Travel vaccination. Part 1: update patients' routine immunisations

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The pretravel consultation provides an ideal opportunity to check whether patients are up to date with their recommended routine immunisations.

Until the early 1990s most GPs would routinely administer to the intending traveller the now superseded cholera and typhoid vaccines and send them on their way. Unfortunately, these older vaccines gave variable protection, often made the recipients feel quite unwell and were discontinued some years after the introduction of a range of newer vaccines.

The first of these newer vaccines was the active hepatitis A vaccine Havrix, which in 1993 became the forerunner of a new generation of vaccines offering superior efficacy and a significantly lower side effect profile. For today's traveller, GPs can now select from over 25 vaccines, with many different brands, formulations and combinations available. Each has its own specific delivery mode, indications, risk of adverse reactions, precautions and contraindications, and all may be promoted heavily. The resultant plethora of information is potentially confusing to both medical practitioners and their travelling patients.

The ninth edition of *The Australian Immunisation Handbook*, published in 2008, goes a long way to avoid this confusion by providing health professionals with updated expert clinical guidelines to use when vaccinating their patients.[1] The recommendations were developed by the Australian Government's Australian Technical Advisory Group on Immunisation (ATAGI) and endorsed by the National Health and Medical Research Council (NHMRC). Recommendations are based on empirical evidence when available, or otherwise on current expert opinion, and are independent of pharmaceutical funding. The electronic online edition includes full referencing and will be updated periodically to reflect new changes (www.immunise.health.gov.au).

This two-part article addresses a number of issues relevant to the international traveller based on recommendations made in *The Australian Immunisation Handbook*. Preparation for the vaccination encounter and the importance of checking that travellers are up to date with their routine immunisations are discussed in this first part of the article. The second part, to be published in the January 2009 issue of *Medicine Today*, focuses on destination-specific vaccinations.

Although this article focuses on vaccination, the pretravel health consultation

Table 1. The vaccination encounter[1]

- Prepare an anaphylaxis response kit
- Ensure the cold chain has been in place
- Conduct a prevaccination screen to assess the patient's immune status
- Discuss options with the patient and obtain valid consent
- Prepare a vaccination plan
- Follow standard occupational health and safety guidelines
- Prepare the vaccine and relevant equipment
- Check each individual dose
- Reconstitute the vaccine
- Locate the injection site
- Administer the vaccine
- Keep the patient under observation for at least 15 minutes
- Be aware of adverse events after immunisation
- Follow postvaccination procedures, including completing relevant documentation[3]

Adapted from reference 1, appendix 10.

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Table 2. The National Immunisation Program Schedule[4]

Age	Vaccine											
Birth	hepB*											
2 months	hepB*	DTPa	Hib*	IPV	7vPCV	Rotavirus						
4 months	hepB*	DTPa	Hib*	IPV	7vPCV	Rotavirus						
6 months	hepB*	DTPa	Hib*	IPV	7vPCV*	Rotavirus*						
12 months	hepB*		Hib*				MMR	MenCCV				
12-24 months									Hepatitis A*†			
18 months										VZV		
18-24 months					23vPPV*†				Hepatitis A†			
4 years		DTPa		IPV			MMR					
10-13 years*	hepB									VZV		
12-13 years*											HPV	
15-17 years*		dTpa										
15-49 years					23vPPV‡							Influenza‡
≥ 50 years					23vPPV§							Influenza§
≥ 65 years					23vPPV							Influenza

Adapted from reference 4.
* For detailed information regarding these recommendations, refer to reference 4. † For Aboriginal and Torres Strait Islander children in high-risk areas. ‡ For Aboriginal and Torres Strait Islander people medically at risk. § For Aboriginal and Torres Strait Islander people.
ABBREVIATIONS: hepB = hepatitis B vaccine; DPTa and dTpa = diphtheria, tetanus and acellular pertussis vaccine (child and adolescent/adult formulations, respectively); Hib = *Haemophilus influenzae* type b vaccine; IPV = inactivated poliomyelitis vaccine; 7vPCV = 7-valent pneumococcal conjugate vaccine; MMR = measles, mumps and rubella vaccine; MenCCV = meningococcal C conjugate vaccine; 23vPPV = 23-valent pneumococcal polysaccharide vaccine; VZV = varicella-zoster vaccine; HPV = human papillomavirus vaccine.

should also deal with issues such as assessing overall fitness to travel; advising on the prevention of gastroenteritis, malaria and other mosquito-borne illnesses; motion sickness; jet lag; altitude sickness and personal security.[2]

The vaccination encounter

Recommendations made in *The Australian Immunisation Handbook* for the vaccination encounter are summarised in Table 1.[1,3] Generally, live viral vaccines should be given to patients either on the same day (at different sites) or three to four weeks apart. If this is not practical because of a traveller's time to departure, adjustments should be made accordingly. Although not ideal, it is better to administer a vaccine that is needed rather than not administer it at all. Similarly, if several doses are needed, it is better to administer one or two doses rather than administer none. After vaccination, travellers should be asked routinely to remain in the premises for at least 15 minutes for observation.

If there is any uncertainty about a traveller's requirements or any other related issues, he or she should be referred to a travel clinic.

NHMRC immunisation recommendations for all

Before considering vaccinations for travel to specific destinations, it is important to ensure that travellers are up to date with their routine immunisations for their appropriate age as according to the National Immunisation Program Schedule (NIPS).[4] This is important for routine general practice, public health and, particularly, for travellers to developing countries. Vaccinations currently recommended on the NIPS are listed in Table 2. It is important to note that the common diseases of childhood do cause serious illness in nonimmune adults, whether overseas or at home. Many of these vaccines are inexpensive. Indeed, the total cost of any vaccine is less than the cost of a hospital stay, here or overseas. It is worthwhile encouraging travellers to Europe or the USA, who may not require area-specific vaccinations, to have a vaccination review to ensure they are fully immunised according to the schedule.

Some comments on routine vaccinations, with specific reference to travellers, follow (see also Table 3). Primary vaccination in neonates and children is not discussed in detail in this article as this should be routinely checked for in any paediatric consultation.

Routine vaccinations by disease

Diphtheria, tetanus and pertussis

Tetanus is a severe and potentially fatal disease that can occur following even trivial injury. Five doses of diphtheria, tetanus and acellular pertussis vaccination have routinely been given to most students by the time they leave school. A booster for tetanus is then not required until the age of 50 years, unless a person sustains a tetanus-prone wound more than five years since vaccination.

One of the most common injuries while travelling is a simple cut or scrape from a fall, which may require a tetanus injection. Hence, travellers to countries where health services are difficult to access and hygiene may be of concern should be offered vaccination if more than five years have elapsed since their last dose.

To satisfy Australian PBS regulations, the tetanus and diphtheria vaccine ADT Booster can only be given from the Doctors' Bag supply at no cost to the patient if an injury has actually occurred. Otherwise, tetanus vaccination must be supplied via script or in-house supply.

Monovalent tetanus vaccination is no longer available in Australia. In view of the relatively high prevalence of pertussis infection in the population, tetanus vaccination is best given in combination with diphtheria and pertussis vaccination (Adacel, Boostrix) unless this combined vaccine has previously been given within the past 10 years. Diphtheria vaccination is recommended for most developing countries, and especially for travel to Eastern Europe and the Russian States.

Poliomyelitis

Most of the population is vaccinated

Table 3. NIPS vaccines administered to travellers

Vaccine	Trade name
Diphtheria, tetanus, pertussis	
Adsorbed diphtheria, tetanus vaccine	ADT Booster
Diphtheria, pertussis, tetanus vaccine	Adacel Boostrix
Diphtheria, pertussis, poliomyelitis, tetanus vaccine	Adacel Polio Boostrix-IPV
Poliomyelitis	
Poliomyelitis vaccine	Ipol
Diphtheria, pertussis, poliomyelitis, tetanus vaccine	Adacel Polio Boostrix-IPV
Measles, mumps, rubella*	
Measles, mumps, rubella vaccine	Priorix
Varicella-zoster*	
Varicella vaccine	Varilrix Varivax Refrigerated
Varicella-zoster vaccine	Zostavax
Influenza	
Influenza vaccine	Fluarix Fluvax, Fluvax Junior Influvac Vaxigrip, Vaxigrip Junior
Pneumococcal disease	
23-valent pneumococcal polysaccharide vaccine	Pneumovax 23
Meningococcal disease	
Tetravalent meningococcal polysaccharide vaccine	Mencevax ACWY Menomune
Meningococcal C conjugate vaccine	NeisVac-C Meningitec Menjugate Syringe
Hepatitis B	
Hepatitis B vaccine	Engerix-B H-B-VAX-II
Hepatitis B, hepatitis A vaccine	Twinrix

* A combined measles, mumps, rubella, varicella vaccine is expected to be available in the near future.

against polio in early childhood. For those individuals who haven't been vaccinated, inactivated poliomyelitis vaccine (IPV; Ipol) or an IPV-containing vaccine (Adacel Polio, Boostrix-IPV) is recommended as the initial vaccine of a primary course. Oral poliomyelitis vaccine (Sabin) is no longer routinely used in Australia. Although a fifth dose of polio vaccine is no longer recommended at late secondary school age, a booster dose should be given to travellers to areas where poliomyelitis is epidemic or endemic. This applies particularly to the Indian subcontinent, parts of Africa and the Middle East.

Measles, mumps, rubella

The regular measles outbreaks that have occurred as a result of nonimmunised individuals importing this disease into Australia and several European countries indicate that this childhood infection remains a significant threat to nonimmune children and adult travellers. Measles in nonimmune adults is often more severe than it is in children.

Measles, mumps, rubella vaccination (Priorix) is recommended before international travel for adults born during or after 1966 who do not have evidence of having had two doses of a measles-containing vaccine in the past. Egg sensitivity is no longer considered a contraindication to this vaccination.

A combined measles, mumps, rubella, varicella vaccine is expected to become available in the near future.

Varicella-zoster

Varicella can have extremely serious sequelae in both children and adults. Vaccination with one dose of a varicella vaccine (Varilrix, Varivax Refrigerated) is now routinely recommended in children at 18 months of age, although it can also be given as a single dose in those up to the age of 13 years (unless they have previously been infected). After this age, two doses are recommended, administered at least six weeks apart. It is likely that two doses will become routinely recommended for all ages in the near future.

Influenza

GeoSentinel Surveillance Network data estimate that influenza is one of the most common diseases suffered by travellers, occurring in more than 5.6% of monitored consultations in travellers attending GeoSentinel clinics.[5] Influenza vaccination (Fluarix, Fluvax, Influvac, Vaxigrip) is advised for visitors to the northern hemisphere over its winter period. Although the vaccine available in the southern hemisphere at any one time may not cover all the antigens present in the influenza strain prevalent in the northern hemisphere, it nonetheless offers some protection against most of the influenza A and B antigens.

Pneumococcal disease

Vaccination against the pneumococcus with the 23-valent pneumococcal polysaccharide vaccine (Pneumovax 23) should be offered to individuals travelling to areas of current infectivity, especially if they are to be part of a large tourist group or are aged 65 years or over. Pneumonia remains one of the more common reasons for travel health insurance claims, and a recent article confirmed the significant incidence of this largely vaccine-preventable illness.[5] Pneumococcal vaccination is also advised for all travellers with chronic medical conditions, especially cardiorespiratory disease or diabetes.

Meningococcal disease

The tetravalent meningococcal polysaccharide vaccine (4vMenPV; Mencevax ACWY, Menomune) is recommended for travellers to areas in which meningococcal disease is endemic, in particular the 'meningitis belt' of sub-Saharan Africa, as well as other areas experiencing epidemics. The Saudi Arabian Ministry of Health requires that all pilgrims attending the annual Hajj show evidence of vaccination with a vaccine including the A and C strains.

It is important to discuss with travellers the differences between the tetravalent vaccine (4vMenPV) and the meningococcal C conjugate vaccine (MenCCV; NeisVac-C, Meningitec, Menjugate Syringe). The risk of lifetime exposure to serogroup C meningococci in Australia is far greater than the risk of exposure to serogroups A, C, W135 and Y during a two-week trip to most destinations, excluding those mentioned above.

Occasionally both vaccines may be recommended: in such cases, 4vMenPV may be given at least two weeks after MenCCV; however, if 4vMenPV is given first, MenCCV should be given at least six months later.

Hepatitis B

The risk of hepatitis B infection becoming chronic is greater in younger age groups; chronic infection carries a significant risk of cirrhosis and hepatocellular carcinoma. In Australia, universal vaccination is now routine for neonates and for adolescents who have not already received a primary course of the vaccine.

Given the wide range of indications for vaccination, as well as the high number of carriers in Australia (estimated at 200,000), the author's own view is that GPs should routinely offer hepatitis B vaccination (Engerix-B, H-B-VAX-II, Twinrix [combined with hepatitis A vaccine]) to all their patients who are not immune to this infection. The pretravel consultation offers an opportunity to do this.

It appears likely that interchangeability of the brands of vaccines for both hepatitis A and hepatitis B is not ideal, but it is acceptable, as there is no evidence to the contrary. Seroconversion frequency is about 35% after the first dose, increasing to over 90% after the third dose. Serological confirmation is recommended for healthcare workers and those who are

Key points

- Remember the valuable role that vaccination has in protecting both the individual and the public.
- Implement procedures for the vaccination encounter.
- Ensure the traveller is up to date with all routine vaccinations according to the national immunisation program schedule.
- Offer advice regarding other components of the pretravel health consultation.
- Discuss each individual's relative risk needs for his or her particular trip; vaccinations are only one of the preventive strategies needed.

immunocompromised. If anti-HBs antibody levels are less than 10 mIU/mL after the third dose, HBsAg carrier status should be tested. If negative, either a fourth double dose (two doses in one arm, or one in each arm) or a second course of three doses should be administered, with antibody testing following that.

It is increasingly clear that cell-mediated immunity is long lasting. Therefore if seroconversion occurred after a primary course, there is no need for booster vaccinations for decades, possibly for life. Nonetheless, for medicolegal reasons, and possibly for peace of mind, it is reasonable for healthcare workers and others at significant risk to have antibody levels measured and boosters given if required.

The combined hepatitis A and B vaccine Twinrix 720/20 can be given as a two-dose schedule, six months apart, for children aged 1 to 15 years. The same formulation has been approved for rapid administration consisting of four doses at 0, 7 and 21 days followed by a booster one year later for long-term protection. This accelerated dose is only recommended for adults and only if there is very limited time to departure to endemic regions.

Summary

Common diseases of childhood can cause serious illness in nonimmune adults, whether they are at home or overseas. The pretravel consultation provides an ideal opportunity to check that travellers are up to date with their routine immunisations.

The second part of this article, to be published in the January 2009 issue of *Medicine Today*, will discuss vaccination recommendations for travellers to specific areas. MT

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