Influenza Vaccination in Vulnerable Populations

People with asthma and COPD are considered to be at risk for complications of influenza. This disease has been responsible for a major increase in morbidity and mortality during epidemic periods, especially in such patients. As early as 1848, the founder of modern concepts of medical surveillance, William Farr, estimated that 41% of the population of London died due to bronchitis or pneumonia. Each year, an average of 20,000 people die of influenza-related illness in the United States. Influenza and pneumonia were the seventh leading cause of death in 2000.

Vaccination remains the primary preventive strategy. Recommendations for annual influenza vaccination in COPD patients come from evidence indicating the efficacy and cost-effectiveness of vaccination in decreasing the rates of hospitalization, pneumonia, and deaths among the elderly and people with high-risk conditions. Yet, there have been few prospective, placebo-controlled, double-blind studies designed to assess the efficacy of the vaccine. Ethical issues pose a difficulty in using the design in high-risk conditions. Yet, there have been few prospective, placebo-controlled, double-blind studies designed to assess the efficacy of the vaccine. Ethical issues pose a difficulty in using the design in high-risk patients. A practical problem arises with the requirement to vaccinate a sufficient number of individuals with the vaccine or placebo in order to detect a statistically significant difference between the two arms of such a study. In addition, the study is best conducted during an influenza epidemic. The antigenic properties of the vaccine strains should match those of strains that are likely to circulate during the epidemic in order for it to be efficacious. Most studies attempting to address these issues have been conducted over short periods and have yielded contradictory results. To complicate matters, some physicians still believe that the vaccine itself can induce exacerbations, and some hesitate to recommend vaccination in patients with allergic asthma, especially in those who are allergic to chicken protein. Many patients are not convinced that the vaccine is helpful. Yet, not only is influenza vaccination effective in decreasing morbidity and mortality, but it can also save costs.

In order to clarify some of these issues concerning vaccination in patients with COPD, Wongsurakiat and colleagues describe in this issue of CHEST (see page 2011) a 16-month study performed at a university hospital in Thailand. They evaluated the protective effects of a trivalent split-virus vaccine in 62 elderly patients with COPD by analyzing the number and severity of episodes of total acute respiratory illness (ARI), and in episodes of influenza-related ARI, and comparing the results to 63 near-age-matched and sex-matched patients who received placebo. Severity of illness was classified as outpatient treatment, hospitalization, and the need for assisted ventilation. They found that the overall incidence of influenza-related ARI in the vaccinated group was less than one fourth that in the placebo group. The effectiveness of vaccination was not influenced by the severity of COPD (as assessed by FEV1), comorbid diseases, age, gender, or current smoking status. By contrast, as expected, there was no difference in the incidence or severity of total ARI between the vaccinated and placebo groups. A key finding was that none of the vaccinated patients required mechanical ventilation because of influenza-related ARI. By contrast, all the unvaccinated patients with moderate-to-severe COPD who were hospitalized because of influenza-related ARI needed assisted ventilation. The effectiveness of the vaccine was reflected by high antibody rates following vaccination, particularly in response to the influenza A strain. Considering that the burden of influenza-related disease represented by COPD is heavy, the clinical relevance of this investigation is significant.

In addition to the elderly and individuals with chronic illnesses such as COPD, vaccination is recommended for health-care providers and others who might transmit the virus to those at risk. Both the National Asthma Education and Prevention Program and the Centers for Disease Control and Prevention recommend that individuals with asthma receive annual influenza vaccinations. Despite these recommendations, only about 21% and 45%, respectively, of persons with asthma aged 18 to 49 years and 50 to 64 years reported being vaccinated from 1999 to 2001 in National Health Interview Surveys. Influenza is a common disease in children. During epidemics, the attack rates approximate 40% in preschool children and 30% in school-age children. The latter group is the main source that introduces the virus into households. Healthy children < 1 year of age are hospitalized for influenza illness at rates similar to those for high-risk adults. Despite recommendations by professional organizations, one study found that only 9% of children with asthma had received vaccination in the period from 1993 to 1995. In a large, retrospective cohort study, Neuzil et al found that among healthy young children there were excess numbers of hospitalizations for acute cardiorespiratory conditions, outpatient visits, and filling of antibiotic prescriptions during a 20-year period when influenza virus was circulating in the community.

The report of Wongsurakiat and colleagues is particularly timely in light of the recent emergence of a new avian strain of influenza A virus in Asia as a potentially serious epidemic that could have global implications. Thailand is among the countries that initially reported illnesses and deaths resulting from fowl-to-human transmission, which resulted in the government-
decreed slaughter of millions of chickens as the only means of controlling the spread of the virus. Person-to-person transmission of this new, more virulent avian virus, possessing the H5N1 antigenic subtype, has yet to be documented. An antigenic shift resulting from the replacement of the hemagglutinin and sometimes the neuraminidase antigens with novel subtypes that have not been present in human viruses for a long time, however, could lead to increased human susceptibility to infection from birds. The incorporation of the hemagglutinin of the avian virus into that of a more common H3N2 or H1N1 type can lead to interhuman transmission with the potential for a pandemic.16 The identification of a new subtype would require the timely preparation of its corresponding influenza vaccine. This may be problematic in the case of new antigenic variants that may not replicate well in eggs, as was the case with the A/Fujian strain that was in circulation from 2003 to 2004.16 Rapid production of vaccine in mammalian cells could be an alternative, or genetically produced viruses with better growth characteristics in eggs could be another option. Whatever the methods used, the study of Wongsurakiat and colleagues clearly demonstrates the importance of the timely production and administration of vaccine in preventing life-threatening complications in large, susceptible populations.

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Asthma and Obesity
A Real Connection or a Casual Association?

Scientists have long suspected an association between overweight and asthma to be likely,1–4 The common assumption is that weight gain occurs because many asthmatic patients avoid exercise since physical activity can trigger their symptoms. The term overweight was defined as a body mass index (BMI) of 25 to 29.9 kg/m², while obesity was defined as a BMI of ≥ 30 kg/m². Interestingly, during the last 3 decades the incidences of both obesity and asthma have shown a steady raise, with the incidence of asthma more than tripling during that period. Currently, it is estimated that 97 million adults in the United States are overweight or obese and that 5.3% of US adults are affected by asthma. In addition to asthma, obesity substantially raises the risk of mor-