Asthma and Influenza Vaccination

Asthma appears to be a diathesis for morbidity related to influenza infection. Children and adults with asthma are at higher risk for influenza-related adverse health outcomes, including pneumonia, hospitalization for acute respiratory disease, and death.1–3 Because 5 to 10% of the US population has asthma, the potential public health impact of influenza infection on this vulnerable subgroup is enormous.

The National Asthma Education and Prevention Program (NAEPP), coordinated by the National Heart, Lung, and Blood Institute, recently identified influenza vaccination as one of several “key clinical activities that should be considered as essential for quality asthma care.”4 The panel viewed influenza vaccination as so important that it was included among the “core set of 10 key clinical activities” that are aimed at reducing asthma morbidity and mortality.

Given this recent emphasis on influenza vaccination for adults with asthma, the article by Ford and colleagues in the current issue of CHEST (see page 783) provides a timely snapshot of vaccine coverage for this high-risk target group. Using data from the population-based National Health Interview Survey from 1999 to 2001, the investigators found that only about one third of US adults with self-reported physician-diagnosed asthma received influenza vaccine during the past year. Although it appeared that a higher proportion of adults with asthma were being vaccinated than members of the general population (eg, 33.3% vs 25.9% in 2001), these data indicate a widespread failure of clinical care for asthma in the United States. There was also no evidence of improvement of influenza vaccination rates between 1999 and 2001.

Why are so many adults with asthma not being vaccinated for influenza? In part, this appears to be a generic failure to achieve vaccination coverage. The Healthy People 2010 objectives indicate that 90% of adults aged ≥ 65 years should receive annual influenza vaccination, irrespective of chronic conditions.5 Based on the article by Ford and colleagues, the prevalence of vaccination is substantially lower among adults ≥ 70 years old, including both adults with (68.4 to 75.7%) and without asthma (65.0 to 68.6%). Consequently, the failure to vaccinate appears to be part of a general failure to deliver recommended health-care interventions.

There are also some potential barriers to vaccination that may be specific to asthma. In particular, the safety of influenza vaccination in adults with asthma has been debated. A randomized controlled trial6 of influenza vaccine conducted with 262 asthma patients revealed a greater risk of asthma exacerbation, manifested by a ≥ 20% fall in peak expiratory flow rate, in the vaccine group compared to placebo. A larger-scale, randomized controlled trial7 of 2,032 adults with asthma, however, found no evidence of asthma exacerbation after influenza vaccination. Influenza vaccination had no adverse effect on a variety of safety outcomes: peak expiratory flow rate, oral corticosteroid use, bronchodilator rescue therapy, and unscheduled health-care utilization. Further strengthening the case for vaccine safety, a large multicenter cohort study8 of children with asthma found no evidence of adverse asthma health outcomes following influenza vaccination. Although influenza vaccine appears to be safe in patients with asthma, it remains possible that perception of vaccine safety still poses a barrier to vaccination, either among health-care providers or the general public.

The efficacy of influenza vaccine for adults with asthma has also been questioned.9 A systematic review concluded that there was inadequate evidence to evaluate the efficacy of influenza vaccine for persons with asthma.9 In fact, there have been very few randomized controlled trials evaluating influenza vaccine among asthmatics. The existing trials are limited by small sample size, limited statistical power, and inconsistent quality.9 Perhaps the lack of specific randomized control trial data is another explanation for low influenza vaccination coverage.

There is substantial indirect evidence, however, that influenza vaccine is beneficial for persons with asthma. The efficacy of influenza vaccination in healthy adults and elderly adults has been firmly established by randomized controlled trials.2,10–13 Moreover, epidemiologic studies14–16 support the strong protective effect of influenza vaccine in chil-
dren and adults with asthma. Based on the available evidence, one would expect influenza vaccination to be at least as effective, and probably more effective, for adults with asthma as for healthy adults. Coupled with the strong evidence for safety, further clinical trials of influenza vaccine are probably not necessary to establish efficacy among adults with asthma.

In the article by Ford and colleagues, the evaluation of sociodemographic characteristics and influenza vaccination provides indirect insight into potential barriers to immunization among adults with asthma. Male sex, younger age, lower educational attainment, and Hispanic or African-American race/ethnicity were associated with a lower likelihood of vaccination. Although reasons for these associations cannot be ascertained from these published data, possible explanations include access to health care, quality of health care, cost of vaccination, logistical constraints, flexibility of employment, or availability of health information. Previous work also indicates that health-related beliefs, such as the perceived efficacy of influenza vaccination, may have an important impact on a person’s decision to be vaccinated.

In a study of 1,007 older adults, the positive belief that influenza vaccine prevents influenza was associated with a nearly 50% higher probability of being vaccinated. Moreover, concern that influenza vaccine will cause influenza infection, which was stated by 14% of respondents, was associated with a sixfold higher risk of nonvaccination. Further work will be necessary to better understand perceptions of influenza vaccine among adults with asthma.

Recent world events may also have had an impact on the perception of vaccination for influenza and other diseases. The threat of bioterrorism has led the US government to initiate a smallpox immunization program for health-care workers who would care for victims of a terrorist attack. Because of the ominous nature of smallpox, this immunization program has garnered widespread media attention. The recent report of serious adverse cardiac effects and death following smallpox vaccination has caused considerable alarm among the general public. These recent trends could further contribute to the belief that vaccines cause disease and are unsafe. How the recent focus on smallpox vaccination and its possible adverse consequences will affect individual decision making about influenza vaccination remains unknown, but there is potential for already low vaccine coverage to drop even lower.

There are other unanswered questions about influenza vaccination for persons with asthma. The impact of oral corticosteroids, and perhaps high-dose inhaled corticosteroids, on influenza vaccine efficacy is unknown. Although a brief course of oral corticosteroids did not appear to reduce the immunogenicity of influenza vaccine in a study of 19 children, the effect of longer-term corticosteroid use has not been established. Future studies should evaluate this interaction between influenza vaccine and corticosteroid treatment. If corticosteroids impair influenza vaccine effectiveness, then adjunctive treatment with oral anti-influenza medications might be warranted for adults with severe asthma who are exposed to persons with influenza infection.

More generally, the effect of asthma severity on influenza-related respiratory morbidity warrants further study. This information would help health-care professionals target especially high-risk groups with vaccination and postexposure prophylaxis. Although we know that influenza complications preferentially affect young children and older adults, more complete elucidation of the age/morbidity relationship in the intervening years could also help refine intervention strategies for adults with asthma.

Whether the perspective is the individual, the health-care system, or the larger society, influenza vaccine for adults with asthma makes sense. The cost is low, the effectiveness is high, and the safety is well established. The more difficult issue is achieving higher vaccine coverage in this high-risk group. The recent NAEPP statement, because it explicitly identified influenza vaccination as a key quality of care indicator for asthma, places renewed importance on efforts to target the broader population of US adults with asthma for annual vaccination.

Mark D. Eisner, MD, MPH, FCCP
San Francisco, CA

Dr. Eisner is Assistant Professor of Medicine, University of California, San Francisco.

Reproduction of this article is prohibited without written permission from the American College of Chest Physicians (e-mail: permissions@chestnet.org).

Correspondence to: Mark D. Eisner, MD, MPH, FCCP, University of California, San Francisco, 350 Parnassus Ave, Suite 609, San Francisco, CA 94117; e-mail: eisner@itsa.ucsf.edu

REFERENCES

I’m a gift to be simple..."

In the era of electronic ICUs, computer-assisted decision making, and robotic surgical assistants, the words of this classic American hymn are a good reminder to not forget the value of basic, simple maneuvers to improve the care of our patients. In this issue of CHEST (see page 883), Mundy and coworkers have elegantly demonstrated this approach with their study on a simple maneuver—getting patients with community-acquired pneumonia (CAP) out of bed, either into a chair or ambulating within 24 h of admission. The result was an impressive average 1.1-day decrease in the length of hospitalization. The most impressive difference in length of stay for the early ambulation group was in patients with a pneumonia severity index (PSI) class III.1 Average hospital length of stay in this group decreased from a mean of approximately 7.5 days to a mean of 5 days. The lack of benefit in the lower acuity PSI classes probably results from the primarily psychological and social reasons for hospital admission.1,2

This article adds to the complementary group of studies suggesting simple procedures, such as patient positioning, decrease the risk of developing respiratory infections or hasten the recovery from them. Drakulovic et al3 demonstrated that keeping the head of the bed elevated in patients receiving mechanical ventilation significantly decreased the incidence of ventilator-associated pneumonia. Multiple studies have demonstrated that early ambulation or at least getting up into a chair decreases the risk of postoperative pneumonia and atelectasis.4

Several physiologic benefits of early upright posture can be hypothesized. Gravitational changes may improve drainage from upper-lobe pneumonias, while greater diaphragm excursion and increased volume changes in lower lobes may improve secretion clearance in lower-lobe pneumonias. The improved cough efficacy in the upright position due to a greater ability to increase intra-abdominal pressure may also contribute. Ambulation will amplify all of these changes. The net benefit may be earlier improvement in oxygenation, a major criteria in the discharge decision.5,6

It is tempting to attribute the decrease in average length of stay with early mobilization to physiologic benefits; however, other factors may play an equal or more important role. The significant variability in physician practice regarding the discharge decision for CAP is well documented but poorly understood. PSI class III patients are generally bimodal—either younger patients with significant physiologic abnormalities or elderly patients with underlying comorbidities. The latter group is where the most benefit is most likely occurring. The attending physician who sees an afebrile elderly CAP patient walking the hall or sitting up eating a meal is more likely to consider discharge than if the same patient is seen still supine in bed. Conversely, the benefit may be on the patient’s psyche. If they realize they are well enough to get out of bed, patients may be more likely to press their physician for early discharge or at least not resist when the physician suggests discharge.

No matter what the reason, the findings are compelling enough to recommend early mobilization as a part of any standard admit orders or clinical pathway for hospitalized patients with CAP.7,8

References


www.chestjournal.org