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## Immunisation of Older People

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### ABSTRACT

Older people are more prone to infections than younger people and prevention via effective vaccines is an important approach to reduce the burden of infections in this age group, especially as microorganisms are often resistant to antibiotics. While there is an emphasis on childhood vaccination, adult vaccination is also important as part of a whole-of-life approach. Influenza, pneumococcal, herpes zoster and tetanus vaccines are effective in older people as are other vaccines for those at high risk. Pertussis vaccination is recommended in older people to reduce the spread of infection to children. The Australian and New Zealand Society for Geriatric Medicine has revised their position statement on vaccination of older people. These recommendations, along with the evidence to support these, are presented in this review.

**J Pharm Pract Res 2012; 42: 316-22.**

### INTRODUCTION

Older people have a higher incidence of infectious diseases and may respond less well to treatment than younger people (aged less than 50 years). Thus, prevention is important and immunisation is effective for several infectious diseases. There is evidence of under-use of effective vaccines in all age groups, e.g. older people and their carers. While society has achieved near universal vaccination rates in young people, a whole-of-life approach to vaccination is yet to gain momentum. The lack of an adult vaccination registry in Australia and New Zealand is an example of the current emphasis on only childhood vaccination.

### IMMUNOSENESCENCE AND EFFICACY

Ageing affects several elements of the immune response resulting in an increased incidence of many infections as well as illnesses associated with dysregulation of the immune response, such as autoimmune diseases. The concept of immunosenescence encompasses these changes and has numerous well established and theoretical causes.<sup>1</sup> Cytomegalovirus infection causes a strong immune response that is believed to lead to a depletion of naïve T cells that limits the ability of older people to respond to other antigens.<sup>2</sup> The large number of committed memory cells associated with cytomegalovirus infection leads to secretion of a range of soluble mediators that can contribute to an inflammatory state ('inflammaging') that can damage organs and other tissues. Vascular disease associated with ageing is clearly associated with cytomegalovirus seropositivity.

Despite these changes in the immune system with ageing, vaccination can still be effective in reducing the

burden of infectious diseases in older people. It is almost universally true that the same vaccine can produce a stronger immune response and is more protective in those not suffering immunosenescence. However, the benefits of several vaccines in older people are well established and age alone should never be a reason to be complacent about vaccination. It is possible to partially overcome the effects of attenuated immune response to vaccination in older people, e.g. by using higher antigen doses, more immunogenic administration routes and the use of adjuvants.

### INFLUENZA VACCINE

Influenza shows marked seasonal variations and there is greater attack rate among older and institutionalised people. The great pandemics, such as the 1918 outbreak, are caused by antigenic shift, which may occur when avian influenza and human influenza viruses co-infect a host. The 2009/10 pandemic was surprisingly benign among older people possibly due to immunity gained earlier in life.<sup>3,4</sup> Some 3000 to 7000 excess deaths occur in Australia during a major influenza outbreak. Deaths in severe epidemics can exceed 10 000.<sup>5</sup> A large study on influenza-related mortality in two influenza A epidemics reported that 11 to 13 excess deaths occurred per 100 000 persons, but in those aged 65 years and over, the incidence of excess deaths increased to 68 to 104 per 100 000.<sup>6</sup>

### Efficacy

A Cochrane review concluded that available evidence on the efficacy or safety of influenza vaccinations in people aged over 65 years is of poor quality.<sup>7</sup> This analysis had potential flaws as outlined in a subsequent letter.<sup>8</sup> Some have commented that the effectiveness of current influenza vaccines in older people is far from established.<sup>9</sup> A large community-based study of vaccine effectiveness of nearly 714 000 person-seasons of observation, revealed a 27% reduction in the risk of hospitalisation for pneumonia or influenza and a 48% reduction in the risk of death.<sup>10</sup> This reduction in mortality was confirmed by a study over eight seasons in The Netherlands, which reported a 31% reduction of risk in those immunised.<sup>11</sup> Efficacy is not compromised significantly if the vaccine is matched less well to currently circulating strains.<sup>12</sup> The influenza vaccine is effective in low-, intermediate- and high-risk elderly community-dwelling people.<sup>13</sup> Influenza increases hospitalisation and deaths in elderly nursing home residents each winter.<sup>14</sup> Vaccination of indigenous populations such as Aboriginal and Torres Strait Islander people is justified at an earlier age on the basis of epidemiological evidence. Influenza vaccination in young children reduces influenza-associated hospitalisations in older adults, possibly by inducing herd immunity, and argues for extensive, if not universal, vaccination of children primarily to prevent transmission to older people.<sup>15,16</sup>

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If greater proportions of residents in aged-care facilities are vaccinated, there may be less likelihood of an influenza breakout in the facility. Thus, attempts should be made to vaccinate everyone – even those whose quality of life may not warrant vaccination.

In a review, influenza vaccination, particularly among older people at high risk, was found to be cost-effective.<sup>17</sup>

### Adverse Effects

A randomised placebo-controlled trial of the 1988/89 trivalent split-antigen vaccine in 336 people over 65 years showed no significant difference between influenza vaccine and placebo with respect to the proportion of subjects reporting disability or systemic symptoms.<sup>18</sup> However, local tenderness occurs in around 30% of vaccine recipients.<sup>19</sup> Although there are isolated reports of serious adverse events, such as rheumatic conditions, these have not been directly attributed to the vaccine. The risk of the vaccine causing the Guillain-Barré syndrome is very small; probably no more than one excess case per million vaccinated although it is not known if this rate is higher in older people.<sup>20</sup> Influenza infection can trigger the Guillain-Barré syndrome in some individuals.

### Increasing Vaccine Usage

By world standards, the uptake of influenza vaccine by Australians over 65 years is high; an estimated 77% vaccinated and 87% in residential care.<sup>21</sup> High-risk people are more likely to be vaccinated than those at low risk, suggesting that the main target group to increase rates should be the healthy elderly.<sup>22</sup>

Strategies to increase uptake include advice from healthcare workers, standing orders to vaccinate, reminder notices and institutional policies to offer the vaccine to all residents/patients or to vaccinate everyone unless they refuse.<sup>23-27</sup> Establishing vaccination stations in clinic areas or mobile vaccination stations are also effective. Such strategies are less effective when there is a high background immunisation rate. Advertising campaigns seem less effective, especially in non-epidemic years. The low mortality rate associated with the recent WHO-declared pandemic may have led to some vaccination 'fatigue'. However, it is anticipated that vaccination rates of older adults will not be significantly reduced. Many lessons were learnt from the 2009/2010 influenza pandemic, e.g. vaccine logistics, stockpiling antivirals, keeping the public and healthcare workers well informed.<sup>28</sup>

Other strategies trialled include vaccinating inpatients on hospital discharge, specialists emphasising and individualising vaccination advice in their communications with primary care physicians, using educational forums to emphasise the benefits and barriers to vaccination, setting up displays in communal areas and rewarding doctors for achieving certain vaccination rates. The main factors leading to non-compliance in older people are fear of adverse effects of the vaccine and perceived good health.<sup>29</sup> The low incidence of adverse effects and that the vaccine protects against influenza (even for those in good health) need to be emphasised.

### Benefits of Repeated Vaccination

Influenza vaccine efficacy is probably greater after repeated annual vaccination, compared with after first-time administration. In a case control study of 315 patients who died of influenza and 777 controls, the odds ratio for certified influenza death was 0.9 for first-time vaccinees and 0.3 for those vaccinated in the study year and previously.<sup>30</sup>

### Increasing Vaccine Efficacy

A range of new influenza vaccination approaches, such as live attenuated and augmented vaccines and other modes of administration, have been reviewed.<sup>31</sup> A quadrivalent vaccine has two influenza B antigens and two A antigens because it is difficult to predict which B lineage is circulating. The intradermal vaccine is more immunogenic but has a higher local reaction rate. A high-dose formulation of the trivalent vaccine may also be more immunogenic.<sup>32</sup> A vaccine with a new adjuvant, MF59 (Fluad), is effective in older people. At this stage, the current seasonal trivalent vaccine is recommended. Monovalent vaccines specific for a serotype causing a pandemic should also be used if that serotype is not included in the seasonal trivalent vaccine.

Undernourished older people may have a poor antibody response to vaccination, which may be overcome by a short period of micronutrient supplementation.<sup>33,34</sup> Exercise training improves vaccine seroprotection in sedentary older adults.<sup>35</sup> However, greater benefit will be achieved by improving uptake of the current vaccine.<sup>36</sup>

### Antiviral Drugs

Amantadine is effective against influenza A and should be considered for prophylactic use during influenza outbreaks, although resistance has been reported.<sup>37,38</sup> Adverse effects of amantadine such as confusion, lower limb oedema and rash are more common in older people.

Neuraminidase inhibitors (e.g. oseltamivir, zanamivir) are effective in treating (reducing symptoms by a mean 0.9 days) and preventing influenza in the elderly and other high-risk groups, although resistance has been reported.<sup>39-43</sup> Antiviral drugs should not replace vaccination.<sup>44</sup> Older people may have difficulty using the inhalation administration device with zanamivir.<sup>45</sup>

### Vaccinating Healthcare Workers

Healthcare workers are a potential reservoir of influenza virus and should be the target of any vaccination program. In a study of 1059 residents from 12 long-term aged-care facilities in Glasgow, vaccination of healthcare workers significantly decreased total mortality among residents from 17% to 10% (odds ratio 0.6; 95%CI 0.4–0.8). Vaccination of the residents did not significantly affect mortality in this study.<sup>46</sup> Other studies have shown similar benefits.<sup>47,48</sup> Vaccinating healthcare workers is likely to be cost-effective to the employer, through less days off work due to illness.<sup>49</sup> Despite this, baseline vaccination rates of healthcare workers is only 30% to 40%.<sup>50</sup> Strategies to improve vaccination include educational programs, offering free vaccine, maintaining a vaccine status register, directly requesting healthcare workers to be vaccinated and requiring compulsory vaccination. These interventions could increase vaccination rates to over 50%, but this is short of the 90% to 95% required to achieve herd protection in an institution.<sup>51</sup> Opinion is divided about implementing mandatory vaccination of healthcare workers.<sup>52</sup> Doctors can be resistant to their own vaccination, with annual vaccination rates as low as 28%.<sup>53</sup> Reasons cited by doctors include being 'too busy' and 'inconvenient', so strategies aiming to increase this rate need to address these perceptions. Better vaccination rates were achieved in older doctors and those claiming a better knowledge of influenza.

## PNEUMOCOCCAL VACCINE

Acute pneumonia is prevalent in older people, with greater numbers affected as the population ages. Mortality is high, ranging from 24% to 31% in hospital series. In Victoria (Australia), the annual incidence of pneumococcal pneumonia and bacteraemia rises exponentially after age 50 years, to nearly 200 per 100 000 by age 80 years.<sup>54</sup> Pneumonia accounted for 82% of diagnoses of those over 65 years with *Streptococcus pneumoniae*. Nearly all are admitted to hospital, with mean duration of hospital stay rising with age: from 6 days for those under 65 years to 13 days for those over 65 years. Earlier data (unpublished) from the same group indicated that 83% of those over 60 years with pneumococcal blood or cerebrospinal fluid infection had a predisposing illness (chronic respiratory disease 45%, cardiovascular disease 34%, malignancy 23%, diabetes 18%).

In 2396 sequential isolates from hospital and private laboratories in Australia in 1996, 6.7% of *S. pneumoniae* were penicillin-resistant, with higher resistance rates for erythromycin (11%), tetracycline (15%) and trimethoprim +sulfamethoxazole (42%).<sup>55</sup> Risk factors for infection with resistant organisms include age over 70 years, prolonged hospitalisation and attendance at a day care centre.<sup>56</sup> Worldwide, penicillin resistance is as high as 80%.<sup>57</sup> Multidrug-resistant *S. pneumoniae* can cause outbreaks of pneumonia and bacteraemia in aged-care facilities.<sup>58</sup> Vaccinating older people with the 23-valent pneumococcal polysaccharide vaccine may avoid the problem of antibiotic resistance by preventing 23 types of invasive infections. Use of the 13-valent pneumococcal conjugate vaccine (PCV13) in children has reduced antibiotic-resistant invasive pneumococcal disease in older people and widespread use of PCV13 in older people may achieve this to an even greater degree.<sup>59</sup>

### Efficacy

#### Polysaccharide Vaccine

The current polysaccharide vaccine immunises against 23 pneumococci serotypes. These serotypes are estimated to cause 88% of pneumococcal bacteraemia cases. This coverage has fallen as PCV13 use in children, has reduced the prevalence of some of these serotypes in young and old people. PCV13 immunises against the 13 serotypes prevalent in young people and while it reduces the prevalence of these serotypes in older people, several serotypes are uncovered, risking (serosubstitution) in older people. In 812 pneumococcal isolates from sterile site infections in those aged over 2 years, 91% belonged to serotypes contained within the 23-valent polysaccharide vaccine.<sup>54</sup> More recent data have shown that antibiotic resistance of strains in adults that are surviving after childhood conjugate vaccination is uncommon, but it is a concern, especially as the substituted strains may become more prevalent with widespread childhood vaccination against the 13 serotypes.<sup>60,61</sup>

A Veterans' Administration Co-operative Study found that among elderly vaccine recipients who developed vaccine-type pneumonia or bronchitis, the majority did not make or sustain sufficient antibodies against the infecting organism.<sup>62</sup> An earlier study, however, showed an antibody response in older people similar to younger adults.<sup>63</sup> As there is concern about the antibody responses of older people, clinical efficacy studies are required to determine the value of the vaccine. A Cochrane meta-analysis reported that the efficacy of the vaccine

in preventing invasive pneumococcal disease was an estimated 54%, efficacy against all-cause pneumonia was inconclusive and the vaccine was not found to be effective against all-cause mortality.<sup>64</sup>

An indirect cohort analysis demonstrated an overall efficacy for preventing infection caused by serotypes included in the vaccine at 57%.<sup>65</sup> Efficacy among people with diabetes mellitus was 84%, coronary vascular disease 73%, congestive cardiac failure 69%, chronic pulmonary diseases 65% and anatomic asplenia 77%. Efficacy for immunocompetent persons older than 65 years was 75%.

In a study of 2837 older people, pneumococcal vaccination provided statistically significant protective efficacy of 59% in those with medical risk factors for pneumonia (34%), although vaccination did not protect from pneumococcal pneumonia.<sup>66</sup> The authors recommended vaccinating all older people because targeted vaccination of at-risk older people may be difficult and because the at-risk subgroup was a substantial proportion of the total population.

There is little doubt about the efficacy of the vaccine in preventing invasive pneumococcal disease.<sup>64</sup> It is unlikely that there will be more convincing data about the current vaccine's efficacy in preventing pneumonia or mortality in older people. After the introduction of free vaccine in Victoria (Australia), overall hospitalisation with pneumococcal pneumonia fell by 39%.<sup>67</sup> A recent prospective study in 23 hospital-affiliated nursing homes in Japan reported that vaccination significantly reduced all-cause pneumonia and deaths from pneumococcal disease (placebo group: 35%, vaccine group: 0%) and insignificantly reduced death from all-cause pneumonia (28% to 21%).<sup>68</sup> An Australian analysis of the cost of vaccination in those aged over 65 years showed the pneumococcal vaccine to be of similar cost effectiveness to the influenza vaccine in preventing hospitalisation (\$11 494 compared to \$10 787 respectively) and more cost-effective in preventing death from invasive pneumococcal disease (\$49 972 per death prevented each year) than influenza vaccination (\$74 801 per death prevented each year).<sup>69</sup>

As invasive pneumococcal disease is associated with high mortality, a vaccine which reduces this is justified. Older people also have a significant prevalence of comorbidities, for which immunisation covered by the vaccine is most effective. It is safer simply to vaccinate all older people, the approach taken in Australia, where the National Health and Medical Research Council has recommended vaccinating all people aged over 65 years.<sup>70</sup> The New Zealand *Immunisation Handbook* makes the same recommendation, but the vaccine is only funded for adults with asplenia.<sup>71</sup>

Advisory committees in the US and Canada, and the WHO have variously recommended vaccinating all people aged over 55 or 65 years. Early vaccination of Aboriginal and Torres Strait Islander people is advisable, based on the higher risk of infection in younger individuals in these groups.

#### Conjugate Vaccine

A second approach to pneumococcal vaccination uses PCV13 in older people. Widespread use in children has altered pneumococcal serotype prevalence in children and adults and may impact on the pathogenicity of these serotypes in older people.<sup>72</sup> In the large CAPITA trial (n = 85 000), PCV13 was administered to community-dwelling

older adults who had not received the polysaccharide vaccine, and morbidity and mortality results are awaited.<sup>73</sup> This study is examining whether vaccinating adults with PCV13 prevents community-acquired pneumonia, not just invasive pneumococcal disease. If the results are sufficiently positive it may lead to PCV13 becoming the pneumococcal vaccine recommended for adults by most national advisory committees due to the concerns that the current polysaccharide vaccine while effective in preventing invasive pneumococcal disease is ineffective for preventing pneumonia.

Although PCV13 is registered for use in adults, until the large studies are completed, particularly CAPITA, there are no Australian or New Zealand recommendations to its use in preference to the polysaccharide vaccine on older people. The US Advisory Committee on Immunization Practices recommends PCV13 be used in combination with the 23-valent polysaccharide vaccine in immunocompromised adults. Eleven serotypes covered by the polysaccharide vaccine are not included in PCV13 (one of the serotypes in PCV13 is not included in the polysaccharide vaccine). Thus, administering PCV13 only may leave older adults vulnerable to the 11 serotypes. This may be of concern when childhood use of PCV13 reduces the risk to adults of these 13 serotypes.

Around 50% of people given polysaccharide pneumococcal vaccine develop mild adverse effects, e.g. erythema, pain at the injection site. Fever, myalgia and severe local reactions have been reported in less than 1% of those vaccinated. Severe systemic reaction, such as anaphylaxis, has rarely been reported.

### **Increasing Vaccine Usage**

In the US in 1985 only 10% to 15% of the target population received pneumococcal vaccination but recent data show that approximately 66% of those aged over 65 years have received at least one dose of the vaccine.<sup>74</sup> The free vaccine campaign in Victoria (Australia) was estimated in 1998 to have increased vaccination to 42% in those over 65 years and recent US figures found 34% of hospitalised patients over 65 years had received the vaccine prior to hospitalisation.<sup>75,76</sup> The influenza season has been shown to trigger pneumococcal vaccination.<sup>77</sup>

Strategies to increase vaccine uptake are similar to those for influenza vaccination, but greater emphasis is needed on convincing health professionals of the need for and effectiveness of the vaccine. In a recent US study, only 81% of specialist physicians strongly recommended pneumococcal vaccinations to their elderly patients.<sup>78</sup> As influenza and other viral respiratory infections increase the risk of invasive pneumococcal disease and the spread of pneumococcus, influenza vaccination is also important in reducing pneumococcal disease. Suggesting coadministration of influenza and pneumococcal vaccines, which is safe and does not reduce efficacy, is another strategy to increase utilisation, and is practical as those aged over 65 years are recommended to have both. Coadministration may slightly increase the risk of local reactions (from 28% to 44%) but has not been associated with an increased risk of serious reactions.<sup>19</sup>

### **Revaccination**

Antibody levels fall after pneumococcal vaccination.<sup>79</sup> In frail chronically ill older nursing home residents, revaccination at least 5 years after primary vaccination was associated with a significant immunological response

(greater than 1.4-fold increase in antibodies against 6 serotypes assessed) and was well tolerated.<sup>80</sup> Repeated vaccination does not appear to cause hypo-responsiveness in older people but there is no evidence that revaccination reduces the risk of pneumococcal disease.<sup>81</sup> At this stage, most public health policy including the US Advisory Committee on Immunization Practices recommend revaccination of those initially vaccinated before age 65 years. A recent Australian directive supports only a single vaccination due to concerns about increased injection site reactions after a second vaccination.<sup>82</sup> Local reactions may be increased if revaccination occurs within 3 years.

If the decision has been made to use PCV13 and the 23-valent polysaccharide vaccine, it is recommended that PCV13 be given first, as the opposite order has been associated with a reduced immunological response to the polysaccharide vaccine. If giving both, consideration should be given to using the polysaccharide vaccine within 2 to 3 months of PCV13, so as to not leave the patient uncovered for the extra 11 serotypes, although this time frame is associated with a higher risk of local reactions.

### **HERPES ZOSTER VACCINE**

Herpes zoster (HZ) (shingles) affects 20% to 30% of adults with more than 50% occurring in those over 60 years of age. Complications, which occur in up to 40% of cases, are more common with increasing age and include post-herpetic neuralgia (PHN) and muscle paralysis. Acute and chronic HZ pain reduce physical, emotional and social functioning. The cost of HZ to the Australian healthcare system has been estimated to be \$32.8 million per year (pain and suffering were not costed).<sup>83</sup>

### **Efficacy**

The Shingles Prevention Study (n = over 38 000 adults aged 60 years and over) demonstrated that a live attenuated vaccine, containing around 15 times the amount of antigen as the current childhood varicella vaccine, reduced shingles by 51%, PHN by 56%, and acute and chronic HZ-associated pain by 61%.<sup>84</sup> Subsequent analyses revealed that the number needed to vaccinate to prevent one case of HZ was 13 at age 60 years and 64 at age 80 years, and the number needed to vaccinate to prevent PHN was 60 to 80 at all ages. Serious adverse event rates were identical in the vaccine and placebo groups.<sup>85</sup> Similar reductions of HZ (55%) in older people have also been achieved in field conditions with 75 761 vaccinated compared to 227 283 unvaccinated people.<sup>86</sup> Reduced HZ-related impairment of activities of daily living also resulted from vaccination.<sup>87</sup> The vaccine is cost-effective, at least in the USA, at a price of \$150.<sup>88</sup>

Effectiveness has not been shown to wane for at least 8 years, but revaccination after 10 years may be beneficial, albeit reducing the cost effectiveness of vaccination. The cost effectiveness of early vaccination (e.g. age 50 years) will be offset by increased need for revaccination, although 20% of cases of shingles occur between the ages of 50 to 59 years.

Serological testing prior to vaccination or eliciting a history of previous varicella or shingles infection has not been shown to predict efficacy; vaccination should be offered independent of HZ history. Vaccination rates in adults over 60 years have exceeded 6.7% in the USA.<sup>89</sup> This vaccine is now available in Australia.

New vaccines are likely to come to market, including inactivated virus requiring several doses, which is safe in immunocompromised people.

### Concomitant Influenza or Pneumococcal Vaccination

HZ vaccination at the same time as influenza vaccination is well tolerated in those aged over 50 years, and antibody responses are similar to sequential administration.<sup>90</sup> Concomitant pneumococcal polysaccharide vaccination may reduce the immunogenicity of zoster vaccination.

### TETANUS VACCINE

Since 1980, 80% of tetanus notifications and 90% of tetanus deaths in Australia, have been in adults over 50 years.<sup>91,92</sup> While in the US, 60% of cases occurred in people over 60 years.<sup>93</sup>

Almost all adult cases of tetanus occur in those who did not complete a primary childhood immunisation series. A history of immunisation from patients, families or medical charts may be an unreliable indicator of tetanus immunity. The main focus of any adult tetanus vaccination policy should be to ensure that everyone receives a primary immunisation series and boosters.

Seroprevalence studies in the US have shown that more than half the adults lack antibody levels that are considered protective against tetanus and support the need to give primary courses and boosters, especially to those with tetanus-prone wounds.<sup>94</sup> Older people have a good response to a single dose of tetanus vaccine.<sup>95</sup> The *Australian Immunisation Handbook* recommends a single booster at age 50 years and booster doses in those aged over 50 years who have not been vaccinated in the last 10 years.<sup>70</sup> Those who have had five or more doses of vaccine over their life do not require a booster. A primary course of three doses should be given to unvaccinated adults, followed by boosters at 10 and 20 years. The *New Zealand Immunisation Handbook* recommends a single booster dose for adults at age 65 years.<sup>71</sup>

### OTHER VACCINES

#### Travel

Older people should be offered the same travel vaccinations as young adults. Although the risks may be greater for some vaccines, e.g. yellow fever has a higher risk of multi-organ failure.

#### High-Risk Groups

Older people in high-risk groups, such as intravenous drug users, those with HIV and healthcare workers, should be offered the same vaccination advice as young adults.

#### Pertussis

Routine vaccination with pertussis antigens is not advised in Australia. There is support for vaccination to protect children that older people are in contact with. An opportune time for pertussis vaccination is at the time of tetanus vaccination, using the combined tetanus, diphtheria and acellular pertussis vaccine, DTaP (only form of adult pertussis vaccine available in Australia).

### NEW VACCINES

Several new vaccines are being developed that may also be useful for older people, e.g. against *Staphylococcus aureus*, noovirus, *Pseudomonas aeruginosa*.

Vaccination against non-infectious diseases may also have a role in the future. Active vaccinations for the treatment and prevention of Alzheimer's disease, using fragments of the A $\beta$  peptide, are being studied and offer an opportunity to reduce the morbidity of this non-infectious epidemic.<sup>96</sup> Vaccines for other chronic and acute illnesses are also being studied.

### RECOMMENDATIONS

The Australia and New Zealand Society for Geriatric Medicine has reviewed their position papers on immunisation of older adults and has made the following recommendations:<sup>97</sup>

- Influenza: yearly with the current vaccine for everyone over 64 years; Aboriginal and Torres Strait Islander people over 15 years; all residents of aged-care facilities; and healthcare providers and staff of aged-care facilities. Except for those with allergies to egg products (being relaxed in some countries, e.g. USA). Regular, repeated influenza vaccination may be more effective than first-time vaccination. New vaccines and augmentation (e.g. micronutrient supplementation in undernourished older people) need to be considered. Neuraminidase inhibitors are effective in preventing and treating influenza, although resistance has been reported. These should not replace vaccination.
- Pneumococcal: vaccination with the 23-valent polysaccharide vaccine for unvaccinated people aged over 64 years. Revaccination should be considered once after 5 to 6 years but not before 3 years and repeated no more than two times (i.e. 3 doses in total). The role of PCV13 in older people is yet to be defined. Aboriginal and Torres Strait Islander people should be vaccinated if over 49 years.
- Herpes zoster: a single vaccine with the current live attenuated Oka/Merck strain for those aged over 60 years who have not received zoster vaccine, whether or not they report a prior episode of shingles. Serological testing prior to vaccination is not recommended. It may be given concomitantly with influenza but not with pneumococcal vaccine. The role of revaccination is not yet defined and efficacy after age 80 years is unclear.
- Tetanus: previously unvaccinated people should have a primary course of two doses 1 to 2 months apart, followed by a third dose in 6 to 12 months. If there is any uncertainty about primary vaccination, this should be repeated. Vaccination with tetanus toxoid, combined with diphtheria toxoid, should be maintained with 10-yearly boosters, except in those who have received five doses of tetanus-containing vaccine.
- Other vaccines: there is insufficient evidence to justify routine vaccination of older people with other vaccines. Certain high-risk older people warrant consideration for a range of vaccines. Pertussis vaccination (DTaP) should be considered for grandparents in contact with their grandchildren.
- Increase vaccine utilisation: various methods can be adopted to improve vaccine use in older people. High-risk older populations should be targeted, such as those with chronic cardiac and respiratory disease, diabetes and malignancy. Strategies to reach these groups include support groups, healthcare facility activities and disease-specific pamphlets.
- Vaccinating staff caring for older people: staff in regular contact with older hospital patients or residents of aged-care facilities need to be vaccinated annually against influenza. Healthcare workers should be vaccinated against hepatitis A and those in contact with blood should also be vaccinated against hepatitis B.

## CONCLUSION

Vaccinating older people is an important component of preventive medicine, but is often overlooked or under-emphasised. Concerns about immunosenescence should not curtail an active approach to vaccinating older people. It would be ideal to develop a whole-of-life approach to vaccination, so that the current effective approaches for younger people can also be fully applied to those who are ageing.<sup>98</sup>

**Competing interests:** None declared.

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Received: 31 August 2011

Revisions requested after external review: 9 November 2012

Revised version received: 14 December 2012

Accepted: 20 December 2012

