

HIGHLIGHTS OF PRESCRIBING INFORMATION

These highlights do not include all the information needed to use PNEUMOVAX 23 safely and effectively. See full prescribing information for PNEUMOVAX 23.

PNEUMOVAX® 23 (pneumococcal vaccine polyvalent)
Sterile, Liquid Vaccine for Intramuscular or Subcutaneous Injection

Initial U.S. Approval: 1983

-----**INDICATIONS AND USAGE**-----

PNEUMOVAX 23 is a vaccine indicated for active immunization for the prevention of pneumococcal disease caused by the 23 serotypes contained in the vaccine (1, 2, 3, 4, 5, 6B, 7F, 8, 9N, 9V, 10A, 11A, 12F, 14, 15B, 17F, 18C, 19F, 19A, 20, 22F, 23F, and 33F).

PNEUMOVAX 23 is approved for use in persons 50 years of age or older and persons aged ≥ 2 years who are at increased risk for pneumococcal disease. (1.1, 14.1)

-----**DOSAGE AND ADMINISTRATION**-----

Single 0.5-mL dose of PNEUMOVAX 23 administered intramuscularly or subcutaneously only. (2.2)

-----**DOSAGE FORMS AND STRENGTHS**-----

Clear, sterile solution supplied in a (0.5-mL dose) single-dose vial and a multidose (5-dose) vial. (3)

-----**CONTRAINDICATIONS**-----

Severe allergic reaction (e.g., anaphylaxis) to any component of PNEUMOVAX 23. (4.1)

-----**WARNINGS AND PRECAUTIONS**-----

- Use caution and appropriate care for individuals with severely compromised cardiovascular and/or pulmonary function in whom a systemic reaction would pose a significant risk. (5.2)

-----**ADVERSE REACTIONS**-----

The most common adverse reactions, reported in >10% of subjects vaccinated with PNEUMOVAX 23 in clinical trials, were: injection-site pain/soreness/tenderness (60.0%), injection-site swelling/induration (20.3%), headache (17.6%), injection-site erythema (16.4%), asthenia and fatigue (13.2%), and myalgia (11.9%). (6.1)

To report **SUSPECTED ADVERSE REACTIONS**, contact Merck Sharp & Dohme Corp., a subsidiary of Merck & Co., Inc., at 1-877-888-4231 or VAERS at 1-800-822-7967 or www.vaers.hhs.gov.

-----**DRUG INTERACTIONS**-----

In a randomized clinical study, a reduced immune response to ZOSTAVAX® as measured by gpELISA was observed in individuals who received concurrent administration of PNEUMOVAX 23 and ZOSTAVAX compared with individuals who received these vaccines 4 weeks apart. Consider administration of the two vaccines separated by at least 4 weeks. (7.1, 14.3)

-----**USE IN SPECIFIC POPULATIONS**-----

Pregnancy: No human or animal data are available. Use only if clearly needed. (8.1)

Pediatrics: PNEUMOVAX 23 is not approved for use in children younger than 2 years of age because children in this age group do not develop an effective immune response to capsular types contained in the polysaccharide vaccine. (8.4)

Geriatrics: For subjects aged 65 years or older in a clinical study systemic adverse reactions, determined by the investigator to be vaccine-related, were higher following revaccination (33.1%) than following initial vaccination (21.7%). Routine revaccination of immunocompetent persons previously vaccinated with a 23-valent vaccine, is not recommended. (8.5)

Immunocompromised Individuals: Response to vaccination may be diminished. (5.4, 8.6)

See 17 for **PATIENT COUNSELING INFORMATION** and FDA-approved Patient Labeling

Revised: 10/2011

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FULL PRESCRIBING INFORMATION**1 INDICATIONS AND USAGE****1.1 Indications and Use**

PNEUMOVAX® 23 is a vaccine indicated for active immunization for the prevention of pneumococcal disease caused by the 23 serotypes contained in the vaccine (1, 2, 3, 4, 5, 6B, 7F, 8, 9N, 9V, 10A, 11A, 12F, 14, 15B, 17F, 18C, 19F, 19A, 20, 22F, 23F, and 33F). PNEUMOVAX 23 is approved for use in persons 50 years of age or older and persons aged ≥ 2 years who are at increased risk for pneumococcal disease.

1.2 Limitations of Use

PNEUMOVAX 23 will not prevent disease caused by capsular types of pneumococcus other than those contained in the vaccine.

2 DOSAGE AND ADMINISTRATION

For intramuscular or subcutaneous injection using a sterile needle and syringe.

2.1 Preparation

- Parenteral drug products should be inspected visually for particulate matter and discoloration prior to administration. If either of these two conditions exists, the vaccine should not be administered.
- Use a separate sterile syringe and needle for each individual patient to prevent transmission of infectious agents from one person to another. Withdraw 0.5 mL from the vial using a sterile needle and syringe free of preservatives, antiseptics, and detergents.
- Do not mix PNEUMOVAX 23 with other vaccines in the same syringe or vial.

2.2 Administration

Administer a single 0.5-mL dose of PNEUMOVAX 23 intramuscularly or subcutaneously using a sterile needle and syringe into the deltoid muscle or lateral mid-thigh.

Do not inject intravascularly or intradermally.

2.3 Revaccination

The Advisory Committee on Immunization Practices (ACIP) has recommendations for revaccination against pneumococcal disease for persons at high risk who were previously vaccinated with PNEUMOVAX 23. Routine revaccination of immunocompetent persons previously vaccinated with a 23-valent vaccine, is not recommended.^{1,2}

3 DOSAGE FORMS AND STRENGTHS

PNEUMOVAX 23 is a clear, sterile solution supplied in a (0.5-mL dose) single-dose vial and a 5-dose vial. [See Description (11) and How Supplied/Storage and Handling (16).]

4 CONTRAINDICATIONS**4.1 Hypersensitivity**

Do not administer PNEUMOVAX 23 to individuals with a history of anaphylactic/anaphylactoid or severe allergic reaction to any component of the vaccine [See Description (11)].

5 WARNINGS AND PRECAUTIONS**5.1 Persons with Moderate or Severe Acute Illness**

Defer vaccination with PNEUMOVAX 23 in persons with moderate or severe acute illness.

5.2 Persons with Severely Compromised Cardiovascular or Pulmonary Function

Caution and appropriate care should be exercised in administering PNEUMOVAX 23 to individuals with severely compromised cardiovascular and/or pulmonary function in whom a systemic reaction would pose a significant risk.

5.3 Use of Antibiotic Prophylaxis

This vaccine does not replace the need for penicillin (or other antibiotic) prophylaxis against pneumococcal infection. In patients who require penicillin (or other antibiotic) prophylaxis against pneumococcal infection, such prophylaxis should not be discontinued after vaccination with PNEUMOVAX 23.

5.4 Persons with Altered Immunocompetence

Persons who are immunocompromised, including persons receiving immunosuppressive therapy, may have a diminished immune response to PNEUMOVAX 23. [See *Use in Specific Populations (8.6)*.]

5.5 Persons with Chronic Cerebrospinal Fluid Leakage

PNEUMOVAX 23 may not be effective in preventing pneumococcal meningitis in patients who have chronic cerebrospinal fluid (CSF) leakage resulting from congenital lesions, skull fractures, or neurosurgical procedures.

6 ADVERSE REACTIONS

The most common adverse reactions, reported in >10% of subjects vaccinated with PNEUMOVAX 23 in clinical trials were: injection-site pain/soreness/tenderness (60.0%), injection-site swelling/induration (20.3%), headache (17.6%), injection-site erythema (16.4%), asthenia/fatigue (13.2%), and myalgia (11.9%). [See *Adverse Reactions (6.1)*.]

6.1 Clinical Trials Experience

Because clinical trials are conducted under widely varying conditions, adverse reaction rates observed in the clinical trials of a vaccine cannot be directly compared to rates in the clinical trials of another vaccine and may not reflect the rates observed in practice.

In a randomized, double-blind, placebo-controlled crossover clinical trial, subjects were enrolled in four different cohorts defined by age (50-64 years of age and ≥65 years of age) and vaccination status (no pneumococcal vaccination or receipt of a pneumococcal polysaccharide vaccine 3-5 years prior to the study). Subjects in each cohort were randomized to receive intramuscular injections of PNEUMOVAX 23 followed by placebo (saline containing 0.25% phenol), or placebo followed by PNEUMOVAX 23, at 30-day (±7 days) intervals. The safety of an initial vaccination (first dose) was compared to revaccination (second dose) with PNEUMOVAX 23 for 14 days following each vaccination.

All 1008 subjects (average age, 67 years; 49% male and 51% female; 91% Caucasian, 4.7% African-American, 3.5% Hispanic, and 0.8% Other) received placebo injections.

Initial vaccination was evaluated in a total of 444 subjects (average age 65 years; 32% male and 68% female; 93% Caucasian, 3.2% African-American, 3.4% Hispanic, and 1.1% Other).

Revaccination was evaluated in 564 subjects (average age 69 years; 53% male and 47% female; 90% Caucasian, 3.5% Hispanic, 6.0% African-American, and 0.5% Other).

Serious Adverse Experiences

In this study, 10 subjects had serious adverse experiences within 14 days of vaccination: 6 who received PNEUMOVAX 23 and 4 who received placebo. Serious adverse experiences within 14 days after PNEUMOVAX 23 included angina pectoris, heart failure, chest pain, ulcerative colitis, depression, and headache/tremor/stiffness/sweating. Serious adverse experiences within 14 days after placebo included myocardial infarction complicated with heart failure, alcohol intoxication, angina pectoris, and edema/urinary retention/heart failure/diabetes.

Five subjects reported serious adverse experiences that occurred outside the 14-day follow-up window: 3 who received PNEUMOVAX 23 and 2 who received placebo. Serious adverse experiences after PNEUMOVAX 23 included cerebrovascular accident, lumbar radiculopathy, and pancreatitis/myocardial infarction resulting in death. Serious adverse experiences after placebo included heart failure and motor vehicle accident resulting in death.

Solicited and Unsolicited Reactions

Table 1 presents the adverse event rates for all solicited and unsolicited reactions reported in ≥1% in any group in this study, without regard to causality.

The most common local adverse reactions reported at the injection site after initial vaccination with PNEUMOVAX 23 were pain/tenderness/soreness (60.0%), swelling/induration (20.3%), and erythema

(16.4%). The most common systemic adverse experiences were headache (17.6%), asthenia/fatigue (13.2%), and myalgia (11.9%).

The most common local adverse reactions reported at the injection site after revaccination with PNEUMOVAX 23 were pain/soreness/tenderness (77.2%), swelling (39.8%), and erythema (34.5%). The most common systemic adverse reactions with revaccination were headache (18.1%), asthenia/fatigue (17.9%), and myalgia (17.3%). All of these adverse reactions were reported at a rate lower than 10% after receiving a placebo injection.

Table 1: Incidence of Injection-Site and Systemic Complaints in Adults ≥50 Years of Age Receiving Their First (Initial) or Second (Revaccination) Dose of PNEUMOVAX 23 (Pneumococcal Polysaccharide Vaccine, 23 Valent) or Placebo Occurring at ≥1% in Any Group			
	PNEUMOVAX 23 Initial Vaccination N=444	PNEUMOVAX 23 Revaccination* N=564	Placebo Injection† N=1008
Number Followed for Safety	438	548	984‡
	AE Rate	AE Rate	AE Rate
Injection-Site Complaints			
Solicited Events			
Pain/Soreness/Tenderness	60.0%	77.2%	7.7%
Swelling/Induration	20.3%	39.8%	2.8%
Erythema	16.4%	34.5%	3.3%
Unsolicited Events			
Ecchymosis	0%	1.1%	0.3%
Pruritus	0.2%	1.6%	0.0%
Systemic Complaints			
Solicited Events			
Asthenia/Fatigue	13.2%	17.9%	6.7%
Chills	2.7%	7.8%	1.8%
Myalgia	11.9%	17.3%	3.3%
Headache	17.6%	18.1%	8.9%
Unsolicited Events			
Fever§	1.4%	2.0%	0.7%
Diarrhea	1.1%	0.7%	0.5%
Dyspepsia	1.1%	1.1%	0.9%
Nausea	1.8%	1.8%	0.9%
Back Pain	0.9%	0.9%	1.0%
Neck Pain	0.7%	1.5%	0.2%
Upper Respiratory Infection	1.8%	2.6%	1.8%
Pharyngitis	1.1%	0.4%	1.3%
*Subjects receiving their second dose of pneumococcal polysaccharide vaccine as PNEUMOVAX 23 approximately 3-5 years after their first dose.			
†Subjects receiving placebo injection from this study combined over periods.			
‡The number of subjects receiving placebo followed for injection-site complaints. The corresponding number of subjects followed for systemic complaints was 981.			
§Fever events include subjects who felt feverish in addition to subjects with elevated temperature.			

In this clinical study an increased rate of local reactions was observed with revaccination at 3-5 years following initial vaccination.

For subjects aged 65 years or older, injection-site adverse reaction rate was higher following revaccination (79.3%) than following initial vaccination (52.9%). The proportion of subjects reporting injection site discomfort that interfered with or prevented usual activity or injection site induration ≥ 4 inches was higher following revaccination (30.6%) than following initial vaccination (10.4%). Injection site reactions typically resolved by 5 days following vaccination.

For subjects aged 50-64 years, the injection-site adverse reaction rate for revaccinees and initial vaccinees was similar (79.6% and 72.8% respectively).

The rate of systemic adverse reactions was similar among both initial vaccinees and revaccinees within each age group. The rate of vaccine-related systemic adverse reactions was higher following revaccination (33.1%) than following initial vaccination (21.7%) in subjects 65 years of age or older, and was similar following revaccination (37.5%) and initial vaccination (35.5%) in subjects 50-64 years of age. The most common systemic adverse reactions reported after PNEUMOVAX 23 were as follows: asthenia/fatigue, myalgia and headache.

Regardless of age, the observed increase in post vaccination use of analgesics ($\leq 13\%$ in the revaccinees and $\leq 4\%$ in the initial vaccinees) returned to baseline by day 5.

6.2 Post-Marketing Experience

The following list of adverse reactions includes those identified during post approval use of PNEUMOVAX 23. Because these reactions are reported voluntarily from a population of uncertain size, it is not always possible to reliably estimate their frequency or their causal relationship to product exposure.

General disorders and administration site conditions

- Cellulitis
- Malaise
- Fever ($>102^{\circ}\text{F}$)
- Warmth at the injection site
- Decreased limb mobility
- Peripheral edema in the injected extremity

Digestive System

- Nausea
- Vomiting

Hematologic/Lymphatic

- Lymphadenitis
- Lymphadenopathy
- Thrombocytopenia in patients with stabilized idiopathic thrombocytopenic purpura³
- Hemolytic anemia in patients who have had other hematologic disorders
- Leukocytosis

Hypersensitivity reactions including

- Anaphylactoid reactions
- Serum Sickness
- Angioneurotic edema

Musculoskeletal System

- Arthralgia
- Arthritis

Nervous System

- Paresthesia
- Radiculoneuropathy
- Guillain-Barré syndrome
- Febrile convulsion

Skin

- Rash
- Urticaria
- Cellulitis-like reactions

Investigations

- Increased serum C-reactive protein

7 DRUG INTERACTIONS

7.1 Concomitant Administration with Other Vaccines

In a randomized clinical study, a reduced immune response to ZOSTAVAX® as measured by gpELISA was observed in individuals who received concurrent administration of PNEUMOVAX 23 and ZOSTAVAX compared with individuals who received these vaccines 4 weeks apart. Consider administration of the two vaccines separated by at least 4 weeks. [See *Clinical Studies (14.3).*]

Limited safety and immunogenicity data from clinical trials are available on the concurrent administration of PNEUMOVAX 23 and vaccines other than ZOSTAVAX.

8 USE IN SPECIFIC POPULATIONS

8.1 Pregnancy

Pregnancy Category C: Animal reproduction studies have not been conducted with PNEUMOVAX 23. It is also not known whether PNEUMOVAX 23 can cause fetal harm when administered to a pregnant woman or can affect reproduction capacity. PNEUMOVAX 23 should be given to a pregnant woman only if clearly needed.

8.3 Nursing Mothers

It is not known whether this drug is excreted in human milk. Because many drugs are excreted in human milk, caution should be exercised when PNEUMOVAX 23 is administered to a nursing woman.

8.4 Pediatric Use

PNEUMOVAX 23 is not approved for use in children less than 2 years of age. Children in this age group do not develop an effective immune response to the capsular types contained in this polysaccharide vaccine.

The ACIP has recommendations for use of PNEUMOVAX 23 in children 2 years of age or older, who have previously received pneumococcal vaccines, and who are at increased risk for pneumococcal disease.²

8.5 Geriatric Use

In one clinical trial of PNEUMOVAX 23, conducted post-licensure, a total of 629 subjects who were aged ≥ 65 years and 201 subjects who were aged ≥ 75 years were enrolled.

In this trial, the safety of PNEUMOVAX 23 in adults 65 years of age and older (N=629) was compared to the safety of PNEUMOVAX 23 in adults 50 to 64 years of age (N=379). The subjects in this study had underlying chronic illness but were in stable condition; at least 1 medical condition at enrollment was reported by 86.3% of subjects who were 50 to 64 years old, and by 96.7% of subjects who were 65 to 91 years old. The rate of vaccine-related systemic adverse experiences was higher following revaccination (33.1%) than following primary vaccination (21.7%) in subjects ≥ 65 years of age, and was similar following revaccination (37.5%) and primary vaccination (35.5%) in subjects 50 to 64 years of age.

Since elderly individuals may not tolerate medical interventions as well as younger individuals, a higher frequency and/or a greater severity of reactions in some older individuals cannot be ruled out.

Post-marketing reports have been received in which some elderly individuals had severe adverse experiences and a complicated clinical course following vaccination. Some individuals with underlying medical conditions of varying severity experienced local reactions and fever associated with clinical deterioration requiring hospital care.

8.6 Immunocompromised Individuals

Persons who are immunocompromised, including persons receiving immunosuppressive therapy, may have a diminished immune response to PNEUMOVAX 23.

11 DESCRIPTION

PNEUMOVAX 23 (Pneumococcal Vaccine Polyvalent) is a sterile, liquid vaccine consisting of a mixture of purified capsular polysaccharides from *Streptococcus pneumoniae* types (1, 2, 3, 4, 5, 6B, 7F, 8, 9N, 9V, 10A, 11A, 12F, 14, 15B, 17F, 18C, 19F, 19A, 20, 22F, 23F, and 33F).

PNEUMOVAX 23 is a clear, colorless solution. Each 0.5-mL dose of vaccine contains 25 micrograms of each polysaccharide type in isotonic saline solution containing 0.25% phenol as a preservative. The vaccine is used directly as supplied. No dilution or reconstitution is necessary.

12 CLINICAL PHARMACOLOGY

12.1 Mechanism of Action

PNEUMOVAX 23 induces type-specific antibodies that enhance opsonization, phagocytosis, and killing of pneumococci by leukocytes and other phagocytic cells. The levels of antibodies that correlate with protection against pneumococcal disease have not been clearly defined.

14 CLINICAL STUDIES

14.1 Effectiveness

The protective efficacy of pneumococcal vaccines containing six (types 1, 2, 4, 8, 12F, and 25) or twelve (types 1, 2, 3, 4, 6A, 8, 9N, 12F, 25, 7F, 18C, and 46) capsular polysaccharides was investigated in two controlled studies in South Africa in male novice gold miners ranging in age from 16 to 58 years, in whom there was a high attack rate for pneumococcal pneumonia and bacteremia.⁴ In both studies, participants in the control groups received either meningococcal polysaccharide serogroup A vaccine or saline placebo. In both studies, attack rates for vaccine type pneumococcal pneumonia were observed for the period from 2 weeks through about 1 year after vaccination. Protective efficacy was 76% and 92%, respectively, for the 6- and 12-valent vaccines, for the capsular types represented.

Three similar studies in South African young adult male novice gold miners were carried out by Dr. R. Austrian and associates⁵ using similar pneumococcal vaccines prepared for the National Institute of Allergy and Infectious Diseases, with pneumococcal vaccines containing a 6-valent formulation (types 1, 3, 4, 7, 8, and 12) or a 13-valent formulation (types 1, 2, 3, 4, 6, 7, 8, 9, 12, 14, 18, 19, and 25) capsular polysaccharides. The reduction in pneumococcal pneumonia caused by the capsular types contained in the vaccines was 79%. Reduction in type-specific pneumococcal bacteremia was 82%.

A prospective study in France found a pneumococcal vaccine containing fourteen (types 1, 2, 3, 4, 6A, 7F, 8, 9N, 12F, 14, 18C, 19F, 23F, and 25) capsular polysaccharides to be 77% (95%CI: 51% to 89%) effective in reducing the incidence of pneumonia among male and female nursing home residents with a mean age of 74 (standard deviation of 4 years).⁶

In a study using a pneumococcal vaccine containing eight (types 1, 3, 6, 7, 14, 18, 19, and 23) capsular polysaccharides, vaccinated children and young adults aged 2 to 25 years who had sickle cell disease, congenital asplenia, or undergone a splenectomy experienced significantly less bacteremic pneumococcal disease than patients who were not vaccinated.⁷

In the United States, one post-licensure randomized controlled trial, in the elderly or patients with chronic medical conditions who received a 14-valent pneumococcal polysaccharide vaccine (types 1, 2, 3, 4, 6A, 8, 9N, 12F, 14, 19F, 23F, 25, 7F, and 18C), did not support the efficacy of the vaccine for nonbacteremic pneumonia.⁸

A retrospective cohort analysis study based on the U.S. Centers for Disease Control and Prevention (CDC) pneumococcal surveillance system, showed 57% (95%CI: 45% to 66%) overall protective effectiveness against invasive infections caused by serotypes included in PNEUMOVAX 23 in persons ≥6 years of age, 65 to 84% effectiveness among specific patient groups (e.g., persons with diabetes mellitus, coronary vascular disease, congestive heart failure, chronic pulmonary disease, and anatomic asplenia) and 75% (95%CI: 57% to 85%) effectiveness in immunocompetent persons aged ≥65 years of age. Vaccine effectiveness could not be confirmed for certain groups of immunocompromised patients.⁹

14.2 Immunogenicity

The levels of antibodies that correlate with protection against pneumococcal disease have not been clearly defined.

Antibody responses to most pneumococcal capsular types are generally low or inconsistent in children less than 2 years of age.

14.3 Concomitant Administration with Other Vaccines

In a double-blind, controlled clinical trial, 473 adults, 60 years of age or older, were randomized to receive ZOSTAVAX and PNEUMOVAX 23 concomitantly (N=237), or PNEUMOVAX 23 alone followed 4 weeks later by ZOSTAVAX alone (N=236). At four weeks postvaccination, the varicella-zoster virus (VZV) antibody levels following concomitant use were significantly lower than the VZV antibody levels following nonconcomitant administration (GMTs of 338 vs. 484 gp ELISA units/mL, respectively; GMT ratio = 0.70 (95% CI: [0.61, 0.80])).

Limited safety and immunogenicity data from clinical trials are available on the concurrent administration of PNEUMOVAX 23 and vaccines other than ZOSTAVAX.

15 REFERENCES

- Centers for Disease Control and Prevention. Prevention of Pneumococcal Disease. Recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR. 46(No. RR-8): 1-25, 1997. Available from: <http://www.cdc.gov/mmwr/PDF/rr/rr4608.pdf>
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- Vaccine Adverse Event Reporting System - United States, MMWR. 39(41): 730-33, October 19, 1990.

16 HOW SUPPLIED/STORAGE AND HANDLING

PNEUMOVAX 23 is supplied as follows:

NDC 0006-4739-00 — one 5-dose vial, color coded with a purple cap and stripe on the vial labels and cartons.

NDC 0006-4943-00 — a box of 10 single-dose vials, color coded with a purple cap and stripe on the vial labels and cartons.

16.1 Storage and Handling

- Store unopened and opened vials at 2-8°C (36-46°F).
- All vaccine must be discarded after the expiration date.

17 PATIENT COUNSELING INFORMATION

See *FDA-Approved Patient Labeling (Patient Information)*.

- Inform the patient, parent or guardian of the benefits and risks associated with vaccination.
- Tell the patient, parent or guardian that vaccination with PNEUMOVAX 23 may not offer 100% protection from pneumococcal infection.
- Provide the patient, parent or guardian with the vaccine information statements required by the National Childhood Vaccine Injury Act of 1986, with each immunization.
- Instruct the patient, parent or guardian to report any serious adverse reactions to their health care provider who in turn should report such events to the vaccine manufacturer or the U.S. Department of Health and Human Services through the Vaccine Adverse Event Reporting System (VAERS), 1-800-822-7967, or report online at www.vaers.hhs.gov.¹⁰

PNEUMOVAX® 23 (Pneumococcal Vaccine Polyvalent)

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