

Use of Pneumococcal Polysaccharide Vaccine (PPV23) in High Risk Adults Aged 18-64 Years

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Outline

- **Current PPV23 recommendations**
- **Asthma prevalence & definition**
- **New risk factor information**
- **Asthma, cigarette smoking**
- **Workgroup considerations & proposed recommendation**
- **Vote**

Pneumococcal Polysaccharide Vaccine (PPV23) - ACIP Recommendations, 1997

TABLE 2. Recommendations for the use of pneumococcal vaccine

Groups for which vaccination is recommended	Strength of recommendation*	Revaccination†
Persons aged 2–64 years with chronic cardiovascular disease, [¶] chronic pulmonary disease, ^{**} or diabetes mellitus	A	Not recommended.

“Persons at increased risk for severe disease include those with chronic illness such as...chronic pulmonary disease (e.g., COPD or emphysema, but not asthma)...”

Current PPV23 recommendation for persons with chronic pulmonary disease

- *“Persons aged 2-64 years with chronic pulmonary disease, including chronic obstructive pulmonary disease and emphysema, should receive PPV23.”*
- *Asthma was not included in the chronic pulmonary disease category because no data on increased risk of pneumococcal disease among persons with asthma were available when the recommendation was made*
- *“Asthma has not been associated with an increased risk for pneumococcal disease, unless it occurs with chronic bronchitis, emphysema, or long-term use of systemic corticosteroids”*

Objective

- Review new information regarding the association of asthma and smoking with increased risk for invasive pneumococcal disease (IPD)
- Review considerations related to expanding PPV23 target groups to include persons aged 18-64 years who have asthma or who are cigarette smokers

Asthma: Definition

- **Chronic inflammatory airway disorder**
- **Airway hyperresponsiveness**
- **Many cell types involved**
- **Symptoms**
- **Variable expiratory airflow obstruction**
- **Reversibility**

Diagnosis: Adults

- **History based diagnosis**
- **Physical exam**
- **Reversibility**
- **Pulmonary function testing**
- **Differential: COPD (emphysema, chronic bronchitis)**

Public Health Burden of Asthma- U.S. Prevalence Estimates, 2006

Age Group	Prevalence
Children	6.8 million (9.3%)
Adults	16.1 million (7.3%)

Diagnosis: Children < 5 Yrs

- **Similar diagnostic steps***
- **Exclude spirometry**
- **Risk factors**
- **Differential: upper airway disease, obstruction involving small airways**
- **Many children “out grow” wheezing****
 - **9 million: lifetime asthma diagnosis**
 - **6.5 million: current asthma (70%)**

* Asthma Management and Prevention. NHLBI/WHO Workshop Report, 2002

** Akinbami L. Advance Data 2006

“Asthma as a Risk Factor for IPD Nested Case-Control Study”

Cases	Controls
IPD	No IPD
Active surveillance of IPD, ABCs Tennessee’s Medicaid program (TennCare), ICD coding	Random selection TennCare
Aged 2-49 yrs	10:1 age-matched
N = 635	N = 6350

Asthma Case Ascertainment

- 1 inpatient or ED diagnosis, 2 outpatient diagnoses (ICD-9-CM) or use of asthma-related meds
- High-risk asthma
 - Hospitalization or ED visit
 - Use of rescue therapy or long-term oral corticosteroids
 - Dispense of ≥ 3 prescriptions for *B*-agonists within 1yr

Results

Age (yrs)	Cases- IPD # (%)	Controls- No IPD # (%)	Adjusted Odds Ratio (OR)
2-4	26/122 (21)	116/1220 (10)	2.3 (95% CI 1.4-4.0)
5-17	11/62 (18)	34/620 (6)	4.0 (95% CI 1.5-10.7)
18-49	77/451 (17)	366/4510 (8)	2.4 (95% CI 1.8-3.3)

“Impact of Pneumococcal Vaccination on Pneumonia Rates in Patients with COPD & Asthma”

- **Retrospective cohort study**
- **Compared rates of pneumococcal pneumonia in asthmatics & controls before & after PPV23 vaccination**
 - **Administrative data, ICD-9 codes**
 - **Documented pneumococcal vaccination**
- **Aged > 50 yrs (average)**
 - **Asthma n = 2746**
 - **Controls n = 1,345**

Results

Table 3. Pneumonia-Related Hospitalization Rates During Follow-up by Disease Group in the Vaccinated Cohort (Rates Presented per 100 Person-Years)

	Crude rates per 100 person-y		Adjusted relative risk	95% CI
	Disease group	Controls		
Asthma				
Pneumococcal pneumonia only				
Prevaccination	0.09	0.21	0.76	0.17 to 3.53
Postvaccination	0.03	0.09	0.30	0.04 to 1.99
Pneumococcal or unspecified pneumonia				
Prevaccination	1.11	0.70	1.78	0.97 to 3.26
Postvaccination	0.99	1.17	0.81	0.50 to 1.31
Any pneumonia				
Prevaccination	1.27	0.99	1.45	0.85 to 2.46
Postvaccination	1.11	1.34	0.79	0.50 to 1.25
Overall hospitalizations				
Prevaccination	49.59	52.79		
Postvaccination	17.75	22.17		

Comparison of IPD Rates Among Asthmatics with Other Groups for whom PPV23 is Recommended

Cases/100,000

Kyaw et al. JID 2005

Adults \geq 18 yrs:

- Healthy: 8.8
- Diabetes: 51.4
- Chronic lung disease: 62.9
- Alcohol abuse: 100.4
- HIV/AIDS: 422.9
- Hematological cancer: 503.1

Talbot et al. NEJM 2005

Age 2-49 yrs:

- No asthma: 12
- Low risk asthma: 23
- High risk asthma: 42

Cigarette Smoking

“Invasive Pneumococcal Disease in Dallas County, TX: Results from Population-Based Surveillance in 1995”

- **Active, laboratory, population-based surveillance**
- **Review of medical records**
- **Dallas, TX**
- **Ages 2 mos – 100 yrs**
- **IPD cases (N=432)**

Results

- **47% of IPD cases were current smokers**
 - **N = 432**
- **Age 24-64 yrs**
 - **OR for IPD 2.6 (CI 1.9-3.5)**
 - **Attributable risk for smoking: 31%**
- **Age \geq 65 yrs:**
 - **OR for IPD 2.2 (CI 1.4-3.4)**
 - **Attributable risk for smoking: 13%**

“Cigarette Smoking and IPD”

- **Population based case-control study**
- **Active, population-based IPD surveillance (ABCs)**
- **Random digit dialing control selection**
- **Immunocompetent adults**
- **Aged 18-64 yrs**
 - **Case n = 297**
 - **Controls n = 301**

Results

TABLE 4. INDEPENDENT RISK FACTORS FOR INVASIVE PNEUMOCOCCAL DISEASE AMONG IMMUNOCOMPETENT ADULTS 18 TO 64 YEARS OLD.

VARIABLE	ODDS RATIO (95% CI)*	P VALUE
Smoking status		
Current smoker	4.1 (2.4–7.3)	<0.001
Former smoker	1.1 (0.5–2.2)	0.91
Passive exposure to smoke	2.5 (1.2–5.1)	0.01
Never smoked and no passive exposure to smoke	1.0	

- Strongest independent IPD risk-factor in immunocompetent, non-elderly adults
- Dose response for # cigarettes smoked, pack-yrs, time since quitting
- Adjusted pop attributable risk: smoking 51% vs chronic illness 14%

Workgroup's considerations – asthma in adults aged 18-64 years

- **Whether or not asthma is an indication for PPV23 has been an area of confusion among health care providers since it is an indication for influenza vaccine**
- **Including asthma in the chronic pulmonary disease category might be consistent with the current clinical practice of many adult immunization providers**
- **Most adult IPD cases with asthma also have another condition for which PPV23 is recommended¹**
- **New information suggests that asthma is an independent risk factor for pneumococcal disease**

* Greene et al CID 2006.

Smokers – Workgroup's considerations

- Currently, about one-fifth of U.S. adults smoke cigarettes
- Defining the criteria for significant smoking history is challenging and using indicators such as number of pack-years smoked may not be feasible in clinical practice
- Among adults, most of the cases with invasive pneumococcal disease who are cigarette smokers already have another condition for which PPV23 is currently recommended*
- Acceptability of vaccination among smokers may be low, particularly in younger age groups
- For the above reasons, the Workgroup elected not to propose recommending PPV23 specifically to cigarette smokers

Workgroup' proposal - asthma

On the basis of the new information, the work group proposes including asthma among the chronic pulmonary diseases that are indications for PPV23 among persons aged 18-64 years

- Proposed language

- ***“Persons at increased risk for invasive pneumococcal disease include those with chronic pulmonary diseases (such as COPD, emphysema or asthma).”***
- ***“Persons aged 18-64 years with chronic pulmonary disease including chronic obstructive pulmonary disease, emphysema and asthma should receive PPV23.”***