

# Vaccinations for the Older Adult



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## KEYWORDS

- Vaccine • Tetanus • Diphtheria • Influenza • Pneumococcus • Immune senescence
- Pertussis • Conjugate

## KEY POINTS

- Influenza vaccines reduce clinical influenza in outpatient elderly adults, more so after vaccination with the high-dose vaccine.
- Standard-dose vaccines that are well matched to circulating influenza also reduce hospitalization risk in older adults compared with those who are not vaccinated.
- The 13-valent pneumococcal conjugate vaccine reduces both vaccine-specific invasive disease and pneumonia in older adults as well as nasal colonization and, hence, reduced transmissibility.
- The increase in pertussis prevalence over the last 50 years has led to its recommendation as part of the vaccine schedule for elderly patients.

## INTRODUCTION

Four major vaccine-preventable diseases affect older adults in the United States, including influenza, herpes zoster, pneumococcal disease, and pertussis, based on their incidence and consequent health care cost (**Table 1**). This article focuses on

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Disease	Incidence N (%)	Cost (\$)
Influenza	4.0 M (77%)	8.3 B (54%)
Herpes zoster	0.6 M (11%)	3.0 B (20%)
Pneumococcal disease	0.4 M (8%)	3.8 B (25%)
Pertussis	0.2 M (4%)	2.1 M (1%)

*Abbreviations:* B, billion; M, million.

*Data from* McLaughlin JM, McGinnis JJ, Tan L, et al. Estimated human and economic burden of four major adult vaccine-preventable diseases in the United States, 2013. *J Prim Prev* 2015;36(4):264.

these diseases, with the exception of herpes zoster, which is covered elsewhere in this issue (See [Schmader K: Herpes Zoster](#), in this issue), as well as diphtheria and tetanus, as these conditions are important globally. Diphtheria and tetanus incidence in the United States is low because of high prevailing underlying immunity from past vaccinations. Hepatitis and hepatitis vaccine are not covered, as it is not a universally recommended vaccination because of limited data in older adults.

The need for vaccination and booster vaccination with advancing age relates to 2 primary concepts. One concerns normal anatomic and physiologic changes with aging that result in more serious disease as people get older. For example, elderly persons with a respiratory illness already have increased residual lung volume, reduced mucociliary escalator efficiency, and reduced force of cough. All of these affect pathogen clearance from the respiratory tract.<sup>1</sup> Secondly, from an immunologic perspective,<sup>2,3</sup> individuals produce less antibody in response to disease and infection with age—less so because of B-cell failure and more so because of thymic involution and reduced T-cell help to drive B-cell activity. The rate of cytokine increase, total amplitude, and rate of decrease on recovery is also tempered with age.

Consequently, cytokines that drive fever, for example, (interleukin-6 among others) do not elevate the temperature as efficiently and, therefore, do not inhibit temperature-sensitive replication of pathogens. Also, some symptoms, including anorexia and malaise associated with specific cytokines, such as tumor necrosis factor- $\alpha$ , may be delayed or less prominent in older adults. So with aging, the presentation of disease can be altered, making diagnosis and early intervention more challenging, even to experienced practitioners (See [Norman DC: Clinical Features of Infection in Older Adults](#), in this issue). Vaccines may also attenuate other important clinical symptoms or illness severity, if not prevent disease altogether.

Primary prevention remains the core approach for vaccine-preventable diseases. Vaccines are relatively cost-effective strategies for older adults, especially our oldest and most frail patients. Vaccines may also attenuate other important clinical symptoms or illness severity. For these and other reasons, vaccines have an increasingly important role for older adults.

## **INFLUENZA AND INFLUENZA VACCINATION**

### ***Influenza Epidemiology***

Influenza and pneumonia remain the leading cause of infectious morbidity and mortality for older adults. Influenza accounts for more than three-quarters of incident vaccine-preventable disease in people 65 years of age and older, some 4 million cases

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