

# Adult Immunization

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# What is a high risk medical condition?

- CHF
- COPD
- Diabetes
- Asthma
- Cardiomyopathy
- Alcoholism
- Chronic Liver Disease
- Institutionalized Setting
- Immunocompromised

# Cost Effectiveness of Vaccination

- 8,260 Deaths from Influenza
- 19,200 Deaths from pneumococcal infections
- Influenza vaccine has been shown to save \$117 per vaccinated person per year in noninstitutionalized elderly adults<sup>1</sup>
- Pneumovax saves \$8.27 per person over age 65<sup>2</sup>

<sup>1</sup> JE, Moskowitz AJ, Whang W. Cost-effectiveness of vaccination against pneumococcal bacteremia among elderly people. JAMA 1997; 278:1333.

<sup>2</sup> BS, Hillman AL, Fendrick AM, et al. A reappraisal of hepatitis B virus vaccination strategies using cost-effectiveness analysis. Ann Intern Med 1993; 118:298-306.

# Cost Effectiveness of Vaccination

TABLE 1

## Evidence Type, Efficacy, and Cost-Effectiveness of Adult Vaccinations

Vaccine to Society	Efficacy	Type of Evidence	Cost Effectiveness
Influenza	70%-90% of healthy adults younger than 65 years (lower if older or immunocompromised or match between circulating and vaccine strains is poor)	RCT, cohort	Cost saving <sup>1,68</sup>
Pneumococcal polysaccharide	66% against definite pneumococcal pneumonia* 83% against definite pneumonia caused by vaccine types (lower if high-risk) <sup>22</sup> 56%-81% in most case control studies <sup>23</sup>	RCT, <sup>2</sup> case-control, indirect cohort	Cost saving <sup>2</sup>

RCT denotes randomized controlled trial.

\*These results are based on randomized trials of pneumococcal polysaccharide vaccines that contained less than the 23 antigens in the current vaccine.

# Low Adult Vaccination Rates

- 1997 Adults over age 65
  - 65% received influenza vaccination
  - 45% had received pneumovax
- Rates lower for Hispanic and African-Americans
- Vaccination rate lower for adults under age 65 with high risk medical conditions

# Reasons for Undervaccination of Adults

- Limited appreciation of the importance of vaccine-preventable diseases in adults
- Doubts about the safety and efficacy of adult vaccines
- Different target groups for different vaccines, necessitating a selective rather than a universal approach
- Too few programs, either public or private, to deliver adult vaccines
- Issues regarding payment for adult vaccination

# Influenza

- Estimated 20,000 deaths in each of the past 10 influenza epidemics in the US<sup>3</sup>
- Cost of severe influenza epidemic estimated to be \$12 billion<sup>4</sup>
- 90% of influenza deaths occur in persons aged 65 and older

<sup>3</sup> for Disease Control and Prevention. Prevention and control of influenza: recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR 2000; 49(RR-3):1-38.

<sup>4</sup> WH. Excess pneumonia and influenza associated hospitalization during influenza epidemics in the United States, 1970-78. Am J Public Health 1986;76:761-5.

# Influenza Vaccine

- Vaccine developed based on serotypes identified in Asian countries
- When match is good, vaccine can prevent 70%-90% of illness in healthy people under 65
- Effective in reducing all-cause mortality by 27%-54%<sup>5</sup>
- May take up to 2 weeks for protection to develop

<sup>5</sup> DS, Wajda A, Nicol JP, et al. Clinical effectiveness of influenza vaccine in Manitoba. JAMA 1993; 270:1956-61. Published erratum appears in JAMA 1994; 271:1578.



# Influenza Recommendations

- Vaccination given September-November
- Annual vaccination for all patients age 50 and over
- Annual vaccination for all persons with a high risk medical condition
- Given to any patient over 6 months requesting vaccination

# Pneumococcal Disease

- Annual Estimates for US<sup>6</sup>
  - 3,000 cases of meningitis
  - 50,000 cases of bacteremia
  - 500,000 cases of pneumonia
- Pneumococcal bacteremia has 20% overall mortality rate for adults, up to 40% for elderly

<sup>6</sup> for Disease Control and Prevention. Prevention of pneumococcal disease: recommendations of the Advisory Committee

# Pneumococcal Vaccine

- Current vaccine is 23-valent
- Efficacy ranges from 56% to 81%

# Pneumovax Recommendations

- All persons age 65 and over
- Persons age 2 to 65 with a high risk medical condition
- Who gets revaccinated?
  - 65 and over: Revaccinate ONCE after 5 years if 1<sup>st</sup> dose given before age 65
  - Asplenia: Revaccinate ONCE after 5 years
  - Immunocompromised: Revaccinate ONCE after 5 years
  - Revaccination may be associated with higher rates (11%) of local reaction

<sup>7</sup> Centers for Disease Control and Prevention. Prevention of pneumococcal disease: Recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR 1997; 46(No. RR-8):10-14.

# Tetanus and Diphtheria

- Routine Vaccination of military personnel started 1941
- Recommend 3 doses of vaccine for all adults who have no prior vaccination or unknown vaccination history
- 1<sup>st</sup> two doses given 4 weeks apart, followed by 3<sup>rd</sup> dose 6 to 12 months after 2<sup>nd</sup> dose
- Booster vaccine at 10 to 30 years
- Wounds: Tetanus toxoid + immunoglobulin administered if patient has incomplete vaccination, or if no booster has been given in last 5 to 10 years

# Measles, Mumps, Rubella

- People born before 1957 assumed to have immunity
- Recommend 1 dose MMR vaccine for all persons born after 1957 and for women of childbearing age
- KMR vaccine given 1963-1967; if patient had this vaccine, they need 2 doses MMR

# Varicella

- People who have had varicella are assumed to be immune
- Serologic testing can be done to ascertain immunity for those with uncertain history
- Recommendation summary – give to people over age 13 who are not immune
- Vaccine effective at modifying disease if given 3 to 5 days after exposure

# Hepatitis B

- Recommended for all persons not previously vaccinated
- 3 step vaccine



# Vaccine check at age 50

- Tetanus Td booster if not given in past 10 years
- Screen for high risk conditions (? Pneumovax)
- Start annual influenza vaccination

# Vaccine contraindications

- Known anaphylactic reaction to vaccine or component
- Persons with febrile illness should postpone vaccination until resolved
- Live virus contraindicated for immunodeficiency, malignancy, pregnancy
  - MMR, Varicella
- HIV patients can be given MMR
- Varicella can be given to those with humoral immunodeficiency but NOT with cellular immunodeficiency

# Bibliography

- Zimmerman RK. Adult vaccination, part 1: vaccines indicated by age. Teaching Immunization for Medical Education (TIME) Project. J. Fam Pract. 2000 Sep;49(9 Suppl):S41-50.