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Guideline

# Recommendation for use of 15- and 20-valent pneumococcal conjugate vaccines in Korean infants and children

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Pneumococcal disease remains the leading cause of morbidity in young children worldwide. Recent advances have expanded pneumococcal conjugate vaccines (PCVs) beyond 13-valent (PCV13) to 15-valent (PCV15) and 20-valent (PCV20) vaccines, which add 2 and 7 serotypes, respectively, thereby broadening their potential protective effects against invasive pneumococcal disease (IPD). Although policies vary among countries, Korea incorporated PCV15 and PCV20 into its National Immunization Program for children in April 2024 and October 2025, respectively, an implementation that is considered within the context of global epidemiology and policy trends. This review discusses evidence of the immunogenicity and safety of PCV15 and PCV20 from clinical trials and early postlicensure data, examines the serotype distribution and IPD burden in Korea alongside data from other regions, and summarizes vaccination recommendations for healthy and high-risk pediatric populations, including considerations for catch-up, interchangeability, and their coadministration. By integrating national updates and global evidence, this review aims to support clinicians and policymakers worldwide optimizing pneumococcal vaccination strategies for children.

**Key words:** *Streptococcus pneumoniae*, Conjugate vaccine, National Immunization Program, Serotype

## Key message

Compared to PCV13, PCV15 includes 2 (22F and 33F), and PCV20 includes 7 (8, 10A, 11A, 12F, 15B, 22F, and 33F) additional serotypes. The vaccination schedule remains the same: primary doses at 2, 4, and 6 months, and a booster at 12–15 months. If PCV13 was administered in the primary series, PCV15 and PCV20 may be used to complete it or as a booster.

## Introduction

*Streptococcus pneumoniae* (pneumococcus) is a leading cause of invasive bacterial infections in infants and young children. It is also the most common pyogenic pathogen responsible for otitis media, sinusitis, and pneumonia and poses a substantial disease burden globally and in Korea. Invasive pneumococcal disease (IPD), defined as the isolation of pneumococci from sterile sites throughout the body such as the blood, cerebrospinal fluid, joints, or pleural fluid, can cause significant morbidities despite appropriate treatment or even death if left untreated. Given the clinical severity of IPD and its potential for long-term sequelae, pneumococcal vaccination is strongly recommended as a key preventive measure.[1,2]

*S. pneumoniae* is a gram-positive diplococcus, most strains of which possess a capsule. Encapsulated pneumococci are primarily responsible for infections in humans. The polysaccharide component of the capsule serves as a major virulence factor and principal antigen, and serotype-specific antibodies against capsular polysaccharides provide critical host protection. More than 100 distinct pneumococcal serotypes have been identified based on structural capsular differences. Although all serotypes are

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capable of causing human diseases, prior to the introduction of pneumococcal conjugate vaccines (PCVs), approximately 10 serotypes caused approximately 60% of IPD cases. However, the distribution of IPD-associated serotypes varies according to geographic region, time period, age group, and vaccination status.[2,3]

Pneumococcal vaccines, which were initially developed in the 1970s as pneumococcal polysaccharide vaccines (PPSVs), are produced by extracting, purifying, and combining capsular polysaccharides from the major serotypes. The 23-valent pneumococcal polysaccharide vaccine (PPSV23) has been in use since 1983. However, PPSVs exhibit low immunogenicity and limited vaccine effectiveness in children under 2 years of age, who are at highest risk for IPD. To address this limitation, PCVs have been developed by chemically linking capsular polysaccharides to carrier proteins, thereby enhancing cell-mediated immunity and inducing stronger and longer-lasting protection, particularly in infants and young children, who have immature immune systems. PCVs have been used in pediatric immunization programs worldwide since the 2000s.[4]

The introduction of PCVs has significantly reduced the incidence of pneumococcal diseases caused by the vaccine serotypes. However, IPD continues to occur due to the replacement of nonvaccine types (NVTs). To address this, the serotype coverage of PCVs has progressively expanded, as exemplified by the progression from the original seven-valent vaccine (PCV7) to 10-valent (PCV10) and 13-valent (PCV13) formulations. Fifteen-valent (PCV15) and 20-valent (PCV20) vaccines were recently developed and are currently used in several countries. In Korea, PCV15 was introduced in April 2024,[5] while the introduction of PCV20 was scheduled for October 2025. Therefore, this guideline was established to prepare for the upcoming period in which only PCV15 and PCV20 will be utilized for the routine immunization of infants and young children in South Korea.

## Brief history of PCV immunization and types in Korea

PPSV23 was first introduced in Korea in the early 1990s for use in high-risk populations. In 2003, PCV7 was introduced as an optional vaccine for infants and young children. In 2010, PCV10 and PCV13 were simultaneously introduced to replace PCV7. After several years of their optional use, PCV10 and PCV13 were incorporated into the National Immunization Program (NIP) in May 2014.[5]

Approximately 10 years later, PCV10 dosing was discontinued in January 2024, and PCV15 was introduced into the NIP in April 2024 for use in combination with PCV13. PCV20 subsequently received regulatory approval from the Ministry of Food and Drug Safety on October 31, 2024. In March 2025, the Immunization Committee of the Korea Disease Control and Prevention Agency approved its inclusion in the NIP for children. Starting in October 2025, PCV13 will be gradually phased out and PCV15 and PCV20 used as routine vaccines for infants and young children.

PCV15 and PCV20 contain the same 13 serotypes covered by PCV13. In addition, PCV15 protects against serotypes 22F and 33F, while PCV20 protects against serotypes 8, 10A, 11A, 12F, and 15B. The introduction timeline, serotype composition, and carrier protein types used for each PCV in Korea are summarized in Table 1.

## Epidemiology of IPD

Pneumococcal infections are common in infants, young children, and older adults (those aged ≥65 years). In children, *S. pneumoniae* is the most frequent cause of occult bacteremia, which refers to bacteremia without an apparent localized source of infection. Pneumococcal meningitis occurs most frequently in children under 12 months of age; prior to the introduction of PCVs, it had an estimated incidence of 10 cases per 100,000 people worldwide.[6] *S. pneumoniae* is also a major cause of community-acquired pneumonia (CAP), otitis media, and sinusitis. Before the introduction of PCVs, pneumococcus was isolated in 13%–

**Table 1. Characteristics and composition of pneumococcal conjugate vaccines (PCVs)**

| Vaccine | Brand name | Company | Introduction | | Serotypes included | Amount of serotype per dose | Carrier protein |
|---|---|---|---|---|---|---|---|
| | | | Optional | NIP | | | |
| PCV7 | Prevenar | Pfizer | 2003 | | 4, 6B, 9V, 14, 18C, 19F, 23F | 2.0 μg for each[a] | CRM197 |
| PCV10 | Synflorix | GSK | 2010 | 2014 | PCV7 types + 1, 5, 7F | 1.0 μg for each[b] | Protein D[d] |
| PCV13 | Prevenar 13 | Pfizer | 2010 | 2014 | PCV10 types + 3, 6A, 19A | 2.2 μg for each[c] | CRM197 |
| PCV15 | Vaxneuvance | MSD | - | 2024 | PCV13 types + 22F, 33F | 2.0 μg for each[a] | CRM197 |
| PCV20 | Prevenar 20 | Pfizer | - | 2025 | PCV15 types + 8, 10A, 11A, 12F, 15B | 2.2 μg for each[c] | CRM197 |

NIP, National Immunization Program.
[a]Except for 6B (4.0 μg). [b]Except 4, 18C, and 19F (3.0 μg each). [c]Except for 6B (4.4 μg). [d]Except for 18C (tetanus toxoid) and 19F (diphtheria toxoid).

28% of CAP cases and 30%–50% of acute otitis media cases. Although recent studies have varied in terms of specimen types collected and diagnostic methods employed, they indicated that pneumococcus is the causative agent in 2%–4% of pediatric CAP cases in high-income countries versus 10%–34% in low- and middle-income countries. However, considering the inherent limitations of diagnostic testing, the true impact of pneumococci on CAP is likely substantially underestimated.[7,8]

Children with certain underlying medical conditions are at particularly high risk of pneumococcal infection and severe disease. Risk factors include chronic heart, lung, or liver disease; diabetes mellitus; cerebrospinal fluid leaks; cochlear implants; anatomical or functional asplenia (e.g., sickle cell disease, other hemoglobinopathies, and post-splenectomy status); human immunodeficiency virus infection; chronic renal failure or nephrotic syndrome; conditions requiring immunosuppressive therapy or radiation therapy (i.e., malignancies, leukemia, lymphoma, and Hodgkin disease); a history of solid-organ transplantation; and congenital immunodeficiency disorders (Table 2). In addition, children who attend daycare centers or preschools have higher nasopharyngeal colonization rates of pneumococcus and a 2- to 3-fold increased risk of developing IPD compared to children of the same age who do not frequent related facilities. These children also have higher rates of respiratory infections, such as pneumococcal otitis media and pneumonia, and more frequently become infected with antibiotic-resistant strains.[2]

## Global trends

Following the introduction of PCV7 in children under 5 years of age, substantial changes have been observed in the epidemiology of pneumococcal infections, incidence of invasive disease, serotype distribution, and antibiotic resistance patterns. In the United States, from 1998–1999 (pre-PCV7 era) to 2006, the incidence of vaccine-serotype IPD among children under 5 years of age decreased by 99%, while the overall incidence of IPD decreased by 80% (from 135 to 27 cases per 100,000 people). In 2019, the incidence further decreased to 10 cases per 100,000, representing a 93% reduction compared to the incidence in 1998.[4,5,9,10]

The indirect herd effects of PCV also led to marked reductions in pneumococcal disease incidence among older children, adults, and elderly individuals as well as a decline in the number of observed penicillin-non-susceptible pneumococcal strains. However, while the incidence of vaccine-serotype IPD decreased, NVT-related IPD cases, particularly serotype 19A, emerged that offset the overall reduction in IPD incidence. The subsequent introduction of PCV10 and PCV13 led to a further decrease in the incidence of vaccine-serotype IPD; however, after widespread PCV10/13 use, a shift occurred toward nonvaccine serotypes causing colonization and invasive disease.[9,10] A recent World Health Organization (WHO)–led PSERENADE multinational study, which analyzed over 530,000 IPD cases from 47 institutions across 30 countries, revealed that the incidence of vaccine-serotype IPD decreased by 83%–99% in children under 5 years of age and decreased by 54%–96% in those aged ≥65 years following the introduction of PCV10 or PCV13. However, the incidence of NVT IPD increased 2- to 3-fold. Notably, serotype 19A IPD decreased by 61%–79% in countries using PCV13 but increased 1.6- to 2.3-fold in those using PCV10. Among PCV13 countries, serotypes 3 (9.6%) and 19A (6.5%) remain important causes of IPD in children under 5 years of age, whereas NVT-related IPD cases, such as those caused by serotypes 10A, 12F, 15B/C, 24, and 35B, have also emerged, with substantial geographic variations.[11,12]

**Table 2. Conditions associated with increased risk of pneumococcal disease in children**

| |
|---|
| Children with chronic medical conditions |
| Chronic heart disease |
| Chronic liver disease |
| Chronic lung disease (including moderate persistent or severe persistent asthma) |
| Diabetes mellitus |
| Cerebrospinal fluid leak |
| Cochlear implant |
| Children with immunocompromising conditions |
| Maintenance dialysis or with nephrotic syndrome |
| Congenital or acquired asplenia, or splenic dysfunction |
| Congenital or acquired immunodeficiencies |
| Diseases and conditions treated with immunosuppressive drugs or radiation therapy |
| Human immunodeficiency virus infection |
| Sickle cell disease or other hemoglobinopathies |
| Solid-organ transplant |

## Korean trends

In Korea, *S. pneumoniae* remains a major cause of bacterial infections in children. A multicenter study conducted across 18 university hospitals between 1996 and 2005 revealed that pneumococcus accounted for 45.3% of invasive bacterial infections in immunocompetent children aged 3 months to 5 years.[13] In a more recent study of 22 institutions (2018–2019), pneumococcus accounted for 32.9%–39.2% of invasive bacterial infections.[14]

National multicenter surveillance of pediatric IPD revealed that, among pneumococci isolated from children under 5 years of age, the proportion of PCV7 serotypes decreased

from 85.2% (1995–1998) to 50.0% (2003–2005), and PCV10 and PCV13 serotypes accounted for 64.9% and 84.4%, respectively, in 2003–2005.[15] Between 2006 and 2010, during the optional PCV7 vaccination period, the common isolated serotypes included 19A (22.9%), 19F (12.1%), and 6B (8.6%). The proportion of PCV7 serotypes decreased from 62.5% in 2006 to 21.4% in 2010, whereas the proportion of additional serotypes included in PCV13 increased from 17.4% to 47.8%.[16] Between 2011 and 2013, during the optional PCV10/13 vaccination era, serotype 19A remained the most common (32.0%), with the proportion of NVT cases exceeding 50%.[17] Following the incorporation of PCV10/13 into the NIP in May 2014, an analysis of pediatric IPD cases from 2014 to 2019 revealed that NVTs caused 82.1% of cases, PCV7 serotypes caused 3.0%, the 3 additional PCV10/13 serotypes accounted for 1.2%, and the 3 additional PCV13 serotypes accounted for 13.1%. The most common serotypes were 10A (23.8%), 15B/C (12.5%), 19A (10.1%), and 15A (8.3%).[18] In the most recent multicenter Korean study comparing the pre- (2016–2019) and postpandemic (2020–2023) periods, the prevalence of serotype 10A decreased from 27.4% to 12.9% among patients with IPD, whereas that of serotype 23B increased from 0.9% to 14.3% and that of serotype 6C increased from 0.9% to 7.1%. Other common serotypes were 15B/C (24.3%) and 15A (11.4%).[19]

A unique finding in the epidemiology of pediatric IPD in Korea is the exceptionally low prevalence of serotype 3 IPD. Although serotype 3 is a major cause of pediatric IPD in many countries using PCV10 or PCV13 and a leading cause of adult IPD in Korea, only 3 cases (0.4%) of pediatric IPD caused by serotype 3 were reported among 735 pediatric IPD cases collected across Korean multicenter studies between 1995 and 2023.[15-19]

## Immunogenicity of PCV15 and PCV20

PCV7 was approved for use based on evidence of its efficacy and safety demonstrated in 3 large placebo-controlled clinical trials.[20] Newly developed PCVs have since been licensed based on comparisons of their immunogenicity with previously approved PCVs despite the absence of efficacy trials.

Serotype-specific immunoglobulin G (IgG) antibody concentrations are primarily used to assess postvaccination immunogenicity during infancy. According to the WHO reference enzyme-linked immunosorbent assay standards, noninferiority can be established by demonstrating that the proportion of subjects achieving an IgG concentration of ≥0.35 μg/mL and the geometric mean concentration ratios of serotype-specific IgG versus the existing vaccine meet predefined thresholds. Functional antibody responses were assessed as secondary criteria using opsonophagocytic assays (OPA). Memory responses were evaluated after booster doses.

PCV10 and PCV13 were approved after the completion of randomized controlled trials comparing them with PCV7. Similarly, the immunogenicity and safety of PCV15 and PCV20 were compared to those of PCV13 in randomized trials. In a study involving 1,720 healthy infants, PCV15 demonstrated noninferiority to PCV13 for all serotypes after 3 doses (except for serotype 6A) and for all serotypes after a fourth booster dose. Notably, PCV15 elicited significantly greater IgG responses for serotypes 22F, 33F, and 3, which typically exhibit lower immunogenicity than PCV13.[21] A crossover study of PCV13 and PCV15 schedules involving 900 healthy infants revealed comparable immunogenicity for the 13 shared serotypes regardless of vaccine sequence. For serotype 22F, noninferior responses were observed when at least one booster dose was administered with PCV15; for serotype 33F, noninferior responses were observed when at least one primary and one booster dose were administered with PCV15.[22] In a catch-up vaccination study of 606 healthy children aged 7 months to 17 years, PCV15 administration after completion of a PCV13 primary series elicited significantly higher antibody responses to serotypes 22F and 33F than those observed in children who did not receive the catch-up dose.[23] Additionally, in a study of 260 adults and 14 children undergoing hematopoietic stem cell transplantation, PCV15 induced comparable responses to PCV13 for the 13 shared serotypes and superior responses for serotypes 22F and 33F.[24]

For PCV20, a comparative trial with PCV13 using 2-, 4-, 6-, and 12–15-month vaccination schedules revealed that, after 3 primary doses, noninferiority was achieved for 14 serotypes (all but 1, 3, 4, 9V, 23F, and 12F). After the booster dose, noninferiority was demonstrated for all 20 serotypes. Moreover, significant OPA titers and memory responses were observed for all serotypes after the primary and booster doses.[25] In children aged 12–24 months in whom a 2-dose PCV13 primary series had been completed, one additional dose of PCV20 elicited sufficient immunogenicity for all serotypes except 12F, whereas 2 doses induced adequate responses across all 20 serotypes including 12F.[26] Furthermore, in children and adolescents aged ≥15 months who had previously received at least 3 doses of PCV13, a single catch-up dose of PCV20 significantly increased IgG concentrations for all 20 serotypes, with 80%–100% seroresponse rates for 7 of the 8 additional serotypes and a 40% seroresponse rate for 12F.[27]

## Safety of PCV15 and PCV20

The frequency of adverse events following primary vaccination with PCV15 did not differ significantly from that observed following primary vaccination with PCV13. Similar findings were reported when PCV13 and PCV15 were administered in a mixed primary series. In catch-up vaccination trials, mild irritability and decreased appetite were more frequently observed among infants aged 7–11 months in the PCV13 group, whereas mild injection-site pain and irritability were more common among children aged 12–23 months in the PCV15 group.[21-23] In clinical trials of PCV20, the frequency and severity of adverse events following primary vaccination were comparable to those observed with PCV13. No significant adverse events were reported after a single catch-up dose of PCV20.[25,27]

## Recommendations in routine use

### 1. Primary vaccination: infants aged 2–23 months

PCV15 or PCV20 were administered in a 3-dose primary series at 2, 4, and 6 months of age, followed by a booster dose at 12–15 months. If the primary series is delayed, a booster dose should be administered at 12–15 months of age, at least 8 weeks after the last primary dose.

### 2. Infants and young children aged ≥7 months without prior primary vaccinations

• Aged 7–11 months: Two doses should be administered at least 4 weeks apart, followed by a third dose after 12 months of age, with a minimum interval of 8 weeks after the second dose.

• Aged 12–23 months: Two doses should be administered at least 8 weeks apart.

• Aged 24–59 months: Healthy children who have never received any PCV should receive a single dose.

For infants and young children under 5 years of age who are not in high-risk groups (as defined in Table 2) and have already completed a PCV series with PCV10 or PCV13, additional vaccination with PCV15 or PCV20 is not recommended.

**Table 3. Recommendations for administering PCV to children by age at visit, health status, and vaccination history**

| Age at visit/ health status | No. of previous PCV13/PCV15/PCV20 doses received | Recommended PCV15/PCV20 regimen | No. of PCV doses needed to complete series by age 24 mo |
|---|---|---|---|
| All children (healthy and those with risk conditions) | | | |
| 2–6 Mo | 0 | 4 Doses: 3 doses, 8 wks apart; last dose at age 12–15 mo | 4 |
| | 1 | 3 Additional doses: 2 doses, 8 wk apart; last dose at age 12–15 mo | 4 |
| | 2 | 2 Additional doses: 1 dose 8 wk after most recent dose; last dose ≥8 wk later at age 12–15 mo | 4 |
| | 3 | 1 Additional dose at age 12–15 mo | 4 |
| 7–11 Mo | 0 (at age <7 mo) | 3 Doses: 2 doses 8 wk apart; last dose at age 12–15 mo | 3 |
| | 1 or 2 (at age <7 mo) | 2 Additional doses: 1 dose 8 wk after most recent dose; last dose ≥8 wk later at age 12–15 mo | 3 or 4 |
| | 3 (at age <7 mo) | 1 Additional dose at age 12–15 mo | 4 |
| | 1 (at age ≥7 mo) | 2 Additional doses: 1 dose 8 wk after most recent dose; last dose ≥8 wk later at age 12–15 mo | 3 |
| | 2 (at age ≥7 mo) | 1 Additional dose ≥8 wk later at age 12–15 mo | 3 |
| 12–23 Mo | 0 (at age <12 mo) | 2 Doses: 2 doses 8 wk apart | 2 |
| | 1 (at age <12 mo) | 2 Additional doses: 1 dose ≥8 wk after most recent dose; last dose ≥8 wk later | 3 |
| | 2 or 3 (at age <12 mo) | 1 Additional dose, ≥8 wk after most recent dose | 3 or 4 |
| | 1 (at age ≥12 mo) | 1 Additional dose, ≥8 wk after most recent dose | 2 |
| Healthy children | | | |
| 24–59 Mo | No previous doses or any incomplete schedule by 24 mo | 1 Additional dose, ≥8 wk after most recent dose | NA |
| 5–18 Yr | No previous doses or any incomplete schedule by 24 mo | No additional dose | NA |
| Children and adolescents with risk conditions | | | |
| 4–71 Mo | No previous doses or any incomplete schedule and <3 doses by age 24 mo | 2 Doses: 1 dose ≥8 wk after most recent dose; last dose ≥8 wk later | NA |
| | 3 (all at age <12 mo) | 1 Additional dose, ≥8 wk after most recent dose | NA |
| 6–18 Yr | No previous doses | 1 Dose | NA |

PCV, pneumococcal conjugate vaccines; PCV13, 13-valent PCV; PCT15, 15-valent PCV; PCV20, 20-valent PCV; NA, not applicable.

## Special considerations

### 1. Delayed immunization

In cases where the PCV schedule is delayed, the number of required doses should be determined based on the age at which the first dose is initiated, the child's age at the time of presentation for vaccination, and the presence or absence of high-risk conditions (Table 3).

### 2. High-risk children

For children aged 2–5 years (24–71 months) with underlying medical conditions associated with an increased risk of pneumococcal disease (Table 2) who have not previously received any PCV, 2 doses of PCV15 or PCV20 should be administered at least 8 weeks apart (Table 3). If PCV15 was used, an additional dose of PPSV23 is recommended (Table 4).

In high-risk children aged 2–18 years who have completed the recommended PCV series before the age of 6 years, no additional vaccination is needed if the series includes at least one dose of PCV20. However, if only PCV13 or PCV15 is used to complete the series, an additional dose of PCV20 or PPSV23 is required. In cases in which PPSV23 was administered, a second additional dose of PCV20 or PPSV23 should be administered 5 years later depending on the underlying medical condition (Tables 4 and 5).

For high-risk children aged 6–18 years who have not completed the recommended PCV series, a single dose of PCV15 or PCV20 should be administered at least 8 weeks after the most recent pneumococcal vaccination (Table 3). If PCV15 was administered, an additional dose of PPSV23 should be administered at least 8 weeks later (Table 4).

### 3. Coadministration with other vaccines

PCV15 and PCV20 can be administered concurrently with other vaccines. To date, no evidence has demonstrated an increased risk of adverse events or a reduction in antibody responses when PCVs are coadministered with DTaP (diphtheria, tetanus, and pertussis), polio, influenza, or other vaccines. However, among individuals with functional or anatomic asplenia, the coadministration of Menactra (Sanofi, France) and PCV13 is not recommended; instead, PCV13 should be administered first, followed by Menactra at least 4 weeks later. Until further evidence regarding PCV15 and PCV20 is available, the same precautionary approach as that for PCV13 is recommended.

### 4. Interchangeability

Crossover vaccination between PCV13 and PCV15 is supported by clinical trial data and permitted for the primary series and booster doses. For PCV13 and PCV20, clinical trial data are available only for booster doses, and crossover therapy is generally recommended only at that stage. However, considering the similarities in vaccine composition, manufacturing processes, antigen content, and carrier proteins as well as prior experience with PCV7 and PCV13, completion of the primary series with PCV20 in infants who began with PCV13 is acceptable.

Clinical studies are lacking on the crossover use between PCV15 and PCV20, and the completion of a 4-dose primary series with the same vaccine is recommended whenever possible. Nonetheless, given manufacturing process comparability, shared carrier proteins, accumulated experience with PCV10 and PCV13, and the current international guidelines (including those from the United States), crossover vaccination between PCV15 and PCV20 may be accep-

**Table 4. Risk-based pneumococcal vaccine recommendations for children and adolescents with risk conditions who have not received PCVs**

| Risk group/condition | Aged <6 yr | Aged 6–18 yr |
|---|---|---|
| Children with chronic medical conditions | PCV15 2 doses→PPSV23 1 dose or PCV20 2 doses | PCV15 1 dose→PPSV23 1 dose or PCV20 1 dose |
| Children with immunocompromising conditions | PCV15 2 doses→PPSV23[a] 2 dosesb] or PCV20 2 doses | PCV15 1 dose→PPSV23 2 doses[b] or PCV20 1 dose |

PCV, pneumococcal conjugate vaccine; PCV15, 15-valent PCV; PCV20, 20-valent PCV; PPSV23, 23-valent pneumococcal polysaccharide vaccine.
[a]For children aged ≥2 years. [b]2nd additional dose: ≥5 years after the first additional dose.

**Table 5. Pneumococcal vaccine recommendations for children aged 2–18 years with a risk factor who received all recommended PCV doses before 6 years of age**

| | PCV vaccination status | 1st additional dose[a] | 2nd additional dose[b] |
|---|---|---|---|
| Children with chronic medical conditions | Complete with any PCV20 dose | None | None |
| | Complete with either PCV10/13/15 | PCV20 | None |
| | | PPSV23 | None |
| Children with immunocompromising conditions | Complete with any PCV20 dose | None | None |
| | Complete with either PCV10/13/15 | PCV20 | None |
| | | PPSV23 | PCV20 |
| | | PPSV23 | PPSV23 |

PCV, pneumococcal conjugate vaccine; PCV10, 10-valent PCV; PCV13, 13-valent PCV; PCV15, 15-valent PCV; PCV20, 20-valent PCV.
[a]≥8 Weeks after the most recent dose. [b]≥5 Years after the first additional dose.

table under unavoidable circumstances.

## Footnotes

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