



Australian and New Zealand Society for Geriatric Medicine

Position Statement No. 7

Immunisation of Older People – Revision Number 2, 2011

Compared with younger people, older people have a greater incidence of most infectious diseases, and often respond less well to treatment. Thus prevention of infections is particularly important, and immunisation has been shown to be effective for several infectious diseases. There is, however, evidence of under-utilisation of effective vaccines in all age groups, including older people and those who care for them. With this as a background, the ANZSGM recommends the following for older adults. These recommendations differ slightly from those in the immunisation schedules of the health departments of Australia and New Zealand, referenced below, as those are influenced by other factors including availability of the vaccines and cost effectiveness.

Key Points

1. Influenza Vaccination

Yearly vaccine with the current vaccine is recommended for:

- All people over age 64;
- Aboriginal and Torres Strait Islander people over age 15;
- All residents of residential care facilities;
- Healthcare providers and staff of residential care facilities

The exception to the recommendations is:

- Those with allergies to egg products.

Regular, repeated vaccination may be more effective than first-time vaccination. Newer vaccines and augmentation (eg by micronutrient supplement in undernourished elderly people) need to be considered as more evidence of efficacy becomes available. Neuraminidase inhibitors are effective in both preventing and treating influenza, although resistance has been

report. They should not replace vaccination.

2. Pneumococcal Vaccine

Vaccination with the current 23-valent polysaccharide vaccine is recommended for unvaccinated people over age 64.

Revaccination should be considered once after five to six years but not before 3 years and repeated no more than two times (i.e. 3 doses in total).

- The role of the pneumococcal conjugate vaccine (PCV) in older people is yet to be defined.
- Aboriginal and Torres Strait Islander people should be vaccinated if over age 49.

3. Herpes Zoster Vaccination

A single vaccination with the current live attenuated Oka/Merck herpes zoster vaccine is recommended for those over age 60 who have not previously 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 vaccination. The role of revaccination is not yet defined.

4. Tetanus Vaccine

Previously unvaccinated people should have a primary course of two doses 1-2 months apart, followed by a third dose 6-12 months later. Where 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 those who have

previously received five doses of tetanus-containing vaccine.

5. Other Vaccines

There is insufficient evidence to justify routine vaccination of older people with other vaccines. Certain higher-risk older adults warrant consideration for a range of vaccines. Pertussis vaccination should be considered for grandparents in contact with their grandchildren.

6. Recommendations to Increase Vaccine Utilisation

Various methods can be adopted to improve use of vaccines in appropriate older people.

Higher risk older populations should be particularly targeted, including those with chronic cardiac and respiratory disease, diabetes and those with malignancy. Specific activities to reach these groups include support groups, healthcare facility activities and disease-specific pamphlets.

7. Recommendations for Vaccinating Staff Caring For Older People

It is recommended that staff in regular contact with older hospital patients or with residents of longer-term care facilities, be vaccinated annually against influenza. Healthcare workers should be vaccinated against Hepatitis A and those potentially in contact with blood should also be vaccinated against Hepatitis B.

This Position Statement represents the views of the Australian and New Zealand Society for Geriatric Medicine. This Statement was approved by the Federal Council of the ANZSGM on 22nd August 2011. This revision was coordinated by Assoc. Professor Michael Woodward.

BACKGROUND PAPER

INFLUENZA VACCINATION

Epidemiology

Influenza shows marked seasonal variations, but at all times there is greater attack rate among older and among institutionalised people. The great pandemics, such as the 1918 outbreak, are caused by antigenic shift, which may occur when avian influenza and human influenza co-infect a host. The recent (2009/10) pandemic

was surprisingly benign amongst older adults possibly due to immunity gained earlier in life. Some 3,000 to 7,000 excess deaths occur in Australia during a major influenza outbreak. Deaths in severe epidemics can exceed 10,000.¹ A larger scale study on influenza related mortality² in two influenza A epidemics reported that 11 to 13 excess deaths occurred per 100,000 persons, but in those aged 65 and older, the incidence of excess deaths increased to between 68 and 104 per 100,000.

Vaccine Efficacy

A recent Cochrane review concluded that available evidence is of poor quality and provided no guidance regarding the efficacy or safety of influenza vaccinations in those over age 65.³ This analysis however had potential flaws, as outlined in a subsequent letter.⁴ A very large community-based study of vaccine effectiveness, involving 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.⁵ This reduction in mortality was confirmed by a recent study over 8 seasons in The Netherlands, which revealed at least a 31% reduction of risk in those immunised.⁶ Vaccine efficacy is not compromised significantly if the current vaccine is matched less well to currently circulating strains.⁷ The vaccine is effective in low, intermediate and high-risk elderly community-dwelling people.⁸ Influenza particularly increases hospitalisation and deaths in elderly nursing home residents each winter.⁹ While not supported by data, the recommendation to vaccinate Aboriginals and Torres Strait Islander people earlier is justified epidemiologically. In New Zealand there are recommendations specific to Maori.

It is probable that for greater proportions of residents vaccinated in residential care facilities, there is less likelihood of an influenza breakout in the home. Thus, attempts should be made to protect residents by vaccinating all – even those whose quality of life may not warrant their individual vaccination.

Cost Effectiveness

Some 10 studies have evaluated the cost effectiveness of influenza vaccination. In a review, influenza vaccination, particularly among elderly people at higher risk, was generally found to be cost saving.¹⁰

Adverse Effects of Vaccine

A randomised placebo controlled trial of the 1988/89 trivalent split-antigen vaccine in 336 people over the age of 65 showed no significant difference between influenza vaccine and placebo with respect to the proportion of subjects reporting disability or systemic symptoms.¹¹ However, local tenderness does occur in around 30% of recipients of the current vaccine.¹² Although there are isolated reports of serious adverse events such as rheumatic conditions, these have not been established as directly caused by the vaccine. The risk of the vaccine causing Guillain-Barre 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.¹³

Methods to Increase Vaccine Usage

The uptake rate of influenza vaccine by Australians over 65 is 77% and even higher (87%) in residential care.¹⁴ Higher risk people are more likely to be vaccinated than lower risk people¹⁵ suggesting that the main target group should be healthy elderly.

Strategies to increase uptake include advice from the healthcare worker (especially from the doctor), reminder notices through mail or by telephone, and institutional policies to offer the vaccine to all residents/patients or to vaccinate all unless they refuse.^{16, 17, 18, 19} Strategies are less effective when there is a higher background immunisation rate. General advertising campaigns (e.g. the frequent 'killer flu approaches' headlines) seem less effective, especially in non-epidemic years. Establishing vaccination 'stations' in busy clinic areas is another strategy.

Other trialled strategies 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 of and the barriers to vaccination, setting up displays in communal areas including pharmacy shop-fronts, and rewarding doctors for achieving certain vaccination rates. Van Essen and colleagues²⁰ have shown that the main factors leading to non-compliance in older people are fear of side-effects of the vaccine and perceived good health, so the low incidence of side-effects and information that the vaccine is protective 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 administration. In a case controlled study of 315 patients who died of influenza and 777 controls, the odds ratio for certified influenza death was 0.91 for first time vaccinees and 0.25 for those vaccinated in the study year and previously.²¹

Newer Vaccines

A range of newer influenza vaccination approaches including live attenuated vaccine, augmented vaccines and other modes of administration have been recently reviewed.²² A quadrivalent vaccine has two influenza B antigens, as it is difficult to predict which B strain is circulating. Intradermal vaccine is more immunogenic but has a higher local reaction rate. A high dose trivalent vaccine is also more immunogenic. At this stage the current seasonal trivalent vaccine is recommended, but other vaccines may soon be felt also appropriate. Undernourished older people may be particularly prone to a poor antibody response to vaccination²³ and this may be overcome by a short period of micronutrient supplementation.²⁴ However, it may be that greater benefit will be achieved by improving uptake of the current vaccine.²⁵

Antiviral Drugs

Amantadine is effective against influenza A and should be considered for prophylactic use in healthcare and residential care facilities during influenza outbreaks²⁶ although resistance has been reported. Neuraminidase Inhibitors (oseltamivir and zanamavir) have been proven effective in both treating (reducing symptoms by a mean 0.9 days) and preventing influenza in the elderly and other high-risk groups, including those in residential care although resistance has been reported.^{27, 28, 29} Antiviral drugs should not replace vaccination.³⁰ Older people may have difficulty using the administration device with zanamavir.³¹

Influenza Vaccination of Healthcare Workers

Healthcare workers including staff of residential care facilities are a potential reservoir of influenza in nursing home residents and hospitalised patients, and should be a target group of any vaccination program. In a study of 1,059 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 0.56; 95% confidence intervals (0.40 – 0.80). Vaccination of the residents themselves did not significantly affect mortality in this study.³² Other studies have shown similar benefits.^{33,34,35} Also, vaccinating healthcare workers is likely to be cost effective to their employer, through reducing days off work due to illness.³⁶ Despite this, baseline vaccination rates of healthcare workers is generally around 30 - 40%. 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. Thomas et al³⁷ showed that these types of interventions could increase vaccination rates to over 50%, but this is still short of the 90-95% probably required to achieve herd immunity in an institution.

PNEUMOCOCCAL VACCINATION

Epidemiology

Acute pneumonia in the elderly is a common problem, with greater total 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, to nearly 200 per 100,000 by age 80.³⁸ Pneumonia accounted for 82% of diagnoses of those over age 65 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 to 13 days for those over age 65. Earlier data (unpublished) from the same group indicated that 83% of those over age 60 with pneumococcal blood or CSF infection had a predisposing illness (chronic respiratory disease 45%, cardiovascular disease 34%, malignancy 23% and diabetes 18%).

Antibiotic Resistance

In a total of 2,396 sequential isolates from hospital and private laboratories in Australia in 1996, Collignon and Bell³⁹ found 6.7% of *S pneumoniae* were penicillin resistant, with higher resistance rates for erythromycin (10.8%), tetracycline (15.2%) and trimethoprim sulphamethoxazole (41.9%). Risk factors for infection with resistant organisms include age

greater than 70, prolonged hospitalisation and attendance at a day care centre.⁴⁰ World-wide, penicillin resistance has been found to be as high as 79.7%⁴¹. Multidrug-resistant *S. pneumoniae* can cause outbreaks of pneumonia and bacteraemia in residential care facilities.⁴² Pneumococcal vaccine use may help avoid the problem of antibiotic resistance.

Pneumococcal Vaccine Efficacy

Polysaccharide vaccine

The current polysaccharide vaccine immunises against 23 of the common pneumococci serotypes – these serotypes are estimated to cause 88% of cases of pneumococcal bacteraemia although that has fallen since the conjugate vaccine (PCV) has reduced the prevalence of some of these serotypes in both young and older people. Victorian data confirmed this wide coverage – in 812 pneumococcal isolates from sterile site infections in those over age 2, 91% belonged to serotypes contained within the 23-valent polysaccharide vaccine.³⁸

A Veterans' Administration Co-operative Study⁴³ found that among elderly vaccine recipients who subsequently had vaccine-type pneumonia or bronchitis, the majority did not make or sustain sufficient serum antibodies against their infecting organism. An earlier study, however, showed an antibody response by elderly individuals similar to that of younger adults.⁴⁴ Given that there is potential concern about the antibody responses of older people, clinical efficacy studies are required to determine the value of the vaccine. These have been reviewed⁴⁵ and subject more recently to a Cochrane meta-analysis.⁴⁶ The efficacy of the vaccine in preventing invasive pneumococcal disease was estimated to be 54%. Efficacy against all-cause pneumonia was inconclusive, and the vaccine was not found to be effective against all-cause mortality.

An indirect cohort analysis⁴⁷ demonstrated an overall efficacy for preventing infection caused by serotypes included in the vaccine at 57%. Efficacy among persons with diabetes mellitus was 84%, with coronary vascular disease 73%, with congestive cardiac failure 69%, with chronic pulmonary diseases 65% and with anatomic asplenia 77%. Efficacy for immunocompetent persons older than 65 years was 75%.

In a study among 2,837 older age people, pneumococcal vaccination provided statistically significant protective efficacy of 59% in those

with medical risk factors for pneumonia (34% of the group), although vaccination again did not protect from pneumococcal pneumonia in the study group as a whole.⁴⁸ 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, the authors recommended vaccinating all older people.

There is little doubt about the efficacy of the vaccine in preventing invasive pneumococcal disease, as supported by the recent Cochrane review⁴⁶, but it is unlikely that there will be more convincing data about the current vaccine's efficacy in preventing pneumonia or mortality in older people. It is notable that after the introduction of free vaccine in Victoria, Australia, overall hospitalisation with pneumococcal pneumonia fell by 39%.⁴⁹ A Japanese study in 23 hospital-affiliated nursing homes showed vaccination significantly reduced all-cause pneumonia and deaths from pneumococcal disease (from 35.1% in placebo group to 0% in the vaccine group) and insignificantly reduced death from all cause pneumonia (from 28.0% to 20.6%)⁵⁰. In Australian analysis in those over age 65 of the cost of vaccination to prevent one hospitalisation from invasive pneumococcal disease 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).⁵¹

As invasive pneumococcal disease is associated with high mortality, a vaccine which reduces this is clinically justified. In addition, elderly people have a significant prevalence of coexisting chronic illness, for which the vaccine is most effective. Thus, it is safer simply to vaccinate all older people, the approach taken in Australia, where the National Health & Medical Research Council in Australia has recommended vaccinating all people over age 65.⁵² The New Zealand Immunization Handbook (2006) makes an identical recommendation, but the vaccine is unfunded for adults except for those with asplenia.⁵³

Advisory committees in the US and Canada, and the World Health Organisation, have variously recommended vaccinating all people over the age of 55 or 65.

The recommendation for earlier vaccination of Aborigines and Torres Strait Islander people is based, as for influenza vaccination, on the higher risk of infection in these age groups.

Conjugate vaccine

A second approach to pneumococcal vaccine utilizes the conjugate vaccine (PCV) and is already recommended in children. This has been shown to alter pneumococcal serotype prevalence and may impact on pathogenicity in older people.⁵⁴ Currently there are trials of PCV in adults, both with and without the polysaccharide vaccine, but morbidity and mortality results are awaited. As childhood use of the PCV reduces the prevalence of those serotypes, PCV vaccination in older people is likely to become less effective.

Adverse Effects/Safety

Approximately 50% of people given polysaccharide pneumococcal vaccine develop mild side effects such as erythema and 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.

Vaccine Usage and Methods to Increase Usage

Figures from the US⁵⁵ showed that in 1985 only 10-15% of the target population received pneumococcal vaccination but more recent data show that approximately 66% of those over 65 have received at least one dose of the vaccine.⁵⁶ The free vaccination campaign in Victoria was estimated in 1998 to have increased vaccination to 42% in those over age 65⁵⁷ and recent USA figures found 33.5% of hospitalised patients over age 65 had received the vaccine prior to hospitalisation.⁵⁸ The influenza season has been shown to trigger pneumococcal vaccination.⁵⁹

The strategies to increase vaccine uptake are similar to those for influenza vaccination, but greater emphasis need to be placed on convincing healthcare professionals of the need for and effectiveness of the vaccine, as this knowledge is less widespread than it is for influenza vaccination. In a recent US study, only 81% of specialist physicians strongly recommended pneumococcal vaccinations to their elderly patients⁶⁰ As influenza and other respiratory viral infections increase both the risk

of invasive pneumococcal disease and the spread of pneumococcus, influenza vaccination is also important in reducing pneumococcal disease. Suggesting co-administration of influenza and pneumococcal vaccine, which is safe and does not reduce efficacy of either, is thus another strategy to increase utilisation, and is practical as those over 65 are recommended to have both. Co-administration may slightly increase the risk of local reactions (from 28% to 44%)¹² but has not been associated with an increased risk of serious reactions.

Revaccination

Antibody levels have been shown to fall after pneumococcal vaccination.⁶¹ 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.⁶² There is no evidence on the additional efficacy of revaccination in preventing pneumococcal disease. At this stage, most public health policy including that of the USA Advisory Committee on Immunization Practices (Nov 2007) recommends one or two revaccinations of those initially vaccinated before age 65. Two revaccinations are more indicated in those with underlying chronic diseases. Local reactions may be increased if revaccination occurs within 3 years.

HERPES ZOSTER VACCINATION

Epidemiology

Herpes zoster (shingles) (HZ) affects 20-30% of adults with more than 50% of cases occurring in those over age 60. Complications, which occur in up to 40% of cases are more common with increasing age and include post herpetic neuralgia (PHN) and muscle paralysis. Both acute and chronic HZ pain reduces physical, emotional and social functioning.

Vaccine efficacy

The Shingles Prevention Study enrolled over 38,000 adults 60 years of age and older and demonstrated that a live attenuated vaccine, containing 15 times as much antigen as the current childhood varicella vaccine, reduced shingles by 51% and post herpetic neuralgia by 55.5%. It reduced acute and chronic herpes zoster-associated pain by 61%.⁶³ Subsequent analyses reveal that the number needed to

vaccinate (NNV) to prevent a case of HZ was 13 at age 60 and 64 at age 80, and the NNV to prevent PHN was 60 – 80 at all ages.

Efficacy has not been shown to wane for at least 8 years, but revaccination may have a beneficial effect after a period of time, albeit reducing cost efficacy of vaccination. The cost efficacy of earlier vaccination (e.g. at age 50) will be offset by increased need for revaccination, although 20% of cases of shingles occur between ages 50-59.

Serological testing prior to vaccinations or eliciting a history of previous varicella or shingles infection has not been shown to predict efficacy of vaccination.

Newer vaccines are likely to come to market, including inactivated virus vaccines requiring several doses but safer in immunocompromised individuals.

Concomitant administration with influenza or pneumococcal vaccination

Vaccination at the same time as influenza vaccination is well tolerated in those over age 50, and antibody responses are similar to those of sequential administration.⁶⁴ Concomitant pneumococcal polysaccharide vaccination however reduces the immunogenicity of zoster vaccination.

TETANUS VACCINATION

In Australia, since 1980, 80% of tetanus notifications and 90% of tetanus deaths have been in adults over 50 years of age^{65, 66} and in the US, 60% of cases occur in persons older than age 60.⁶⁷

Almost all adult cases of tetanus occur in those who never completed a primary childhood immunisation series. A history of immunisation from patients, families or medical charts may be an unreliable indicator of tetanus immunity. Thus, the main thrust 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 tetanus⁶⁸ and support the need to give primary courses and boosters, especially to those with tetanus-prone wounds. Older people have a good response to single administration of a single dose of tetanus vaccine.⁶⁹ The current edition of the Australian Immunisation

Handbook⁵² recommends a single booster at age 50 and booster doses in those reaching age 50 who have not been vaccinated in the last 10 years. Those who have had 5 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 Immunization Handbook recommends a single booster dose for older adults at age 65 (and presumably later if that is missed).

OTHER VACCINATIONS

Travel vaccinations

Older people should be offered the same travel vaccination as younger people. This is particularly important as older people are travelling overseas more frequently.

High risk groups

Older people in high risk groups, such as IV drug users and healthcare workers, should be offered the same vaccination advice as younger people.

Pertussis

Routine vaccination with pertussis is not advised. There is support for vaccination to protect the young children they are in contact with, mostly grandchildren, and such vaccination is reimbursed in at least one Australian state. An opportune time for pertussis vaccination is at the time of tetanus vaccination, using the combined tetanus, diphtheria and acellular pertussis vaccine known as dTap-the only adult pertussis vaccine..

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