

## Key points

- Reasons for adults requiring vaccination include incomplete childhood schedules, waning immunity, medical and lifestyle risk factors, travel and immigration.
- Low rates of adult vaccination can be improved but remain a challenge.
- GPs face a number of barriers in the delivery of adult vaccinations, including lack of opportunity to identify vaccination requirements, public misconceptions about the need for vaccination and the complexity of funding and catch-up programs.
- The increase in the number of vaccines recommended for adults means that GPs need to develop strategies to immunise adults at every opportunity.



# Immunisation for life: don't forget adults

MELINA M. GEORGIOUSAKIS BSc(Hons), PhD JANE JELFS BAppSci (Med Lab Sci), PhD, MASM  
KRISTINE K. MACARTNEY BMedSci, MB BS, MD, FRACP

A number of vaccines are recommended for adults; however, identifying and reaching eligible adult patients is often a challenge. This article provides an overview of the available vaccines and the range of indications for use in the adult population, while addressing some of the difficulties met by immunisation providers.

**M**any vaccines are provided early in life to induce immunity before diseases occur. However, protection from vaccination is not always lifelong. In addition, changing lifestyle and health factors, and an increased risk of certain diseases with age, means the vaccination needs of adults should be assessed regularly. In recent years there has been an increase in the number of vaccines provided to adolescents, primarily

through school-based vaccination programs. Improving the protection provided by immunisation throughout adulthood is the next challenge.

The role of GPs and other immunisation providers is crucial in ensuring delivery and uptake of adult vaccines. This article aims to provide an overview of vaccination of adults and discusses some of the barriers to, and opportunities for, providing best practice in this area.

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Dr Georgousakis is Research Officer at the National Centre for Immunisation Research and Surveillance, Westmead Hospital, Sydney. Dr Jelks is the Manager, Policy Support at the National Centre for Immunisation Research and Surveillance at Westmead Hospital, Sydney and Senior Lecturer in the Discipline of Paediatrics and Child Health, Sydney Medical School, University of Sydney, Sydney. Associate Professor Macartney is Deputy Director Government Programs at the National Centre for Immunisation Research and Surveillance at Westmead Hospital, Sydney and a Staff Specialist in the Department of Infectious Diseases and Microbiology, The Children's Hospital at Westmead, Sydney, NSW.

### OPPORTUNITIES TO DISCUSS VACCINATION WITH ADULTS

- Registration of new patients
- Age-based health checks
- Immigration
- Pregnancy
- Travel
- Visits for immunisation of children
- Visits for illness/injury

### KEEPING ADULT PATIENTS UP TO DATE

The vaccines recommended for adults have changed over time. Current recommendations regarding vaccines to be given to adults are made by the Australian Technical Advisory Group on Immunisation and are outlined in *The Australian Immunisation Handbook* (from here on referred to as 'the Handbook'; available online at [www.health.gov.au/internet/immunise/publishing.nsf/Content/Handbook-home](http://www.health.gov.au/internet/immunise/publishing.nsf/Content/Handbook-home)).<sup>1</sup>

Not all vaccines are funded under the Australian National Immunisation Program (NIP). The current NIP schedule for adults includes both seasonal influenza and pneumococcal polysaccharide (23vPPV) vaccines for specific groups, as described in more detail below. In addition to these Commonwealth-funded vaccines, a number of others are recommended for all or most adults, including tetanus, measles, mumps and rubella (MMR), pertussis and herpes zoster. Additional vaccines are also recommended for adults who are at increased risk of certain vaccine preventable diseases; these are described in more detail below and in the Table.<sup>2</sup>

Many vaccines recommended for adults require a private prescription; however, state and territory programs do fund some. Two vaccines, 23vPPV for

at-risk individuals and adult booster formulation of diphtheria and tetanus, are available through the PBS. These PBS-funded vaccines require a prescription with the RPBS or PBS box ticked, and patients, depending on whether they hold a health concession card, may be required to make a copayment at the pharmacy when filling the prescription. Patients will then be required to transport the vaccine(s) back to the GP for administration. NIP-funded vaccines are free of charge to patients and supplied to immunisation service provider practices via state or territory distribution centres.

### The adult immunisation encounter

Every opportunity should be taken to identify adult patients who are not up to date with recommended vaccinations. Discussions on vaccine requirements can be made part of standard practice, especially by using questionnaires when registering new patients. In addition, GPs can use specific triggers, such as patient travel, to review vaccine history.

Although specific 'travel' vaccines, such as Japanese encephalitis, yellow fever, typhoid or hepatitis A, may be indicated for certain destinations (and will not be discussed in more detail in this article), it is essential to ensure that more routine immunisations are up to date. This particularly includes: tetanus, diphtheria and pertussis; measles, mumps and rubella; influenza; and hepatitis B. Other triggers to spark discussion could include visits due to injury or illness (including those of family members), pregnancy, age-based health checks or parents visiting for their children's immunisations (see the box on this page).

### Catch-up and 'incomplete schedules'

#### *Measles, mumps and rubella*

Adult patients may be at risk of certain vaccine preventable diseases due to

incomplete childhood or adolescent vaccine schedules, or missed boosters. For example, two doses of MMR vaccine are now recommended for all adults born after 1966 because they are unlikely to have naturally acquired immunity to measles, mumps and rubella because these viruses have not been in wide circulation since that time.

Although provision of a second dose has been promoted for over a decade, some adolescents and young adults missed this during the Australian Measles Control Campaign in the late 1990s, and the subsequent Young Adults MMR program in 2001.<sup>3</sup> This group now has the most measles notifications, with 56.4% of notifications between 2001 and 2005 reported among adults between 20 and 39 years of age.<sup>4</sup>

#### *Tetanus*

Immunisation requirements for tetanus vaccine boosters changed in 2000. Adults who have completed a primary immunisation course now only require one routine booster dose of a tetanus-containing vaccine at 50 years of age and over, providing they have not received a tetanus-containing vaccine in the previous 10 years. This replaces earlier recommendations to vaccinate adults against tetanus every 10 years.

Adults who have received a tetanus-prone wound should still receive a booster dose if more than five years have elapsed since their previous dose. Although some adults will have had many tetanus boosters over their lifetime, others may never have received a dose beyond childhood. Australian serosurvey data show that only 47% of the adult population over 70 years of age have measurable immunity to tetanus, highlighting the need to ensure these patients are offered tetanus vaccine when appropriate.<sup>5</sup>

#### *Human papillomavirus*

The funded catch-up program for human papillomavirus (HPV) vaccine for girls

**TABLE. SUMMARY OF VACCINES FOR USE IN ADULTS IN THE AUSTRALIAN IMMUNISATION HANDBOOK, 9TH EDITION AND THE DIFFERENT CIRCUMSTANCES THAT MAY INDICATE THEIR USE\*†**

	All adults	Elderly	Indigenous	At-risk			Pregnancy	
				Medical	Lifestyle	Occupational	During	Planning or postpartum
Annual influenza	✓ <sup>1</sup>	✓≥ 65 years	✓≥ 15 years	✓ <sup>2</sup>		✓ <sup>3</sup>	✓ <sup>4</sup>	
Pneumococcal (23vPPV)		✓≥ 65 years	✓≥ 50 years	✓ <sup>5</sup>				
Measles, mumps and rubella (MMR)	✓ <sup>6</sup>					✓ <sup>7</sup>		✓ <sup>8</sup>
Diphtheria and tetanus (dT)	✓ <sup>9</sup>			✓ <sup>10</sup>				
Pertussis	✓ <sup>11</sup>					✓ <sup>12</sup>		✓ <sup>13</sup>
Varicella	✓ <sup>14</sup>					✓ <sup>14</sup>		✓ <sup>14</sup>
Herpes zoster		✓≥ 60 years						
Hepatitis A				✓ <sup>15</sup>	✓ <sup>15</sup>	✓ <sup>15</sup>		
Hepatitis B				✓ <sup>16</sup>	✓ <sup>16</sup>	✓ <sup>16</sup>		
Human papillomavirus (HPV)	✓ <sup>17</sup>							
Meningococcal C				✓ <sup>18</sup>		✓ <sup>18</sup>		
Japanese encephalitis					✓ <sup>19</sup>	✓ <sup>19</sup>		
Q fever						✓ <sup>20</sup>		

\* Reproduced with permission from: Adult vaccination: vaccines for Australian adults NCIRS Fact sheet: November 2010.<sup>2</sup>

† Not including vaccinations specific for travel outside of Australia.

Note: Cells that are shaded in darker green represent adult vaccinations funded under the National Immunisation Program.

The numbers in the table represent recommendations in *The Australian Immunisation Handbook* 9th edition.

- Influenza vaccination is recommended for anyone (≥ 6 months of age) who wishes to be protected against influenza.
- Anyone ≥ 6 months of age who has a medical condition that puts them at increased risk of severe influenza.
- People who are in contact with individuals at increased risk of severe influenza, people who work in the commercial poultry industry and people providing essential services.
- Women planning pregnancy or pregnant women who will be in their second or third trimester during the influenza season.
- Available through the PBS for adults with certain medical conditions (e.g. splenectomy); funded under the NIP for Aboriginal and Torres Strait Islander people 15 to 49 years of age who have a medical condition that puts them at risk of invasive pneumococcal disease.
- Adults born after 1966 who are non-immune or have only received one dose of MMR should receive a second dose.
- Health care workers or people who work with children should be vaccinated if they are non-immune or have only received one dose of MMR.
- Women planning pregnancy or as soon as possible after delivery if seronegative for rubella.
- Adults who are 50 years of age and have not received a booster dose of a tetanus containing vaccine in the previous 10 years. This can be given as dT or the adult formulation dTpa, which provides additional protection against pertussis.
- Adults who have received a tetanus prone wound should receive a dT (or dTpa) booster dose if more than five years have elapsed since their last dose.
- Any adult who requires a booster dose of dT vaccine should be encouraged to do so with dTpa.
- Health care workers and those who work with children are recommended a booster dose

of dTpa if no documented booster has been received.

- Adults planning pregnancy or any household contact of infants and young children should receive a single booster dose of dTpa if no documented dTpa booster dose has been received. This is funded in some states and territories through short-term pertussis vaccination programs.
- Adults who are not immune (serology recommended) to varicella require two doses of varicella vaccine to achieve adequate protection. In particular, nonimmune adults who work with children, women before pregnancy and contacts of young children or people with impaired immunity.
- Adults who are at increased risk of acquiring hepatitis A due to their occupation, lifestyle or medical status.
- Adults who are at increased risk of acquiring hepatitis B due to their occupation, lifestyle or medical status including household and sexual contacts of hepatitis B carriers. For certain groups the combined hepatitis A/hepatitis B vaccine should be considered.
- Adult females up to 26 years of age; however, both HPV vaccines are registered for use in females up to 45 years of age and can be considered for this age group. The quadrivalent HPV vaccine is approved for use in adult males up to 26 years of age; however, routine vaccination of males is not recommended.
- Adults at high risk for meningococcal disease including close contacts of meningococcal C cases, adults who suffer from complement defects or functional/anatomical asplenia and laboratory personnel who handle *Neisseria meningitidis*.
- Adults who live in the outer islands in the Torres Strait or nonresidents who will live or work on the outer islands for a cumulative total of 30 days or more during the wet season, as well as laboratory personnel who might be exposed to the virus.
- Workers who may be exposed to infected animals and are seronegative for Q fever, including farmers, animal transporters, veterinarians, and agricultural college staff and students. Also, laboratory personnel handling veterinary specimens or working with *Coxiella burnetii*.

and young women aged between 13 and 26 years ended in 2009 but HPV vaccination continues to be NIP-funded for girls aged 12 and 13 years (delivered in a school-based program).

Both available HPV vaccines are now registered in Australia for use in females up to 45 years of age and can be offered through private prescription to girls or women who were not vaccinated during the catch-up program. It is important to note, however, that as the likelihood of exposure to HPV increases with age, the effectiveness of vaccination decreases, which should be considered when discussing vaccination with adult females.

In June 2010, the TGA approved the quadrivalent HPV vaccine, for use in males between 9 and 26 years of age for the prevention of external genital lesions and infection caused by the HPV strains in the vaccine. However, currently, routine vaccination of males is not recommended in the *Handbook*.

### VACCINATION OF MIGRANTS

Immigrants to Australia and those on short-term visas, such as international students, may have left countries where immunisation rates are low, or where schedules are different or less comprehensive than in Australia. Although migrants undergo medical assessments before entry into Australia, there is no extensive review of vaccination history or delivery of recommended vaccines. It is important that GPs and other immunisation providers assess and identify these patients and establish catch-up schedules, especially for polio, hepatitis B, varicella, MMR, diphtheria, tetanus and pertussis (dTpa) vaccines.

Guidelines in the current *Handbook* (Chapter 1.3.5) can assist GPs in making a catch-up plan.

GPs may request documentation of previous vaccinations, which, although not always available, is usually considered sufficient evidence of immunity.

Serological confirmation of vaccination is not usually recommended but can be useful in specific circumstances, for example, screening for evidence of past or active hepatitis B infection. Although vaccination of immigrants is important for both their personal health and that of the community, opportunities to reach this population are often missed.

### PREGNANCY AND INFANT PROTECTION

Vaccination during pregnancy, except for influenza, is not routinely recommended. All live viral vaccines, such as MMR and varicella, are contraindicated in pregnancy due to their potential to cause vaccine virus infection in the fetus. Inactivated seasonal influenza vaccine

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is recommended and NIP funded for all pregnant women, particularly those who will be in the second or third trimester of pregnancy during the influenza season.

Influenza during pregnancy has been associated with complications such as severe maternal respiratory illness (a five-fold risk increase in the third trimester)

and spontaneous abortion.<sup>6</sup> In the 2009 H1N1 influenza pandemic, pregnant and postpartum women were seven times more likely to experience severe influenza illness than nonpregnant women of childbearing age.<sup>7</sup> Influenza vaccination has a good safety record in pregnancy, and there is emerging evidence that influenza vaccination during pregnancy

can also protect infants from influenza up to 6 months of age.<sup>8</sup>

Vaccination of women planning pregnancy or postpartum is advised to protect the fetus and newborn, particularly against diseases such as rubella, pertussis and varicella. Maternal rubella infection in pregnancy results in high rates of fetal harm, often presenting as congenital rubella syndrome (CRS). Most cases of CRS in Australia in the past decade have been in the children of migrants who have not had previous rubella infection or vaccination, which highlights the importance of prepregnancy screening and immunisation.<sup>9</sup>

Similarly, pertussis vaccination, using the adult dTpa formulation, is recommended for women before or immediately after pregnancy. Fathers, and others caring for newborns, should also be vaccinated against pertussis, preferably prior to the birth. The highest rates of hospitalisation and death from pertussis occur in infants aged less than 6 months, with most infected by parents, siblings or other household contacts. Some states and territories have rolled out short-term 'cocooning' vaccination programs, which fund pertussis vaccination for parents and carers of newborns.

## THE ELDERLY

Elderly people in Australia are a priority group for vaccination. Immune senescence (the gradual reduction of immune function with age) and an increase in chronic disease place the elderly at increased risk of vaccine-preventable diseases compared with younger adults. Although evidence suggests that vaccination of the frail or very elderly may be relatively less effective compared with the otherwise healthy elderly, there are still benefits from vaccinating this group.

Together, influenza and pneumonia are the fourth most common causes of death in adults aged over 65 years in industrialised countries.<sup>10</sup> Annual influenza vaccination of the elderly from 65 years of



age has reduced not only hospitalisation and mortality rates due to pneumonia and influenza,<sup>11</sup> but also chronic diseases such as cardiac disease and stroke.<sup>12</sup> The most recent published national coverage rates for seasonal influenza vaccination from 2009 reported high coverage (74.6%) in people aged 65 years and over.<sup>13</sup>

Indigenous and non-Indigenous adults should receive 23vPPV at age 50 and 65 years, respectively. Immunity to polysaccharide vaccines is short lived, hence re-vaccination is recommended five years after the primary dose. In 2009, approximately 50% of adults aged 65 years and over reported having received 23vPPV within the past five years; however, uptake of the second dose is lower. Adults with certain underlying medical conditions may require a third dose five years after the second re-vaccination, as described in the *Handbook*.

The elderly are particularly at risk of herpes zoster, as waning cellular immunity gives risk to reactivation of latent varicella-zoster virus. Incidence rates increase with age with about half of those aged over 85 years affected at some time. The elderly also have the highest rates of zoster complications such as postherpetic neuralgia and disseminated infection.

Use of a live attenuated zoster vaccine has been recently recommended as a single dose in adults aged 60 years and over (see the online *Handbook* and also available at [www.ncirs.edu.au/immunisation/fact-sheets/herpes-zoster-vaccine-fact-sheet.pdf](http://www.ncirs.edu.au/immunisation/fact-sheets/herpes-zoster-vaccine-fact-sheet.pdf)). The vaccine has also been recommended for inclusion on the NIP from age 60 years; however, a government decision on NIP funding has not occurred yet, and there have been supply problems at the manufacturer limiting availability on the private market.

### ABORIGINAL AND TORRES STRAIT ISLANDER PEOPLE

Overall, Indigenous Australians have experienced higher rates of vaccine preventable diseases compared with non-Indigenous Australians. This has led to the development of specific immunisation programs for Aboriginal and Torres Strait Islander people that vary between states and territories. Although there has been a reduction in diseases such as diphtheria, polio and hepatitis B, other diseases, such as invasive pneumococcal disease and influenza, continue to result in higher levels of morbidity and mortality in Indigenous Australians.<sup>14</sup>

From 2010, the NIP was extended

to provide free influenza vaccination for all Indigenous people aged 15 years or over, independent of health status. The recommendations for pneumococcal vaccine are unchanged: Indigenous people aged between 15 and 49 years with risk factors (including cigarette smoking), and all Indigenous people aged 50 years and over, are advised to receive 23vPPV vaccine. The number of booster doses required is dependent on age and health status, as described in the *Handbook*.

### RISK FACTORS

#### Lifestyle issues

Lifestyle factors, such as drug use, sexual practices and cigarette smoking, can place some adults at higher risk of infection compared with the general population. For example, both hepatitis A and hepatitis B vaccines are recommended for intravenous drug users and men who have sex with men, due to the higher risk of infection. GPs should seek documentation of a completed hepatitis B vaccine course; hepatitis A vaccination is less likely to have occurred. Serology is useful to determine immunity to both diseases. The combined hepatitis A and B vaccine can be considered if immunity to both viruses is absent.

#### Immune impairment

Individuals who are immune impaired, whether as a result of disease or medical treatment, are often a challenge to vaccinate, and in some cases should receive additional doses or new courses of inactivated vaccines, such as hepatitis B, pneumococcal and influenza. Live vaccines, such as BCG (immunisation against tuberculosis), varicella and MMR, are usually contraindicated in people with impaired immunity. Primary care providers should liaise closely with their patients' specialist physicians to ensure that together they have provided patients with timely and complete vaccination. Annual influenza vaccine is particularly important.

## Health issues

Adults and children with medical conditions, such as chronic respiratory disease (including severe asthma), heart disease, diabetes and other chronic diseases, are up to five times more likely to experience severe or complicated influenza than their healthy peers. From January 2010, all Australians aged 6 months and over with specified medical conditions that put them at increased risk of complications from influenza are eligible for annual seasonal influenza vaccination under the NIP.

Although the vaccine had previously been PBS listed for this indication, it is anticipated that availability under the NIP will reduce the need for repeat doctor visits (for prescription and administration) and will also increase coverage. Details of this new program are available online (see: [www.immunise.health.gov.au](http://www.immunise.health.gov.au)).

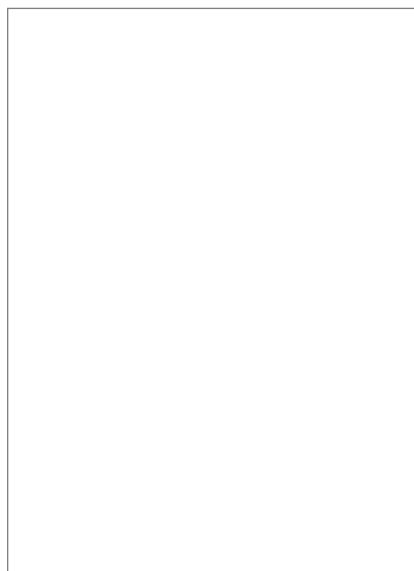
## OCCUPATIONAL REQUIREMENTS

A number of occupations are linked with an increased risk of certain diseases. These include occupations where close person to person contact or contact with contaminated products such as blood can occur; for example, health care workers, childcare workers, residential care workers, students in health care-related fields and laboratory workers. Other occupations may have specific risks, such as workers in meat and livestock industries for whom Q fever is a risk and vaccination is available.

Health care workers are at risk of both acquiring infections from and transmitting infections to their patients, and are a priority group for vaccination. For example, health care workers have been identified as a source of pertussis infection of newborns and young children.<sup>15</sup> Vaccines recommended for this group include hepatitis B, influenza, MMR and pertussis.

Low levels of vaccine uptake have been reported among health care workers; in 2005, only 38% of staff in Victorian

hospitals were vaccinated against seasonal influenza.<sup>16</sup> Health care premises, including GP practices, have a duty of care to staff and patients to ensure that all those in their office are up to date with their immunisations, including influenza vaccination.



## BARRIERS TO ADULT IMMUNISATION

The infrastructure and support systems that are well established for childhood and adolescent vaccination are less well developed for adult immunisation. This is probably a result of the variable mechanisms in place for funding and promoting adult vaccines, which include the NIP, PBS, varied state and territory programs, employee-funded programs and recommended but self-funded vaccines. Recent improvements, such as the new NIP-funded influenza program for at-risk adults, hold promise for improving vaccine delivery.

The ability to track vaccine coverage at the individual and population level is still a challenge, with coverage data only currently available for seasonal influenza and pneumococcal vaccines in the elderly. A 'whole-of-life immunisation register', building on the success of the Australian Childhood Immunisation Register (ACIR), has been proposed and should be consid-

## WHY PROMOTE VACCINATION TO ADULTS?

- To maintain immunity into old age  
Example: only 47% of adults over 70 years of age have measurable immunity to tetanus
- To prevent transmission to vulnerable groups  
Example: adults are the most common source of pertussis infections in infants
- To increase vaccine uptake because it is lower than optimal especially for at-risk individuals  
Example: Only a small proportion of health care workers are vaccinated against influenza
- To identify adults who are at risk of disease  
Example: Over 50% of measles notifications are in young adults

ered in the new National Immunisation Strategy (under development).<sup>17</sup>

Education programs that focus on increasing public understanding of adult vaccination have been successful in improving adult vaccine uptake. However, they have not always been commonplace or comprehensive. Many adults may believe that vaccination is not required if they are healthy; they may be unaware of factors, other than travel, that place themselves or their contacts at an increased risk of disease.

Balancing time and opportunity remains a barrier for health care providers, with a decline in adults visiting doctors for 'healthy' visits. However, GPs remain important advocates for adult vaccination (see the box on this page). One of the strongest motivators reported by adult patients for receiving a vaccine, especially the elderly, is its recommendation by a GP or health care professional.<sup>13</sup> Seizing

opportunities for vaccine discussions during consultations, or scheduling follow-up visits for immunisation, can help GPs bring this important preventative health strategy to their patients' attention.

### WHAT IS TO COME?

Vaccines formulated specifically for adult populations, including the use of new adjuvants and delivery systems, are currently being investigated. Innovative strategies aim to increase vaccine efficacy in the elderly, such as the use of intradermal vaccine delivery and conjugate vaccines; new conjugate pneumococcal vaccines may offer superior protection against pneumococcal disease.

Funding of additional adult vaccinations under the NIP, such as those for herpes zoster, is also being considered. Future developments like these could play a critical role in the improvement of adult vaccination coverage.

### CONCLUSION

Despite the availability of a number of safe and effective vaccines recommended for adults, vaccine uptake within this population remains suboptimal. Lack of knowledge of the recommended vaccines for adults and the associated benefits are barriers that can be addressed through education and advocacy. GPs and immunisation providers play a critical role in this process.

Information resources from state and territory health services as well as *The Australian Immunisation Handbook* and fact sheets developed by the National Centre for Immunisation Research and Surveillance (available online at: [www.ncirs.edu.au/immunisation/factsheets/index.php](http://www.ncirs.edu.au/immunisation/factsheets/index.php)) can assist immunisation providers in the delivery of adult vaccines. Lifelong protection against vaccine-preventable diseases should be a priority for both the community and health care providers; therefore, vaccination of adults should not be forgotten. **MT**

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