
Contraindications

Pneumococcal vaccines (WHO position paper)

[WER 2003, vol. 78, 14, pp 110-119](#)
page 116

There are no absolute contraindications to vaccination with pneumococcal polysaccharide vaccine except for an anaphylactic reaction to the previous dose.

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
page 102

The only contraindication to PCV-7 immunization is a severe hypersensitivity reaction to a previous dose of the vaccine.

General

Pneumococcal vaccines (WHO position paper)

[WER 2003, vol. 78, 14, pp 110-119](#)
page 111

(P)oor immunogenicity of polysaccharide (pneumococcal) vaccines in early childhood precludes the use of the 23-valent pneumococcal vaccine in the high-risk group of children under 2 years of age.

Pneumococcal vaccines (WHO position paper)

[WER 2003, vol. 78, 14, pp 110-119](#)
page 112

The duration of protection following immunization with the 23-valent polysaccharide vaccine is estimated at 5 years, or more, in healthy adults. However, the duration may be considerably shorter in some high-risk groups for pneumococcal disease. Revaccination using the polysaccharide vaccine is not routinely recommended.

(Page 116) Revaccination using the polysaccharide vaccine is not routinely recommended, but immunocompromised children who have received polysaccharide vaccine may be revaccinated after 3 years. The safety of three or more doses of the polysaccharide vaccine is not known.

Pneumococcal vaccines (WHO position paper)

[WER 2003, vol. 78, 14, pp 110-119](#)
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A single dose of the 23-valent polysaccharide vaccine is recommended for selected groups above 2 years of age at increased risk of pneumococcal disease. These groups include the healthy elderly (over 65 years of age), particularly those living in institutions.

Pneumococcal vaccines (WHO position paper)

[WER 2003, vol. 78, 14, pp 110-119](#)
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There are no absolute contraindications to vaccination with pneumococcal polysaccharide vaccine except for an anaphylactic reaction to the previous dose.

Pneumococcal vaccines (WHO position paper)

[WER 2003, vol. 78, 14, pp 110-119](#)
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The polyvalent polysaccharide vaccine is recommended for selected groups above 2 years of age with increased risk of pneumococcal disease. Such groups include the healthy elderly (over 65 years old), particularly those living in institutions, patients suffering from chronic organ failure, diabetes, nephrotic syndrome and certain immunodeficiencies, particularly those with functional or anatomical asplenia.

Recent meta-analyses on the efficacy and effectiveness of the pneumococcal polysaccharide vaccine have raised doubts about the benefit of the vaccine in the elderly population. However, these vaccines continue to be recommended for this group based on evidence from observational studies that show a beneficial effect against pneumococcal disease associated with bacteraemia.

Conclusions and recommendations from the Strategic Advisory Group of Experts (SAGE) - 9-11 November 2005

[WER 2006, vol. 81, 1, pp 2-11](#)
page 10

SAGE recommended that WHO gives a clear signal on the priority for wider use of pneumococcal vaccine in children.

Lack of clarity of demand is a critical factor inhibiting industrial scaling up of manufacturing capacity. This uncertainty needs to be overcome since validated demand forecasts are essential for the commitments required from industry that will make this vaccine available at affordable prices.

In particular, evidence was required through studies on disease burden of the cost benefit of using pneumococcal conjugate vaccines and the feasibility of vaccine delivery to all vulnerable groups.

Pneumococcal serotype prevalence studies, undertaken in different settings, are required to judge the appropriateness of the conjugate vaccine to be used. A firm position from SAGE will be required once serotype prevalence studies are completed to judge the appropriateness of the conjugate vaccine available.

(SAGE) recognized that a global recommendation, made before resolution of funding and supply issues, could leave vulnerabilities that have been experienced with the implementation of Hib vaccine.

Pneumococcal vaccines (WHO position paper)

[WER 2003, vol. 78, 14, pp 110-119](#)
page 115

Pneumococcal polysaccharide vaccine . . . Does not tolerate freezing and should be stored at 2-8 C.

Temperature sensitivity of vaccines

[WHO/IVB/06.10](#)
page 21

The only currently licensed pneumococcal conjugate vaccine, a 7-valent vaccine produced by Wyeth, is formulated with aluminum adjuvant, is a liquid, and should be protected from freezing as for other aluminum adjuvanted vaccines. For long term storage it should be stored at 2-8C.

State of the art of new vaccines: research and development

[WHO/IVB/06.01](#)

page 27

The polyvalent PS (polysaccharide) vaccine (against *Streptococcus pneumoniae*) is recommended for healthy people over 65 years of age, particularly those living in institutions. Randomized controlled trials in healthy elderly people in industrialized countries have, however, failed to show a beneficial effect of the vaccine, so that recommendation for its use in the elderly is based on data from observational studies showing a significant protective effect against invasive (bacteraemic) pneumococcal disease, but not pneumonia.

Conclusions and recommendations from the meeting of the immunization Strategic Advisory Group of Experts (SAGE) - November 2006

[WER 2006, vol. 82, 1, pp 1-16](#)

page 8

SAGE considers that including pneumococcal conjugate vaccine in national immunization programmes should be a priority and supports the introduction of the currently licensed PCV-7 vaccine. This recommendation is based on epidemiological data and vaccine-impact data from a number of different settings.

Countries with mortality among children under the age of 5 years of >50 deaths/1000 births, or with >50 000 annual deaths among children, should make the introduction of PCV-7 a high priority for their immunization programmes.

Conclusions and recommendations from the meeting of the immunization Strategic Advisory Group of Experts (SAGE) - November 2006

[WER 2006, vol. 82, 1, pp 1-16](#)

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Countries are encouraged to conduct appropriate surveillance for pneumococcal invasive disease in order to establish a baseline and to monitor the impact of vaccination, including the occurrence and magnitude of replacement disease.

Conclusions and recommendations from the meeting of the immunization Strategic Advisory Group of Experts (SAGE) - November 2006

[WER 2006, vol. 82, 1, pp 1-16](#)

page 9

The incidence of preventable disease (that is, the product of the proportion of severe disease caused by vaccine serotypes and the rate of pneumococcal disease) should be used to anticipate the likely impact of pneumococcal conjugate vaccine. Where country-specific estimates of the incidence of preventable pneumococcal disease are not available, they may be approximated using data from epidemiologically similar populations.

Conclusions and recommendations from the meeting of the immunization Strategic Advisory Group of Experts (SAGE) - November 2006

[WER 2006, vol. 82, 1, pp 1-16](#)
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The burden of pneumococcal disease is substantially higher among individuals infected with HIV. Since pneumococcal conjugate vaccines have been shown to be safe and efficacious in HIV-infected children, SAGE recommends introducing PCV-7 in countries where HIV is a significant cause of mortality and it encourages evaluation of the impact of vaccination among the HIV-infected population.

Populations with a high prevalence of other underlying conditions that increase the risk of pneumococcal disease, such as sickle-cell disease, should also be targeted for vaccination.

Conclusions and recommendations from the meeting of the immunization Strategic Advisory Group of Experts (SAGE) - November 2006

[WER 2006, vol. 82, 1, pp 1-16](#)
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Consistent with WHO's position on new vaccines, PCV-7 (7-serotype conjugate pneumococcal vaccine) can be easily integrated into routine vaccination schedules, and it may be administered at the same time, though at a different site, as other vaccines in infant immunization programmes, including DTP, hepatitis B, Hib and polio vaccines. Routine immunization with PCV-7 should be initiated before the age of 6 months to maximize the benefits of the vaccine and may start as early as 6 weeks of age.

Conclusions and recommendations from the meeting of the immunization Strategic Advisory Group of Experts (SAGE) - November 2006

[WER 2006, vol. 82, 1, pp 1-16](#)
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Clinical efficacy has been demonstrated in 2 schedules (for PCV-7, the 7-serotype conjugate pneumococcal vaccine) : a 6-week, 10-week, 14-week schedule and a 2-month, 4-month, 6-month schedule, which was followed by a booster dose at 12-15 months of age. Further information on the cost effectiveness of other potential schedules (for example, using different numbers of doses or different intervals between doses, and with and without boosters) should be obtained. Other schedules (such as 2 doses in a primary series plus a booster dose) are being used in some countries, whose experiences may be important as GAVI-supported countries begin introducing PCV-7 or review its use. Although a late dose (around the first birthday) may be challenging operationally for GAVI-eligible countries, there may be suitable opportunities when a dose of PCV-7 could be given, such as at the same time as measles vaccination. Countries should evaluate this information once it is available and select the most appropriate schedule based on the anticipated impact, cost effectiveness and programmatic feasibility.

Conclusions and recommendations from the meeting of the immunization Strategic Advisory Group of Experts (SAGE) - November 2006

[WER 2006, vol. 82, 1, pp 1-16](#)
page 10

The risk of serious pneumococcal disease remains high throughout childhood. When vaccine is introduced, maximum individual protection and community-level protection can be achieved by also vaccinating children aged 1 year to 5 years with a single dose. Countries should determine the feasibility of reaching such children and, where possible, implement strategies for vaccinating this population within the first year of vaccine introduction.

Conclusions and recommendations from the meeting of the immunization Strategic Advisory Group of Experts (SAGE) - November 2006

[WER 2006, vol. 82, 1, pp 1-16](#)
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When other formulations of pneumococcal vaccine that are appropriate for infant immunization become available, countries using PCV-7 should assess the value of switching to one of these formulations.

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
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The 23-valent (pneumococcal) vaccine is primarily designed for use in older children and adults who are at high risk for pneumococcal disease. It is not licensed for use in children aged <2 years

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
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PCV-7 (7-valent polysaccharideprotein conjugate pneumococcal) vaccine is highly immunogenic in all age groups, but it is currently licensed for use only in children aged <5 years, including infants aged <12 months.

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
page 95

Recognizing the heavy burden of pneumococcal disease occurring in young children and the safety and efficacy of PCV-7 in this age group, WHO considers that it should be a priority to include this vaccine in national immunization programmes, particularly in countries where mortality among children aged <5 years is >50/1000 live births or where >50 000 children die annually.

(Page 103) - WHO considers that pneumococcal conjugate vaccine should be a priority for inclusion in national childhood immunization programmes. Countries with mortality among children aged <5 years of >50 deaths/1000 births or with more than 50 000 childrens deaths annually should make the introduction of PCV-7 a high priority for their immunization programmes.

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
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The burden of pneumococcal disease is substantially higher among individuals who are infected with HIV. Since pneumococcal conjugate vaccines have been shown to be safe and efficacious when used in children infected with HIV, WHO recommends that countries with a high prevalence of HIV prioritize the introduction of PCV-7. Furthermore, populations with a high prevalence of other underlying conditions that increase the risk of pneumococcal disease, such as sickle cell disease, should also be targeted for vaccination.

(Page 103) The burden of pneumococcal disease is substantially higher among individuals who are infected with HIV. Since pneumococcal conjugate vaccines have been shown to be safe and efficacious in HIV-infected children, WHO recommends prioritizing the introduction of PCV-7 in countries where HIV is a significant cause of mortality. Evaluations of the impact of vaccination among the population infected with HIV are encouraged. Populations with high prevalence of other underlying conditions that increase the risk of pneumococcal disease, such as sickle-cell disease, also should be targeted for vaccination.

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
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Trials in several developing countries have demonstrated the efficacy of a 3-dose schedule for infants without a subsequent booster dose. This schedule is compatible with the schedules of national immunization programmes in many developing countries. The benefit of administering an additional dose in the second year of life requires further investigation in these settings. Similarly, consideration of alternative PCV-7 vaccination schedules - including delaying the administration of a third dose so it may be given along with measles vaccination or in the second year of life - should be guided by future research findings.

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
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When the vaccine is first introduced into routine childhood immunization programmes a single catch-up dose of PCV-7 may be given to previously unvaccinated children aged 12-24 months and to children aged 2-5 years who are at high risk.

(Page 98) - When the vaccine is initially introduced into childhood immunization programmes, a single catch-up dose of PCV-7 may be given to previously unvaccinated children aged 12-24 months and to children aged 2-5 years considered to be at high risk. It is not known whether re-vaccination is necessary later in life.

(Page 103) - When PCV-7 is first introduced into routine childhood immunization programmes, maximum individual and community-level protection can be achieved by also providing a single catch-up dose of the vaccine to previously unvaccinated children who are aged 12-24 months and to children aged 2-5 years who are considered to be at high risk.

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
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Countries are encouraged to conduct appropriate surveillance for pneumococcal disease in order to establish a baseline measurement of disease and to monitor the impact of vaccination. This is particularly important in those developing countries that will be among the first to introduce the vaccine and in countries with a high prevalence of HIV infection or other conditions known to increase the risk of pneumococcal disease.

(Page 103) - Countries are encouraged to conduct appropriate surveillance for invasive pneumococcal disease to establish a baseline measure and to monitor the impact of vaccination, including the occurrence and magnitude of replacement disease. This is particularly important in those developing countries that are among the first to introduce the vaccine into their national programmes; and in countries where there is a high prevalence of HIV infection or where other conditions known to increase the risk of pneumococcal disease exist.

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
page 96

Once pneumococcal vaccines offering broader serotype coverage become available, countries using PCV-7 should assess whether it would be helpful to switch to these vaccines. This assessment should be based on the distribution of serotypes causing invasive pneumococcal disease in the affected population and the likely additional benefit to be gained from broadening the spectrum of vaccine serotypes. The introduction of pneumococcal conjugate vaccines with broader coverage will be facilitated if PCV-7 is already in use.

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
page 97

Although infection with pneumococci accounts for a substantial proportion of the estimated 2 million deaths from pneumonia occurring in children, the use of pneumococcal vaccine should be seen as complementary to the use of other pneumonia-control measures, including appropriate case management and the reduction of exposure to known risk factors, such as indoor pollutants, tobacco smoke, premature weaning and nutritional deficiencies.

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
page 98

PCV-7 should not be mixed in the same syringe with other vaccines.

The vaccine may be administered concomitantly with other vaccines in the Expanded Programme on Immunization provided that separate syringes and sites of injection are used.

(Page 103) - (PCV-7) may be administered concurrently with, though at a different site from, other vaccines in infant immunization programmes, including DTP, hepatitis B, H. influenzae type b and polio vaccines.

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
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(PCV-7) does not tolerate freezing and should be stored at 2-8 C.

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
page 98

The primary series of PCV-7 consists of 3 intramuscular doses administered to infants at intervals of at least 4 weeks, starting at the age of 6 weeks or later.

Vaccination at the age of 6 weeks, 10 weeks and 14 weeks in infants in developing countries is as immunogenic as vaccination at 2 months, 4 months and 6 months in industrialized countries. A booster dose administered after 12 months of age may improve the immune response and may especially affect pneumococcal nasopharyngeal carriage. Some industrialized countries have adopted a schedule based on delivering 2 doses during infancy (for example, at 2 months and 4 months) and a third dose at 12-13 months.

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
page 101

Changes in the incidence of disease due to non-vaccine serotypes after vaccine introduction need to be evaluated carefully to determine whether they are attributable to the vaccine or to natural temporal changes in serotypes. The replacement phenomenon should be carefully monitored especially in developing countries that have higher rates of nasopharyngeal carriage and disease burden.

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
page 102

The only contraindication to PCV-7 immunization is a severe hypersensitivity reaction to a previous dose of the vaccine.

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
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To maximize the benefits of the vaccine, routine immunization with PCV-7 should be initiated before 6 months of age and may start as early as 6 weeks of age.

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
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There are 2 schedules that have proven clinical efficacy: a 6 week10 week14 week series and a 2 month4 month6 month series; this latter series is followed by a booster dose at 1215 months of age.

Countries should evaluate information on impact and scheduling once it is available and select the most appropriate schedule based on anticipated impact, cost effectiveness and programmatic feasibility.

23-valent pneumococcal polysaccharide vaccine (WHO position paper)

[WER 2008, vol. 83, 42, pp 373-384](#)
page 383

In resource-limited settings where there are many competing health priorities, the evidence does not support routine immunization of the elderly and high-risk populations with PPV23. Given the substantial effects of herd immunity in adult age groups following routine infant immunization with PCV7, a higher priority should be given to introducing and maintaining high coverage of infants with PCV7.

23-valent pneumococcal polysaccharide vaccine (WHO position paper)

[WER 2008, vol. 83, 42, pp 373-384](#)
page 382

Given the high burden of pneumococcal disease in children and adults, WHO considers the prevention of pneumococcal disease to be a high priority in both industrialized and developing countries.

23-valent pneumococcal polysaccharide vaccine (WHO position paper)

[WER 2008, vol. 83, 42, pp 373-384](#)
page 383

Many industrialized countries recommend PPV23 immunization of their elderly and other high-risk groups.^{26, 27} In resource-limited settings where there are many competing health priorities, the evidence does not support routine immunization of the elderly and high-risk populations with PPV23. Given the substantial effects of herd immunity in adult age groups following routine infant immunization with PCV7, a higher priority should be given to introducing and maintaining high coverage of infants with PCV7. Countries considering introducing PPV23 to elderly or other high-risk populations will need to develop strategies for reaching these target populations.

23-valent pneumococcal polysaccharide vaccine (WHO position paper)

[WER 2008, vol. 83, 42, pp 373-384](#)
page 383

Because of the low level of evidence for benefit, routine PPV23 vaccination of HIV-infected adults is not recommended in resource-limited settings. 46 In low-income countries, WHO recommends the use of other measures that directly or indirectly may help prevent pneumococcal disease, such as trimethoprim-sulfamethoxazole chemoprophylaxis and antiretroviral therapy.

23-valent pneumococcal polysaccharide vaccine (WHO position paper)

[WER 2008, vol. 83, 42, pp 373-384](#)
page 383

PPV23 has not been shown to reduce the risk of CAP associated with seasonal or pandemic influenza. However, in countries using PPV23, high levels of vaccine uptake in at-risk populations may help reduce the incidence of pneumococcal bacteraemia during an influenza epidemic or pandemic. Nevertheless, in countries that do not routinely administer PPV23 to high-risk populations, data are insufficient to recommend introducing this vaccine to reduce the morbidity and mortality associated with pandemic influenza.

23-valent pneumococcal polysaccharide vaccine (WHO position paper)

[WER 2008, vol. 83, 42, pp 373-384](#)
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Insufficient evidence of a beneficial effect precludes recommending routine PPV23 vaccination of pregnant or breastfeeding women in order to prevent pneumococcal disease in infants during the first few months of life. 47 In view of the strong herd immunity effect of routine infant immunization with PCV7 and the indirect protection of infants too young to receive conjugated pneumococcal vaccine, emphasis should be placed on ensuring high coverage of PCV7 (or an equivalent conjugated pneumococcal vaccine) in national immunization programmes.

23-valent pneumococcal polysaccharide vaccine (WHO position paper)

[WER 2008, vol. 83, 42, pp 373-384](#)
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deferred during pregnancy, particularly during the first trimester, because their effect on the fetus has not been fully evaluated. However, no adverse consequences have been reported among newborns whose mothers were given PPV23 during pregnancy. In countries that routinely administer PCV23 to individuals with identified risk factors for pneumococcal disease (see above), women considered to be in urgent need of this vaccine may be vaccinated even during pregnancy.

23-valent pneumococcal polysaccharide vaccine (WHO position paper)

[WER 2008, vol. 83, 42, pp 373-384](#)
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Primary immunization with PPV23 consists of a single intramuscular or subcutaneous dose. The intramuscular route may be preferred because of the lower rate of reactions at the injection site. The optimal timing, frequency and clinical effectiveness of additional doses of PPV23 are poorly defined, and national recommendations regarding revaccination vary. However, on the basis of the data on the duration of vaccine-induced protection, WHO suggests one single revaccination >5 years after a first vaccination.
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23-valent pneumococcal polysaccharide vaccine (WHO position paper)

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Additional data are needed on the possible induction of hyporesponsiveness following repeated doses of pneumococcal polysaccharide vaccine. Further studies are also required to make recommendations on the possible use of PPV23 to extend the serotype coverage in individuals who have previously received PCV7.
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HIV/AIDS and immunosuppression

Pneumococcal vaccines (WHO position paper)

[WER 2003, vol. 78, 14, pp 110-119](#)
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The duration of protection following immunization with the 23-valent polysaccharide vaccine is estimated at 5 years, or more, in healthy adults. However, the duration may be considerably shorter in some high-risk groups for pneumococcal disease. Revaccination using the polysaccharide vaccine is not routinely recommended.

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Conclusions and recommendations from the meeting of the immunization Strategic Advisory Group of Experts (SAGE) - November 2006

[WER 2006, vol. 82, 1, pp 1-16](#)
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The burden of pneumococcal disease is substantially higher among individuals infected with HIV. Since pneumococcal conjugate vaccines have been shown to be safe and efficacious in HIV-infected children, SAGE recommends introducing PCV-7 in countries where HIV is a significant cause of mortality and it encourages evaluation of the impact of vaccination among the HIV-infected population.

Populations with a high prevalence of other underlying conditions that increase the risk of pneumococcal disease, such as sickle-cell disease, should also be targeted for vaccination.

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

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New Vaccines

Conclusions and recommendations from the Strategic Advisory Group of Experts (SAGE) - 9-11 November 2005

[WER 2006, vol. 81, 1, pp 2-11](#)

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SAGE recommended that WHO gives a clear signal on the priority for wider use of pneumococcal vaccine in children.

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Conclusions and recommendations from the meeting of the immunization Strategic Advisory Group of Experts (SAGE) - November 2006

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Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

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Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

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Once pneumococcal vaccines offering broader serotype coverage become available, countries using PCV-7 should assess whether it would be helpful to switch to these vaccines. This assessment should be based on the distribution of serotypes causing invasive pneumococcal disease in the affected population and the likely additional benefit to be gained from broadening the spectrum of vaccine serotypes. The introduction of pneumococcal conjugate vaccines with broader coverage will be facilitated if PCV-7 is already in use.

Policy

Pneumococcal vaccines (WHO position paper)

[WER 2003, vol. 78, 14, pp 110-119](#)
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(P)oor immunogenicity of polysaccharide (pneumococcal) vaccines in early childhood precludes the use of the 23-valent pneumococcal vaccine in the high-risk group of children under 2 years of age.

Pneumococcal vaccines (WHO position paper)

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Pneumococcal vaccines (WHO position paper)

A single dose of the 23-valent polysaccharide vaccine is recommended for selected groups above 2 years of age at increased risk of pneumococcal disease. These groups include the healthy elderly (over 65 years of age), particularly those living in institutions.

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Pneumococcal vaccines (WHO position paper)

There are no absolute contraindications to vaccination with pneumococcal polysaccharide vaccine except for an anaphylactic reaction to the previous dose.

[WER 2003, vol. 78, 14, pp 110-119](#)
page 116

Pneumococcal vaccines (WHO position paper)

The polyvalent polysaccharide vaccine is recommended for selected groups above 2 years of age with increased risk of pneumococcal disease. Such groups include the healthy elderly (over 65 years old), particularly those living in institutions, patients suffering from chronic organ failure, diabetes, nephrotic syndrome and certain immunodeficiencies, particularly those with functional or anatomical asplenia.

[WER 2003, vol. 78, 14, pp 110-119](#)
page 118

Recent meta-analyses on the efficacy and effectiveness of the pneumococcal polysaccharide vaccine have raised doubts about the benefit of the vaccine in the elderly population. However, these vaccines continue to be recommended for this group based on evidence from observational studies that show a beneficial effect against pneumococcal disease associated with bacteraemia.

Pneumococcal vaccines (WHO position paper)

Pneumococcal polysaccharide vaccine . . . Does not tolerate freezing and should be stored at 2-8 C.

[WER 2003, vol. 78, 14, pp 110-119](#)
page 115

Temperature sensitivity of vaccines

The only currently licensed pneumococcal conjugate vaccine, a 7-valent vaccine produced by Wyeth, is formulated with aluminum adjuvant, is a liquid, and should be protected from freezing as for other aluminum adjuvanted vaccines. For long term storage it should be stored at 2-8C.

[WHO/IVB/06.10](#)
page 21

State of the art of new vaccines: research and development

The polyvalent PS (polysaccharide) vaccine (against *Streptococcus pneumoniae*) is recommended for healthy people over 65 years of age, particularly those living in institutions. Randomized controlled trials in healthy elderly people in industrialized countries have, however, failed to show a beneficial effect of the vaccine, so that recommendation for its use in the elderly is based on data from observational studies showing a significant protective effect against invasive (bacteraemic) pneumococcal disease, but not pneumonia.

[WHO/IVB/06.01](#)
page 27

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
page 94

The 23-valent (pneumococcal) vaccine is primarily designed for use in older children and adults who are at high risk for pneumococcal disease. It is not licensed for use in children aged <2 years

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
page 94

PCV-7 (7-valent polysaccharideprotein conjugate pneumococcal) vaccine is highly immunogenic in all age groups, but it is currently licensed for use only in children aged <5 years, including infants aged <12 months.

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
page 95

Recognizing the heavy burden of pneumococcal disease occurring in young children and the safety and efficacy of PCV-7 in this age group, WHO considers that it should be a priority to include this vaccine in national immunization programmes, particularly in countries where mortality among children aged <5 years is >50/1000 live births or where >50 000 children die annually.

(Page 103) - WHO considers that pneumococcal conjugate vaccine should be a priority for inclusion in national childhood immunization programmes. Countries with mortality among children aged <5 years of >50 deaths/1000 births or with more than 50 000 childrens deaths annually should make the introduction of PCV-7 a high priority for their immunization programmes.

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
page 95

The burden of pneumococcal disease is substantially higher among individuals who are infected with HIV. Since pneumococcal conjugate vaccines have been shown to be safe and efficacious when used in children infected with HIV, WHO recommends that countries with a high prevalence of HIV prioritize the introduction of PCV-7. Furthermore, populations with a high prevalence of other underlying conditions that increase the risk of pneumococcal disease, such as sicklecell disease, should also be targeted for vaccination.

(Page 103) The burden of pneumococcal disease is substantially higher among individuals who are infected with HIV. Since pneumococcal conjugate vaccines have been shown to be safe and efficacious in HIV-infected children, WHO recommends prioritizing the introduction of PCV-7 in countries where HIV is a significant cause of mortality. Evaluations of the impact of vaccination among the population infected with HIV are encouraged. Populations with high prevalence of other underlying conditions that increase the risk of pneumococcal disease, such as sickle-cell disease, also should be targeted for vaccination.

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
page 95

Trials in several developing countries have demonstrated the efficacy of a 3-dose schedule for infants without a subsequent booster dose. This schedule is compatible with the schedules of national immunization programmes in many developing countries. The benefit of administering an additional dose in the second year of life requires further investigation in these settings. Similarly, consideration of alternative PCV-7 vaccination schedules - including delaying the administration of a third dose so it may be given along with measles vaccination or in the second year of life - should be guided by future research findings.

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
page 95

When the vaccine is first introduced into routine childhood immunization programmes a single catch-up dose of PCV-7 may be given to previously unvaccinated children aged 12-24 months and to children aged 2-5 years who are at high risk.

(Page 98) - When the vaccine is initially introduced into childhood immunization programmes, a single catch-up dose of PCV-7 may be given to previously unvaccinated children aged 12-24 months and to children aged 2-5 years considered to be at high risk. It is not known whether re-vaccination is necessary later in life.

(Page 103) - When PCV-7 is first introduced into routine childhood immunization programmes, maximum individual and community-level protection can be achieved by also providing a single catch-up dose of the vaccine to previously unvaccinated children who are aged 12-24 months and to children aged 2-5 years who are considered to be at high risk.

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
page 95

Countries are encouraged to conduct appropriate surveillance for pneumococcal disease in order to establish a baseline measurement of disease and to monitor the impact of vaccination. This is particularly important in those developing countries that will be among the first to introduce the vaccine and in countries with a high prevalence of HIV infection or other conditions known to increase the risk of pneumococcal disease.

(Page 103) - Countries are encouraged to conduct appropriate surveillance for invasive pneumococcal disease to establish a baseline measure and to monitor the impact of vaccination, including the occurrence and magnitude of replacement disease. This is particularly important in those developing countries that are among the first to introduce the vaccine into their national programmes; and in countries where there is a high prevalence of HIV infection or where other conditions known to increase the risk of pneumococcal disease exist.

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
page 96

Once pneumococcal vaccines offering broader serotype coverage become available, countries using PCV-7 should assess whether it would be helpful to switch to these vaccines. This assessment should be based on the distribution of serotypes causing invasive pneumococcal disease in the affected population and the likely additional benefit to be gained from broadening the spectrum of vaccine serotypes. The introduction of pneumococcal conjugate vaccines with broader coverage will be facilitated if PCV-7 is already in use.

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
page 97

Although infection with pneumococci accounts for a substantial proportion of the estimated 2 million deaths from pneumonia occurring in children, the use of pneumococcal vaccine should be seen as complementary to the use of other pneumonia-control measures, including appropriate case management and the reduction of exposure to known risk factors, such as indoor pollutants, tobacco smoke, premature weaning and nutritional deficiencies.

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
page 98

PCV-7 should not be mixed in the same syringe with other vaccines.

The vaccine may be administered concomitantly with other vaccines in the Expanded Programme on Immunization provided that separate syringes and sites of injection are used.

(Page 103) - (PCV-7) may be administered concurrently with, though at a different site from, other vaccines in infant immunization programmes, including DTP, hepatitis B, H. influenzae type b and polio vaccines.

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
page 98

(PCV-7) does not tolerate freezing and should be stored at 2-8 C.

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
page 98

The primary series of PCV-7 consists of 3 intramuscular doses administered to infants at intervals of at least 4 weeks, starting at the age of 6 weeks or later.

Vaccination at the age of 6 weeks, 10 weeks and 14 weeks in infants in developing countries is as immunogenic as vaccination at 2 months, 4 months and 6 months in industrialized countries. A booster dose administered after 12 months of age may improve the immune response and may especially affect pneumococcal nasopharyngeal carriage. Some industrialized countries have adopted a schedule based on delivering 2 doses during infancy (for example, at 2 months and 4 months) and a third dose at 12-13 months.

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
page 101

Changes in the incidence of disease due to non-vaccine serotypes after vaccine introduction need to be evaluated carefully to determine whether they are attributable to the vaccine or to natural temporal changes in serotypes. The replacement phenomenon should be carefully monitored especially in developing countries that have higher rates of nasopharyngeal carriage and disease burden.

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
page 102

The only contraindication to PCV-7 immunization is a severe hypersensitivity reaction to a previous dose of the vaccine.

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
page 103

To maximize the benefits of the vaccine, routine immunization with PCV-7 should be initiated before 6 months of age and may start as early as 6 weeks of age.

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
page 103

There are 2 schedules that have proven clinical efficacy: a 6 week10 week14 week series and a 2 month4 month6 month series; this latter series is followed by a booster dose at 1215 months of age.

Countries should evaluate information on impact and scheduling once it is available and select the most appropriate schedule based on anticipated impact, cost effectiveness and programmatic feasibility.

23-valent pneumococcal polysaccharide vaccine (WHO position paper)

[WER 2008, vol. 83, 42, pp 373-384](#)
page 383

In resource-limited settings where there are many competing health priorities, the evidence does not support routine immunization of the elderly and high-risk populations with PPV23. Given the substantial effects of herd immunity in adult age groups following routine infant immunization with PCV7, a higher priority should be given to introducing and maintaining high coverage of infants with PCV7.

23-valent pneumococcal polysaccharide vaccine (WHO position paper)

[WER 2008, vol. 83, 42, pp 373-384](#)
page 382

Given the high burden of pneumococcal disease in children and adults, WHO considers the prevention of pneumococcal disease to be a high priority in both industrialized and developing countries.

23-valent pneumococcal polysaccharide vaccine (WHO position paper)

[WER 2008, vol. 83, 42, pp 373-384](#)
page 383

Many industrialized countries recommend PPV23 immunization of their elderly and other high-risk groups.^{26, 27} In resource-limited settings where there are many competing health priorities, the evidence does not support routine immunization of the elderly and high-risk populations with PPV23. Given the substantial effects of herd immunity in adult age groups following routine infant immunization with PCV7, a higher priority should be given to introducing and maintaining high coverage of infants with PCV7. Countries considering introducing PPV23 to elderly or other high-risk populations will need to develop strategies for reaching these target populations.

23-valent pneumococcal polysaccharide vaccine (WHO position paper)

[WER 2008, vol. 83, 42, pp 373-384](#)
page 383

Because of the low level of evidence for benefit, routine PPV23 vaccination of HIV-infected adults is not recommended in resource-limited settings.⁴⁶ In low-income countries, WHO recommends the use of other measures that directly or indirectly may help prevent pneumococcal disease, such as trimethoprim-sulfamethoxazole chemoprophylaxis and antiretroviral therapy.

23-valent pneumococcal polysaccharide vaccine (WHO position paper)

[WER 2008, vol. 83, 42, pp 373-384](#)
page 383

PPV23 has not been shown to reduce the risk of CAP associated with seasonal or pandemic influenza. However, in countries using PPV23, high levels of vaccine uptake in at-risk populations may help reduce the incidence of pneumococcal bacteraemia during an influenza epidemic or pandemic. Nevertheless, in countries that do not routinely administer PPV23 to high-risk populations, data are insufficient to recommend introducing this vaccine to reduce the morbidity and mortality associated with pandemic influenza.

23-valent pneumococcal polysaccharide vaccine (WHO position paper)

[WER 2008, vol. 83, 42, pp 373-384](#)
page 384

Insufficient evidence of a beneficial effect precludes recommending routine PPV23 vaccination of pregnant or breastfeeding women in order to prevent pneumococcal disease in infants during the first few months of life.⁴⁷ In view of the strong herd immunity effect of routine infant immunization with PCV7 and the indirect protection of infants too young to receive conjugated pneumococcal vaccine, emphasis should be placed on ensuring high coverage of PCV7 (or an equivalent conjugated pneumococcal vaccine) in national immunization programmes.

23-valent pneumococcal polysaccharide vaccine (WHO position paper)

[WER 2008, vol. 83, 42, pp 373-384](#)
page 384

deferred during pregnancy, particularly during the first trimester, because their effect on the fetus has not been fully evaluated. However, no adverse consequences have been reported among newborns whose mothers were given PPV23 during pregnancy. In countries that routinely administer PCV23 to individuals with identified risk factors for pneumococcal disease (see above), women considered to be in urgent need of this vaccine may be vaccinated even during pregnancy.

23-valent pneumococcal polysaccharide vaccine (WHO position paper)

[WER 2008, vol. 83, 42, pp 373-384](#)
page 384

Primary immunization with PPV23 consists of a single intramuscular or subcutaneous dose. The intramuscular route may be preferred because of the lower rate of reactions at the injection site. The optimal timing, frequency and clinical effectiveness of additional doses of PPV23 are poorly defined, and national recommendations regarding revaccination vary. However, on the basis of the data on the duration of vaccine-induced protection, WHO suggests one single revaccination >5 years after a first vaccination.
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23-valent pneumococcal polysaccharide vaccine (WHO position paper)

[WER 2008, vol. 83, 42, pp 373-384](#)
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Additional data are needed on the possible induction of hyporesponsiveness following repeated doses of pneumococcal polysaccharide vaccine. Further studies are also required to make recommendations on the possible use of PPV23 to extend the serotype coverage in individuals who have previously received PCV7.
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Pregnant Women

23-valent pneumococcal polysaccharide vaccine (WHO position paper)

[WER 2008, vol. 83, 42, pp 373-384](#)
page 384

Insufficient evidence of a beneficial effect precludes recommending routine PPV23 vaccination of pregnant or breastfeeding women in order to prevent pneumococcal disease in infants during the first few months of life.⁴⁷ In view of the strong herd immunity effect of routine infant immunization with PCV7 and the indirect protection of infants too young to receive conjugated pneumococcal vaccine, emphasis should be placed on ensuring high coverage of PCV7 (or an equivalent conjugated pneumococcal vaccine) in national immunization programmes.

23-valent pneumococcal polysaccharide vaccine (WHO position paper)

[WER 2008, vol. 83, 42, pp 373-384](#)
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deferred during pregnancy, particularly during the first trimester, because their effect on the fetus has not been fully evaluated. However, no adverse consequences have been reported among newborns whose mothers were given PPV23 during pregnancy. In countries that routinely administer PCV23 to individuals with identified risk factors for pneumococcal disease (see above), women considered to be in urgent need of this vaccine may be vaccinated even during pregnancy.

Program Management

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
page 97

Although infection with pneumococci accounts for a substantial proportion of the estimated 2 million deaths from pneumonia occurring in children, the use of pneumococcal vaccine should be seen as complementary to the use of other pneumonia-control measures, including appropriate case management and the reduction of exposure to known risk factors, such as indoor pollutants, tobacco smoke, premature weaning and nutritional deficiencies.

Research

Conclusions and recommendations from the meeting of the immunization Strategic Advisory Group of Experts (SAGE) - November 2006

[WER 2006, vol. 82, 1, pp 1-16](#)
page 9

Clinical efficacy has been demonstrated in 2 schedules (for PCV-7, the 7-serotype conjugate pneumococcal vaccine) : a 6-week, 10-week, 14-week schedule and a 2-month, 4-month, 6-month schedule, which was followed by a booster dose at 12-15 months of age. Further information on the cost effectiveness of other potential schedules (for example, using different numbers of doses or different intervals between doses, and with and without boosters) should be obtained. Other schedules (such as 2 doses in a primary series plus a booster dose) are being used in some countries, whose experiences may be important as GAVI-supported countries begin introducing PCV-7 or review its use. Although a late dose (around the first birthday) may be challenging operationally for GAVI-eligible countries, there may be suitable opportunities when a dose of PCV-7 could be given, such as at the same time as measles vaccination. Countries should evaluate this information once it is available and select the most appropriate schedule based on the anticipated impact, cost effectiveness and programmatic feasibility.

SAGE - recommend to WHO

Conclusions and recommendations from the Strategic Advisory Group of Experts (SAGE) - 9-11 November 2005

[WER 2006, vol. 81, 1, pp 2-11](#)
page 10

SAGE recommended that WHO gives a clear signal on the priority for wider use of pneumococcal vaccine in children.

Lack of clarity of demand is a critical factor inhibiting industrial scaling up of manufacturing capacity. This uncertainty needs to be overcome since validated demand forecasts are essential for the commitments required from industry that will make this vaccine available at affordable prices.

In particular, evidence was required through studies on disease burden of the cost benefit of using pneumococcal conjugate vaccines and the feasibility of vaccine delivery to all vulnerable groups.

Pneumococcal serotype prevalence studies, undertaken in different settings, are required to judge the appropriateness of the conjugate vaccine to be used. A firm position from SAGE will be required once serotype prevalence studies are completed to judge the appropriateness of the conjugate vaccine available.

(SAGE) recognized that a global recommendation, made before resolution of funding and supply issues, could leave vulnerabilities that have been experienced with the implementation of Hib vaccine.

Schedule

Pneumococcal vaccines (WHO position paper)

[WER 2003, vol. 78, 14, pp 110-119](#)
page 111

(P)oor immunogenicity of polysaccharide (pneumococcal) vaccines in early childhood precludes the use of the 23-valent pneumococcal vaccine in the high-risk group of children under 2 years of age.

Pneumococcal vaccines (WHO position paper)

[WER 2003, vol. 78, 14, pp 110-119](#)
page 112

The duration of protection following immunization with the 23-valent polysaccharide vaccine is estimated at 5 years, or more, in healthy adults. However, the duration may be considerably shorter in some high-risk groups for pneumococcal disease. Revaccination using the polysaccharide vaccine is not routinely recommended.

(Page 116) Revaccination using the polysaccharide vaccine is not routinely recommended, but immunocompromised children who have received polysaccharide vaccine may be revaccinated after 3 years. The safety of three or more doses of the polysaccharide vaccine is not known.

Pneumococcal vaccines (WHO position paper)

[WER 2003, vol. 78, 14, pp 110-119](#)
page 116

A single dose of the 23-valent polysaccharide vaccine is recommended for selected groups above 2 years of age at increased risk of pneumococcal disease. These groups include the healthy elderly (over 65 years of age), particularly those living in institutions.

Pneumococcal vaccines (WHO position paper)

[WER 2003, vol. 78, 14, pp 110-119](#)
page 118

The polyvalent polysaccharide vaccine is recommended for selected groups above 2 years of age with increased risk of pneumococcal disease. Such groups include the healthy elderly (over 65 years old), particularly those living in institutions, patients suffering from chronic organ failure, diabetes, nephrotic syndrome and certain immunodeficiencies, particularly those with functional or anatomical asplenia.

Recent meta-analyses on the efficacy and effectiveness of the pneumococcal polysaccharide vaccine have raised doubts about the benefit of the vaccine in the elderly population. However, these vaccines continue to be recommended for this group based on evidence from observational studies that show a beneficial effect against pneumococcal disease associated with bacteraemia.

State of the art of new vaccines: research and development

[WHO/IVB/06.01](#)
page 27

The polyvalent PS (polysaccharide) vaccine (against *Streptococcus pneumoniae*) is recommended for healthy people over 65 years of age, particularly those living in institutions. Randomized controlled trials in healthy elderly people in industrialized countries have, however, failed to show a beneficial effect of the vaccine, so that recommendation for its use in the elderly is based on data from observational studies showing a significant protective effect against invasive (bacteraemic) pneumococcal disease, but not pneumonia.

Conclusions and recommendations from the meeting of the immunization Strategic Advisory Group of Experts (SAGE) - November 2006

[WER 2006, vol. 82, 1, pp 1-16](#)
page 9

Consistent with WHO's position on new vaccines, PCV-7 (7-serotype conjugate pneumococcal vaccine) can be easily integrated into routine vaccination schedules, and it may be administered at the same time, though at a different site, as other vaccines in infant immunization programmes, including DTP, hepatitis B, Hib and polio vaccines. Routine immunization with PCV-7 should be initiated before the age of 6 months to maximize the benefits of the vaccine and may start as early as 6 weeks of age.

Conclusions and recommendations from the meeting of the immunization Strategic Advisory Group of Experts (SAGE) - November 2006

[WER 2006, vol. 82, 1, pp 1-16](#)
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Clinical efficacy has been demonstrated in 2 schedules (for PCV-7, the 7-serotype conjugate pneumococcal vaccine) : a 6-week, 10-week, 14-week schedule and a 2-month, 4-month, 6-month schedule, which was followed by a booster dose at 12-15 months of age. Further information on the cost effectiveness of other potential schedules (for example, using different numbers of doses or different intervals between doses, and with and without boosters) should be obtained. Other schedules (such as 2 doses in a primary series plus a booster dose) are being used in some countries, whose experiences may be important as GAVI-supported countries begin introducing PCV-7 or review its use. Although a late dose (around the first birthday) may be challenging operationally for GAVI-eligible countries, there may be suitable opportunities when a dose of PCV-7 could be given, such as at the same time as measles vaccination. Countries should evaluate this information once it is available and select the most appropriate schedule based on the anticipated impact, cost effectiveness and programmatic feasibility.

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
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The 23-valent (pneumococcal) vaccine is primarily designed for use in older children and adults who are at high risk for pneumococcal disease. It is not licensed for use in children aged <2 years

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
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Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
page 95

Trials in several developing countries have demonstrated the efficacy of a 3-dose schedule for infants without a subsequent booster dose. This schedule is compatible with the schedules of national immunization programmes in many developing countries. The benefit of administering an additional dose in the second year of life requires further investigation in these settings. Similarly, consideration of alternative PCV-7 vaccination schedules - including delaying the administration of a third dose so it may be given along with measles vaccination or in the second year of life - should be guided by future research findings.

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
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When the vaccine is first introduced into routine childhood immunization programmes a single catch-up dose of PCV-7 may be given to previously unvaccinated children aged 12-24 months and to children aged 2-5 years who are at high risk.

(Page 98) - When the vaccine is initially introduced into childhood immunization programmes, a single catch-up dose of PCV-7 may be given to previously unvaccinated children aged 12-24 months and to children aged 2-5 years considered to be at high risk. It is not known whether re-vaccination is necessary later in life.

(Page 103) - When PCV-7 is first introduced into routine childhood immunization programmes, maximum individual and community-level protection can be achieved by also providing a single catch-up dose of the vaccine to previously unvaccinated children who are aged 12-24 months and to children aged 2-5 years who are considered to be at high risk.

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
page 98

The primary series of PCV-7 consists of 3 intramuscular doses administered to infants at intervals of at least 4 weeks, starting at the age of 6 weeks or later.

Vaccination at the age of 6 weeks, 10 weeks and 14 weeks in infants in developing countries is as immunogenic as vaccination at 2 months, 4 months and 6 months in industrialized countries. A booster dose administered after 12 months of age may improve the immune response and may especially affect pneumococcal nasopharyngeal carriage. Some industrialized countries have adopted a schedule based on delivering 2 doses during infancy (for example, at 2 months and 4 months) and a third dose at 12-13 months.

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
page 103

To maximize the benefits of the vaccine, routine immunization with PCV-7 should be initiated before 6 months of age and may start as early as 6 weeks of age.

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
page 103

There are 2 schedules that have proven clinical efficacy: a 6 week10 week14 week series and a 2 month4 month6 month series; this latter series is followed by a booster dose at 1215 months of age.

Countries should evaluate information on impact and scheduling once it is available and select the most appropriate schedule based on anticipated impact, cost effectiveness and programmatic feasibility.

23-valent pneumococcal polysaccharide vaccine (WHO position paper)

[WER 2008, vol. 83, 42, pp 373-384](#)
page 384

Primary immunization with PPV23 consists of a single intramuscular or subcutaneous dose. The intramuscular route may be preferred because of the lower rate of reactions at the injection site. The optimal timing, frequency and clinical effectiveness of additional doses of PPV23 are poorly defined, and national recommendations regarding revaccination vary. However, on the basis of the data on the duration of vaccine-induced protection, WHO suggests one single revaccination >5 years after a first vaccination.

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VPD Surveillance

Conclusions and recommendations from the meeting of the immunization Strategic Advisory Group of Experts (SAGE) - November 2006

[WER 2006, vol. 82, 1, pp 1-16](#)
page 9

Countries are encouraged to conduct appropriate surveillance for pneumococcal invasive disease in order to establish a baseline and to monitor the impact of vaccination, including the occurrence and magnitude of replacement disease.

Conclusions and recommendations from the meeting of the immunization Strategic Advisory Group of Experts (SAGE) - November 2006

[WER 2006, vol. 82, 1, pp 1-16](#)
page 9

The burden of pneumococcal disease is substantially higher among individuals infected with HIV. Since pneumococcal conjugate vaccines have been shown to be safe and efficacious in HIV-infected children, SAGE recommends introducing PCV-7 in countries where HIV is a significant cause of mortality and it encourages evaluation of the impact of vaccination among the HIV-infected population.

Populations with a high prevalence of other underlying conditions that increase the risk of pneumococcal disease, such as sickle-cell disease, should also be targeted for vaccination.

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
page 95

Countries are encouraged to conduct appropriate surveillance for pneumococcal disease in order to establish a baseline measurement of disease and to monitor the impact of vaccination. This is particularly important in those developing countries that will be among the first to introduce the vaccine and in countries with a high prevalence of HIV infection or other conditions known to increase the risk of pneumococcal disease.

(Page 103) - Countries are encouraged to conduct appropriate surveillance for invasive pneumococcal disease to establish a baseline measure and to monitor the impact of vaccination, including the occurrence and magnitude of replacement disease. This is particularly important in those developing countries that are among the first to introduce the vaccine into their national programmes; and in countries where there is a high prevalence of HIV infection or where other conditions known to increase the risk of pneumococcal disease exist.

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
page 101

Changes in the incidence of disease due to non-vaccine serotypes after vaccine introduction need to be evaluated carefully to determine whether they are attributable to the vaccine or to natural temporal changes in serotypes. The replacement phenomenon should be carefully monitored especially in developing countries that have higher rates of nasopharyngeal carriage and disease burden.

Vaccine Administration

Conclusions and recommendations from the meeting of the immunization Strategic Advisory Group of Experts (SAGE) - November 2006

[WER 2006, vol. 82, 1, pp 1-16](#)
page 9

Consistent with WHO's position on new vaccines, PCV-7 (7-serotype conjugate pneumococcal vaccine) can be easily integrated into routine vaccination schedules, and it may be administered at the same time, though at a different site, as other vaccines in infant immunization programmes, including DTP, hepatitis B, Hib and polio vaccines. Routine immunization with PCV-7 should be initiated before the age of 6 months to maximize the benefits of the vaccine and may start as early as 6 weeks of age.

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
page 98

PCV-7 should not be mixed in the same syringe with other vaccines.

The vaccine may be administered concomitantly with other vaccines in the Expanded Programme on Immunization provided that separate syringes and sites of injection are used.

(Page 103) - (PCV-7) may be administered concurrently with, though at a different site from, other vaccines in infant immunization programmes, including DTP, hepatitis B, H. influenzae type b and polio vaccines.

23-valent pneumococcal polysaccharide vaccine (WHO position paper)

[WER 2008, vol. 83, 42, pp 373-384](#)
page 383

In resource-limited settings where there are many competing health priorities, the evidence does not support routine immunization of the elderly and high-risk populations with PPV23. Given the substantial effects of herd immunity in adult age groups following routine infant immunization with PCV7, a higher priority should be given to introducing and maintaining high coverage of infants with PCV7.

23-valent pneumococcal polysaccharide vaccine (WHO position paper)

[WER 2008, vol. 83, 42, pp 373-384](#)
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Given the high burden of pneumococcal disease in children and adults, WHO considers the prevention of pneumococcal disease to be a high priority in both industrialized and developing countries.

23-valent pneumococcal polysaccharide vaccine (WHO position paper)

[WER 2008, vol. 83, 42, pp 373-384](#)
page 383

Many industrialized countries recommend PPV23 immunization of their elderly and other high-risk groups.^{26, 27} In resource-limited settings where there are many competing health priorities, the evidence does not support routine immunization of the elderly and high-risk populations with PPV23. Given the substantial effects of herd immunity in adult age groups following routine infant immunization with PCV7, a higher priority should be given to introducing and maintaining high coverage of infants with PCV7. Countries considering introducing PPV23 to elderly or other high-risk populations will need to develop strategies for reaching these target populations.

23-valent pneumococcal polysaccharide vaccine (WHO position paper)

[WER 2008, vol. 83, 42, pp 373-384](#)
page 383

Because of the low level of evidence for benefit, routine PPV23 vaccination of HIV-infected adults is not recommended in resource-limited settings. 46 In low-income countries, WHO recommends the use of other measures that directly or indirectly may help prevent pneumococcal disease, such as trimethoprim-sulfamethoxazole chemoprophylaxis and antiretroviral therapy.

23-valent pneumococcal polysaccharide vaccine (WHO position paper)

[WER 2008, vol. 83, 42, pp 373-384](#)
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PPV23 has not been shown to reduce the risk of CAP associated with seasonal or pandemic influenza. However, in countries using PPV23, high levels of vaccine uptake in at-risk populations may help reduce the incidence of pneumococcal bacteraemia during an influenza epidemic or pandemic. Nevertheless, in countries that do not routinely administer PPV23 to high-risk populations, data are insufficient to recommend introducing this vaccine to reduce the morbidity and mortality associated with pandemic influenza.

23-valent pneumococcal polysaccharide vaccine (WHO position paper)

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Insufficient evidence of a beneficial effect precludes recommending routine PPV23 vaccination of pregnant or breastfeeding women in order to prevent pneumococcal disease in infants during the first few months of life. 47 In view of the strong herd immunity effect of routine infant immunization with PCV7 and the indirect protection of infants too young to receive conjugated pneumococcal vaccine, emphasis should be placed on ensuring high coverage of PCV7 (or an equivalent conjugated pneumococcal vaccine) in national immunization programmes.

23-valent pneumococcal polysaccharide vaccine (WHO position paper)

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deferred during pregnancy, particularly during the first trimester, because their effect on the fetus has not been fully evaluated. However, no adverse consequences have been reported among newborns whose mothers were given PPV23 during pregnancy. In countries that routinely administer PCV23 to individuals with identified risk factors for pneumococcal disease (see above), women considered to be in urgent need of this vaccine may be vaccinated even during pregnancy.

23-valent pneumococcal polysaccharide vaccine (WHO position paper)

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Primary immunization with PPV23 consists of a single intramuscular or subcutaneous dose. The intramuscular route may be preferred because of the lower rate of reactions at the injection site. The optimal timing, frequency and clinical effectiveness of additional doses of PPV23 are poorly defined, and national recommendations regarding revaccination vary. However, on the basis of the data on the duration of vaccine-induced protection, WHO suggests one single revaccination >5 years after a first vaccination.
48

23-valent pneumococcal polysaccharide vaccine (WHO position paper)

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Additional data are needed on the possible induction of hyporesponsiveness following repeated doses of pneumococcal polysaccharide vaccine. Further studies are also required to make recommendations on the possible use of PPV23 to extend the serotype coverage in individuals who have previously received PCV7.⁴⁹

Vaccine Handling

Pneumococcal vaccines (WHO position paper)

[WER 2003, vol. 78, 14, pp 110-119](#)
page 115

Pneumococcal polysaccharide vaccine . . . Does not tolerate freezing and should be stored at 2-8 C.

Temperature sensitivity of vaccines

[WHO/IVB/06.10](#)
page 21

The only currently licensed pneumococcal conjugate vaccine, a 7-valent vaccine produced by Wyeth, is formulated with aluminum adjuvant, is a liquid, and should be protected from freezing as for other aluminum adjuvanted vaccines. For long term storage it should be stored at 2-8C.

Pneumococcal conjugate vaccine for childhood immunization (WHO position paper)

[WER 2006, vol. 82, 10, pp 93-104](#)
page 98

(PCV-7) does not tolerate freezing and should be stored at 2-8 C.