history
- Adverse reactions to previous vaccines
- Behavioural or lifestyle patterns of the traveller
- Destination
- Duration of visit

- Purpose of visit
- Risk of exposure to the disease
- Risk of infecting others
- Special risk factors
- Standards of accommodations and food hygiene
- Risk of infecting others

Many major urban centres and well-developed tourist destinations pose little risk to the short-term tourist or business traveller. Travel to remote areas where sanitation and standards of hygiene are poor and medical services are difficult to access can pose serious risks to travellers. Any special occupation or activity should also be taken into account, e.g. contact with fresh water in areas where schistosomiasis is endemic.

In general, travel vaccinations are both safe and effective. However, not all vaccines offer complete protection and additional recommendations for preventing disease should be followed. Following administration most vaccines require a few weeks for a protective immune response to develop and therefore they should be administered at least two weeks before travel, although the late-presenting traveller may still benefit from having vaccinations even at the last minute.

Multiple vaccines can be administered at different sites on the same day.

Live vaccines such as MMR, varicella, and yellow fever should be administered on the same day or else 4 weeks apart. (For details see yellow fever section).

Note: While immunisations are an important part of a travel consultation, advice on risk avoidance, chemoprophylaxis and methods of self-treatment should also be given. Ideally short-term travellers should present for advice at least 6 weeks before travel. Those who are travelling for long periods or going to remote regions may require 6-12 weeks for a full series of immunisations. All travellers to mosquito-endemic areas should take precautions to avoid mosquito bites. Personal preventive measures include the use of repellents, long-sleeved and long-legged clothes, and bed nets.

Travellers should be made aware that many travel-acquired conditions can present after they have returned from abroad. In general, patients who develop an illness within one year of returning should inform a doctor that they have been abroad.

Vaccines for global travellers

Each traveller should be up to date with the routine vaccine schedule including vaccines against influenza and pneumococcal vaccines for those in at-risk groups. Other vaccines (Table 5.1) maybe advised depending on the area to be visited, the type of travel, any special identified risks and the age, health and vaccination history of each traveller.

Table 5.1 Vaccines for travellers

Category	Vaccine
1. Routine vaccination See relevant chapters for details	DTaP/IPV or Tdap/IPV
	Hepatitis B
	Hib
	Men C
	MMR
	Influenza
	Pneumococcal
2. Recommended vaccines depending on itinerary, type and duration of travel etc	BCG
	Cholera
	Hepatitis A
	Hepatitis B
	Japanese encephalitis
	Meningococcal ACWY
	Rabies
	Tick-borne encephalitis
	Typhoid fever
	Yellow fever
3. Mandatory vaccines for some countries	Men ACWY (for Hajj, Umra)
	Yellow fever

Cholera (notifiable)

Cholera is an acute diarrhoeal disease caused by an enterotoxin of *Vibrio cholerae* which has infected the small bowel. Two main serogroups occur (O1 and O139). Humans are the only known natural host for *V. cholerae*, and the disease is spread mainly by faecal contamination of water and food. Transmission from person to person is uncommon. New and more virulent strains of *V. cholerae* O1 that now predominate in parts of Africa and Asia, and antibiotic-resistant strains are spreading.

The disease occurs mainly in countries where there is inadequate sanitation and where clean drinking water is difficult to obtain. The risk for most travellers is very low, even during epidemics. Activities that predispose to infection include drinking untreated water or eating poorly cooked seafood in endemic areas. Travellers living in unsanitary conditions, for example relief workers in disaster or refugee areas, are at particular risk.

Most of those infected will have no or mild symptoms, and can be successfully treated with oral rehydration solution. Symptomatic infection is characterised by the sudden onset of profuse watery diarrhoea and occasionally vomiting. Dehydration, metabolic acidosis and circulatory collapse may follow rapidly if adequate oral hydration is not provided. Severe cholera is one of the most rapidly fatal infectious illnesses known. Within 3–4 hours of onset of symptoms, a previously healthy person may rarely become severely dehydrated and if not treated with intravenous fluids and antibiotics may die within 24 hours.

All travellers should be given advice on maintaining good food, water and hand hygiene, safe eating and drinking and water purification. Simple precautions are usually sufficient to prevent cholera. Vaccination is only advised for those at significantly increased risk of the disease, such as aid workers assisting in disaster relief or refugee camps, and travellers with remote itineraries in areas with cholera O1 outbreaks and with limited access to medical care.

Vaccine

Cholera vaccine (inactivated, oral) (Dukoral) is provided as a suspension (3 ml) of inactivated bacteria and effervescent granules for dissolution in 150 ml water. For details of preparation, see the SmPC.

It contains inactivated antigens of serogroup O1 but is not effective against O139 strains. Protection is achieved in 85–90% of recipients, with antibodies persisting up to 3 years after the primary course.

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An up to date list of licensed vaccines can be accessed on the HPRA website www.hpra.ie

Cholera vaccine should be stored between +2°C to +8°C.

Dose and route of administration

Cholera vaccine is not recommended for children under 2 years of age, due to lack of efficacy data.

Children 2 to 6 years of age: 3 doses at intervals of at least one week. If more than 6 weeks have elapsed between doses, the primary immunisation course should be re-started.

Adults and children from 6 years of age: 2 doses orally, from 1 to 6 weeks apart. There are very limited data on protective efficacy of the vaccine in those aged 65 years and over.

Immunisation should be completed at least 1 week prior to potential exposure to *V. cholerae* 01.

If more than 6 weeks have elapsed between doses, the primary immunisation course should be re-started.

Booster

For continuous protection against cholera a single booster dose is recommended within 2 years for adults and children from 6 years of age, and after 6 months for children aged 2 to 6 years. If more than 2 years have elapsed since the last vaccination the primary course should be repeated.

Contraindications

Anaphylaxis to any of the vaccine constituents.

Precautions

Acute severe febrile illness -defer until recovery.

Acute gastrointestinal illness-defer until recovery.

Diphtheria (notifiable) (see Chapter 6)

Diphtheria continues to pose a threat to public health and travellers to any part of the world should be fully vaccinated.

Those aged 10 years and over should not be given the higher strength childhood vaccine due to the possibility of a significant local reaction.

Hepatitis A (notifiable) (see Chapter 8)

Vaccination with 1 dose gives >98% seroconversion by day 19; a booster dose 6-12 months later results in long-term (>20 years) protection.

Travellers presenting less than 20 days prior to travel should be advised that they may not have adequate antibody protection for 20 days post vaccination and they need to exercise extra precautions until then.

Hepatitis B (notifiable) (see Chapter 9)

The standard 0, 1, 6 month schedule is recommended when possible. In exceptional circumstances in adults, when travel is anticipated within one month of initiating the vaccination course, a schedule of *four* doses of Hepatitis B or combined Hepatitis A and Hepatitis B (Twinrix) vaccine given at 0, 7 and 21 days and 12 months may be used.

Influenza (notifiable) (see Chapter 11)

All travellers are at some risk of acquiring seasonal influenza during an outbreak. Tourists are at increased risk because they often travel in crowded conditions and visit very crowded locations.

Vaccine

There may be, in any given year, a significant difference between strains circulating during the influenza seasons of the northern and southern hemisphere which occur at different times of the year (November to April in the North and April to September in the South). Therefore influenza vaccine administered in one hemisphere may only offer partial protection to travellers to a different hemisphere. At-risk travellers who are going to another hemisphere during the influenza season should arrange to have influenza vaccine as soon as possible after arriving at their destination.

Japanese B encephalitis (notifiable)

Japanese encephalitis (JE) virus is a mosquito-borne flavivirus, closely related to dengue, yellow fever, tick-borne encephalitis and West Nile viruses, and endemic in South East Asia. It is predominantly a rural disease causing a potentially fatal encephalitis. It is spread by bites from mosquitoes (*Culex* genus) that bite mainly from dusk to dawn. Rice fields are important breeding sites. Mosquitoes become infected by feeding on infected domestic pigs and wild birds. JE virus is the main cause of viral encephalitis in many countries of Asia with an estimated 68,000 clinical cases every year.

Epidemics predominantly occur in the monsoon season in Cambodia, India and Thailand. In other countries, such as Indonesia, Malaysia and the Philippines, there is a risk of infection all year round.

Short-term (<1 month) travellers whose visits are restricted to major urban areas are at minimal risk for JE, unless they have extensive exposure in rural areas during periods of active transmission. The risk of JE among people from non-endemic countries travelling to Asia is estimated to be less than 1 case per 1 million travellers. Those who stay for prolonged periods in rural areas with active JE transmission (i.e. in close proximity to rice fields, or infected pigs and birds) are likely to be at similar risk as the resident population (5–50 cases per 100,000 per year).

The majority of people who contract JE virus remain asymptomatic or suffer from a short acute viral illness. One in 200 people develop encephalitis that has a mortality rate of about 30–50%. Of those with encephalitis who survive, 20%–30% suffer permanent intellectual, behavioural or neurological problems such as paralysis, recurrent seizures or the inability to speak. The chance of permanent neurological disease increases with increasing age.

The vaccine is recommended for

- Those with prolonged (>1 month) stay in a JE endemic area.

The vaccine should be offered to the following:

- Those with a travel itinerary covering rural areas, in particular spending a period of time in rice fields or close to pig farms
- Those who are repeat travellers to JE endemic areas
- Travelers to an area with an ongoing JE outbreak.
- Any traveller requesting maximum protection.

Further detailed information should be sought from specialised centres or the WHO website.

Vaccine

Japanese encephalitis vaccine (inactivated, adsorbed) (IXIARO) is the only licenced JEV vaccine available in Ireland (see Table 5.2).

A second JE vaccine (Green Cross) is available in some countries.

The vaccine should be stored between +2°C to +8°C.

Table 5.2 Japanese Encephalitis Vaccines

	IXARIO
Type	Inactivated cell-culture derived virus
Efficacy	>90%
Age	From 2 months
Dose	2 months to <3 years: 0.25 ml Age \geq 3 years: 0.5ml
Route	I.M.
Dosing Schedule	2 doses at 0, 28 days.
Booster	a. If at continuous risk of exposure:* 1 year after primary course b. If at continued potential risk of exposure: 1-2 years after primary course Data on the need for further booster doses are not available
Special Instructions	Vaccination courses should be completed with the same vaccine
Side Effects	<i>Common:</i> Injection site pain and tenderness, headache, myalgia, fatigue <i>Rare:</i> Arthralgia, fever

*Laboratory personnel or persons residing in endemic areas.

Meningococcal infection (notifiable) (see Chapter 13)

Different meningococcal serogroups predominate in different regions of the world. Serogroup A predominates in Africa (see Figure 5.1).

Figure 5.1 Map showing countries in Meningitis Belt (WHO)



Epidemic disease is characterised by an increased case-attack rate and altered age distribution, with increased numbers of cases seen in adolescents and adults. Examples include large epidemics involving serogroup A or serogroup W strains in association with the annual pilgrimage (Hajj) to Mecca, with importation into other countries by returning pilgrims.

Vaccine

Table 5.3 outlines the meningococcal vaccines required for travel. Both are conjugate MenACWY vaccines.

Table 5.3 Meningococcal vaccines for travel

Age	Name of Vaccine	
	Menveo	Nimenrix
6 weeks to <12 months ^{1,2}	Not licensed for this age group	2 doses, 2 months apart, and booster age \geq 12 months at least 2 months after 2 nd dose
1 to <2 years		1 dose
\geq 2 years	1 dose	1 dose
Booster dose	Only required for those at increased medical risk See Chapters 3 and 13	

1 If Nimenrix is not available, Menveo may be used from 6 weeks of age (schedule as for Nimenrix)

2 Give a dose of conjugate MenACWY vaccine instead of MenC if the timing coincides with the normal Men C vaccination. If MenC vaccine has already been administered, give one dose of conjugate MenACWY vaccine (at least 4 weeks after MenC) and a booster dose at least 4 weeks but preferably 2 months later

Either vaccine may be given if previously vaccinated with polysaccharide meningococcal vaccine.

Meningococcal vaccines should be stored between +2°C to +8°C.

Dose and route of administration

The dose is 0.5 ml, given by IM injection in the anterolateral thigh or the deltoid region.

Indications for Travellers

1. Travel to high-risk areas, including the meningitis belt of Africa and Saudi Arabia during the Hajj. Vaccination with MenACWY is mandatory for pilgrims entering Mecca for pilgrimages.
2. Travel to areas where epidemics of meningococcal disease are occurring (see WHO website for up-to date information).

A risk-based approach in deciding whether it is worthwhile vaccinating a patient should take the following factors into account:

- Destination (i.e. the countries highlighted in Figure 5.1 above).
- Duration at destination; a stay of months represents a higher risk than a 2-week trip.

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Travellers at high-risk include:

- those who live or work with local people
- those who live or travel rough such as hitchhikers or trekkers
- aid workers in refugee camps

From time to time, meningococcal disease outbreaks occur in various parts of the world. Where such outbreaks are due to vaccine-preventable strains, vaccination may be recommended for some groups of travellers to the affected areas. The advice of an appropriate Specialist should be sought.

Note: Visa entry requirements should be checked in good time prior to travel to individual countries.

Contraindications

Anaphylaxis to any of the vaccine constituents.

Precautions

Acute severe febrile illness, defer until recovery.

Adverse reactions

Local: Pain erythema, induration, pruritus, and swelling.

General: Headache, nausea, rash and malaise. Infants and younger children may develop irritability, reduced feeding and sleep disturbance.

Poliomyelitis (notifiable) (see Chapter 17)

Transmission of poliomyelitis has been significantly lessened during the past 20 years. However, in 2016, cases of wild polio were reported from Afghanistan, Nigeria and Pakistan. Polio continues to pose a public health threat and travellers to any part of the world (including Europe) should be fully vaccinated. For an up-to-date list of countries for which polio boosters are recommended for travellers, see the WHO website.

Rabies (notifiable) (see Chapter 18)

Rabies, a viral disease transmitted by bites, licks or scratches from infected mammals, is a very important cause of viral encephalomyelitis in many parts of the world. Travellers can be bitten in countries where access to treatment is difficult and sometimes unavailable. For further details of rabies pre and post exposure management see Chapter 18.

Tick-borne encephalitis (TBE) (notifiable)

Although TBE is most commonly recognised when it presents as a meningo-encephalitis, mild febrile illnesses can also occur. There are three forms of the disease related to the virus subtypes, namely European, Far Eastern and Siberian. The disease is caused by a flavivirus belonging to the same family as Japanese encephalitis, dengue, yellow fever and West Nile viruses.

The virus is usually transmitted in spring and summer by ticks that feed on wild and domestic animals. The ticks attach themselves to passing animals or humans. After attachment the tick may not feed for up to 12 hours; thus, early removal of ticks can prevent disease. The tick should be removed with tweezers, care being taken not to leave the head or mouth parts attached to the skin. The disease is also transmitted by unpasteurised goat's milk or goat's milk products.

The disease occurs sporadically through parts of Eastern and Central Europe, Russia and northern and eastern China. The incidence peaks in spring and early summer, but can occur throughout the year.

The annual incidence is estimated at 10,000 cases in Russia (where it is known as Russian spring-summer fever) and 3,000 cases in the rest of Europe. The true incidence is probably much higher and has risen dramatically in last 4 decades. It has spread to new areas particularly Scandinavia and Switzerland. Most infections are caused by leisure activity such as hiking.

The incubation period is from two to 28 days. The European form of the disease is biphasic with an initial viraemic phase of fever and influenza-like symptoms followed in some cases (after an afebrile period of one to 20 days) by CNS involvement. The case fatality rate of the European form is 1%. Long-lasting or permanent neuropsychiatric sequelae are observed in 10–20% of affected patients.

After infection there is an initial viraemic phase, with 20-30% of those affected developing encephalitis. Post-encephalitic sequelae are common and the disease has a mortality rate of 1%. There are higher mortality rates with Siberian and Far Eastern subtypes (2-3% and 20-40%) compared to European virus (1-2%) and increased morbidity with increasing age.

Travellers planning to camp or trek through forests or along nature trails should consider vaccination before travelling. If indicated, further detailed information should be sought from specialised centres or the WHO website.

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Some protection against TBE is provided by covering arms, legs and ankles, and using insect repellents on socks and outer clothing.

Vaccine

This is an inactivated TBE Virus produced in chick embryo fibroblast cells and adsorbed on aluminium. It is presented as TicoVac 0.5 ml for those aged 16 upwards, and TicoVac Junior 0.25 ml children from 1 to 15 years. Both are supplied in a prefilled syringe.

TBE vaccine should be stored between +2°C to +8°C.

Dose and route of administration

1. Adults and children aged >16 years: 0.5 ml IM at 0, 1 and 12 months.
2. Children aged 16 years and less: 0.25 ml at 0, 1 and 12 months.

A shorter course at day 0, day 14, and 5-12 months can be used for rapid protection.

A booster is given 3 years after the primary course, and then every 5 years (3 yearly for those aged 60 and over) for those who are exposed to the disease regularly.

Contraindications

Anaphylaxis to any of the vaccine constituents, including egg or chicken protein.

Precautions:

Acute severe febrile illness-defer until recovery.
Persons with pre-existing non-stable cerebral disorders.

Adverse reactions

Local: Pain, erythema and induration.

General: Fever, headache, restlessness.

Tuberculosis (notifiable) (see Chapter 22)

Tuberculosis occurs worldwide and the risk of infection varies from country to country (see map on WHO website).

If indicated, BCG vaccine should be given at least 6 weeks before departure. Further vaccination in the arm in which BCG is given is not recommended for at least 3 months.

Live vaccines can interfere with the response to the tuberculin skin test (TST). The TST, if indicated, can be done before or on the day that live virus vaccines are administered or at least 4 weeks later.

For further information on indications etc, see Chapter 22.

Typhoid (notifiable)

Typhoid fever is a systemic infection caused by *Salmonella typhi* or *paratyphi*. Humans are the only hosts.

Typhoid is predominantly a disease of countries with poor sanitation and poor standards of personal and food hygiene. It is particularly prevalent in the Indian sub- continent. All travellers to endemic areas are at risk of infection. The risk is lowest in tourist and business centres and rises as travellers enter more rural areas where standards of accommodation and food hygiene are poor.

Most serotypes cause only local infection of the gastro-intestinal tract (gastro-enteritis or 'food poisoning').

Following ingestion of contaminated food or water *S. typhi* penetrates the intestinal mucosa, replicates and enters the bloodstream. Symptoms range from mild fever, diarrhoea, myalgia and headache to severe disseminated disease with multi-organ involvement in 10-15% of cases. The case-fatality rate (CFR) is less than 1% with prompt antibiotic therapy, but may be as high as 20% in untreated cases. The likelihood of becoming a chronic carrier increases with age.

As typhoid vaccine is only partially effective, travellers should be advised to take precautions against eating or drinking potentially contaminated food and drink.

Vaccine

Three typhoid vaccines are available.

1. Oral typhoid vaccine (Ty 21a, Vivotif enteric coated capsule). This contains a live, attenuated strain of *S. typhi* (Ty 21a). A three dose course gives a cumulative three year efficacy of 50 to 60%. The vaccine is indicated for persons from six years of age.
2. Monovalent typhoid vaccine (Typhim Vi). This contains Vi capsular polysaccharide from *S. typhi* Ty 2 strain. In non-endemic countries

seroconversion occurs in >90% two to three weeks after single injection. Efficacy wanes, such that <50% are seropositive after 3 years. Children under 2 years may show a sub optimal response. Use of the vaccine in this age group should therefore be governed by the likely risk of exposure to infection.

3. Hepatitis A and Typhoid polysaccharide vaccine (Viatim). A dual-chamber syringe contains 0.5 mls of inactivated Hepatitis A vaccine and 0.5 mls of Typhoid polysaccharide Ty 2 strain vaccine which are mixed prior to injection.

Typhoid-containing vaccines should be stored at +2°C to +8°C.

An up to date list of licensed vaccines can be accessed on the HPRA website www.hpra.ie

Note: Vaccination should occur at least 2 weeks prior to potential exposure to infection.

Dose and route of administration

1. Oral typhoid vaccine (Ty 21a)
Adults and children from 6 years of age: three doses orally at 0, 2 and 4 days.
2. Monovalent typhoid vaccine
Adults and children from 2 years of age: one dose of 0.5ml. IM

Children 1-2 years of age: These should be immunised if there is a high risk of typhoid though there may be a sub-optimal response. Immunisation is not recommended for children under one year of age.

NOTE; As the response to the vaccine may be sub-optimal in those aged <2 years, more scrupulous attention than normal should be given to personal, food and water hygiene measures.

Re-immunisation every 3 years is recommended for those who remain at risk of infection.

3. Hepatitis A and Typhoid polysaccharide vaccine
Adults and children aged 15 years and over. One dose of 1ml IM. For information regarding subsequent doses see the SmPC.

Indications

Typhoid immunisation is required for:

- Laboratory workers handling specimens which may contain typhoid organisms
- Travellers to countries in Africa, Asia, Central and South America and South East Europe, and to other areas where hygiene is likely to be poor. Vaccination

is generally less important in areas where typhoid is not highly endemic and where visits are confined to urban centres with good accommodation.

Contraindications

Anaphylaxis to any of the vaccine constituents.

Precautions

Acute severe febrile illness, defer until recovery.

Pregnancy, avoid unless at high risk.

Adverse reactions

Oral typhoid vaccine (Ty 21a): Adverse events are uncommon or rare, and include malaise, headache, GIT upset and fever.

Monovalent typhoid vaccine: Local reactions (pain, swelling, and erythema) are very common, but generally resolve within 2 days. Fever is common.

Hepatitis A and Typhoid polysaccharide vaccine: Local reactions (pain, swelling, and erythema) are very common, but generally resolve within 2 days. Nausea, vomiting and fever are common.

Yellow fever (notifiable)

Yellow fever is an acute haemorrhagic fever spread by mosquitoes that occurs in tropical South America and in many countries in sub-Saharan Africa. It generally presents as an acute fever with jaundice and haemorrhage, with a mortality rate of up to 50% in outbreaks. The risk of acquiring disease increases in patients who travel to rural areas but also in urban centres reporting outbreaks. Areas where yellow fever occurs far exceed those officially reported.

The risk of infection can be reduced by taking precautions against mosquito bites. The species that transmits yellow fever also bites during day time. Vaccination is recommended for all travellers (exceptions see below) who visit any area where there is a risk of yellow fever transmission. For in-country travel, vaccination is recommended outside urban areas of the endemic zone (see current WHO maps <http://apps.who.int/ithmap/>) even if these countries have not officially reported the disease.

Vaccine

Yellow fever vaccine is a live viral vaccine. Duration of protection is lifelong, with some exceptions. Among over 540 million doses of YF vaccine administered up to 2015, only 18 vaccine failures were identified.

A certificate of vaccination is required for travel to endemic areas.

The vaccine should be stored between +2°C to +8°C.

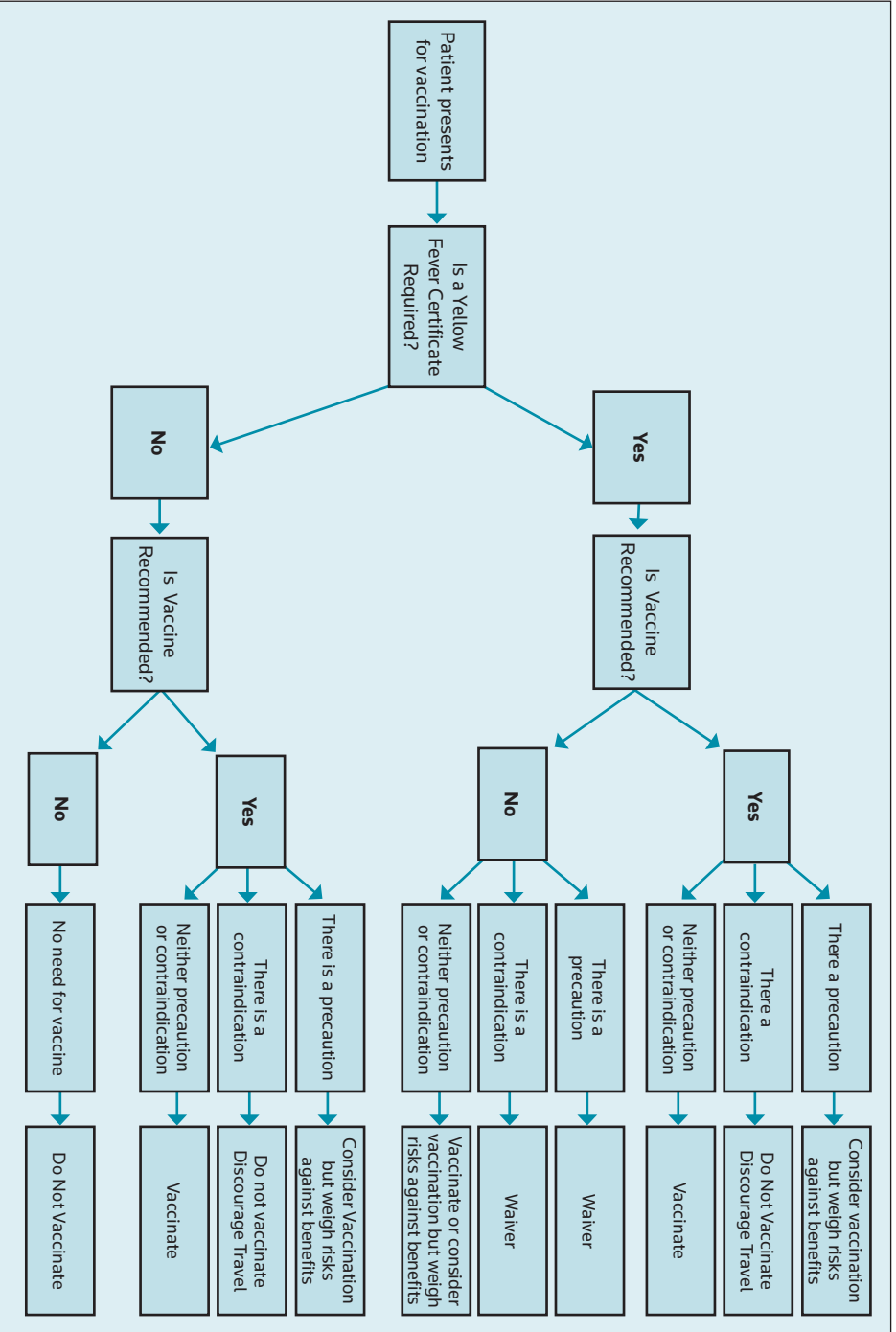
An up to date list of licensed vaccines can be accessed on the HPRA website www.hpra.ie

Dose and route of administration

NOTE: Because a single dose of YF vaccine is sufficient to confer long-lasting protection, the International Health Regulations of the WHO were changed in 2016 to remove the requirement for a ten year booster. Existing certificates with expiry dates do not need to be changed or reissued. However some countries may continue to require 10 yearly revaccination despite WHO guidance. Practitioners may choose to give an exemption certificate to avoid unnecessary boosting.

The dose is 0.5 ml subcutaneously, at least 10 days before entering an endemic area. Vaccination must be completed by an approved Yellow Fever vaccination centre and a certificate supplied according to regulations currently in force. Certificates are not valid until ten days after vaccination, so travellers are advised to seek medical advice in time.

Figure 5.2: Algorithm for yellow fever vaccination



Indications

Active immunisation against yellow fever of persons:

- travelling to, passing through or living in an endemic area
- travelling to any country that requires an International Certificate of Vaccination or Prophylaxis for entry
- handling potentially infectious materials (e.g. laboratory personnel)
- those who need a valid International Certificate of Vaccination or Prophylaxis (ICVP).

A booster is only recommended for:

- women pregnant when they received their initial YF vaccine
- those who received YF vaccine while infected with HIV and more than ten years after initial vaccine
- those who received YF vaccine while immunosuppressed (see Chapter 3)
- those who received a HSCT after receiving a YF vaccine and who are sufficiently immunocompetent to be safely vaccinated (see Chapter 3)

Vaccination may be an entry requirement for travellers arriving from countries where there is a risk of yellow fever transmission. It does not generally apply to passengers from European countries unless the host country has certified yellow fever vaccination as an entry requirement.

If yellow fever is contraindicated for medical reasons and the traveller is aware of the risks of infection, a waiver or certificate of exemption may be provided to allow essential travel. A waiver must have a beginning and an end date and is renewed for each and every trip.

A yellow fever certificate is valid from 10 days after vaccination for the life of the person vaccinated.

Yellow fever vaccination is not without risk and should always be considered in the context of the vaccine's risk/benefit profile.

Contraindications:

The risk of death from yellow fever is far greater than the risks related to the vaccine.

1. Anaphylaxis to the vaccine constituents, including egg
2. Significant immunosuppression including thymus disorder or thymectomy (see Chapter 3)
3. Infants aged <6 months.

Precautions:

1. Acute severe febrile illness-defer until recovery.
2. Pregnancy or if breast-feeding, unless at high risk (e.g. during a yellow fever outbreak), and after expert consultation to consider the potential risks and benefits.
3. Children aged from 6 to 9 months unless at high risk as the vaccine may cause encephalitis; seek expert opinion.
4. Age >60 years of age unless there is a considerable and unavoidable risk of acquiring yellow fever infection, as the risk for yellow fever vaccine associated neurotropic disease (YEL-AND) and yellow fever vaccine associated viscerotropic disease (YEL-AVD) increases with age.
5. When possible, yellow fever vaccine and MMR should be given 28 days apart, at separate sites and in a different limb. If these vaccines are given at the same time there may be reduced immune responses to the mumps, rubella and yellow fever antigens, so a four week interval should be left between them. If protection is required rapidly the vaccines may be given at any interval and an additional dose of MMR given at least 4 weeks later. If a vaccination precaution exists, the traveller may be vaccinated if the risks of travel outweigh the risks of vaccination and the traveller has been fully informed of the risks and given the option of changing travel plans.

Adverse reactions

Local: Common or very common: Pain, tenderness, swelling.

General: Common or very common: Headaches, GIT upset, myalgia, arthralgia, rash, low-grade fever.

Very rare: anaphylaxis meningitis, encephalitis (particularly in those aged <9 months of age), Yellow fever vaccine associated neurotropic disease (YEL-AND) includes neurological symptoms, coma, and/or Guillain-Barré syndrome. Yellow fever vaccine associated viscerotropic disease (YEL-AVD) mortality rate >60%. The risks of YEL-AND and YEL-AVD appear to be higher in those aged over 60 years.

All travellers should ensure that their routine vaccinations are up to date

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