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Issue No. 6, February 2006, is part of a 12-part CME/CE activity (September 2005 – August 2006).

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Applicants will receive a certificate of participation from PPS by return mail within 6 to 8 weeks of the date of receipt of the completed evaluation/registration form.

Learning Objectives

After studying the literature presented in this Pediatric Respiratory Care series, participants will be able to:

- Identify respiratory disorders in pediatric patients
- Summarize risk factors for respiratory disorders in pediatric patients
- Select an appropriate therapeutic regimen for patients with pediatric respiratory disorders

Target Audience

This educational activity is designed for pediatricians, primary care physicians, pediatric and family nurse practitioners, neonatologists, infectious disease specialists, allergists, pulmonologists, immunologists, and other healthcare professionals involved in the care and management of pediatric respiratory patients.

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Empirical antiviral treatment offers better health outcomes and cost efficiency

Primary care physicians face several decisions when managing care for a child displaying influenza-like illness. Although treatment can shorten the duration of the illness and prevent complications, antiviral drugs can be expensive and may carry the potential for adverse effects. In addition, antiviral treatment is only effective if the child is treated within

48 hours of illness

onset. Many viral infections mimic influenza, further complicating the situation. Although rapid testing methods can aid diagnosis, these

methods are expensive and can result in false negative findings.

In an attempt to clarify and facilitate the decision-making process, Rothberg and colleagues constructed a decision model based on published data to determine the cost-effectiveness of rapid testing and antiviral therapy for children of varying ages who demonstrated influenza-like symptoms. Outcome measures were costs and quality-adjusted life years (QALYs) saved.* Healthy children aged 2, 7, and 15 years were con-

sidered representative of toddlers, children, and adolescents, respectively. All analyses were performed twice to differentiate between vaccinated and unvaccinated children.

For all age groups, empirical therapy with antiviral medication resulted in the greatest benefit. Compared with no treatment, antiviral therapy improved quality-adjusted life expectancy by 0.003 QALY

because of shortening of illness duration and prevention of complications such as otitis media. In cases where influenza A predominated, empirical amantadine therapy (**Note:** see page 2, this drug

is no longer recommended because of high level resistance of influenza A in 2006) provided the best outcomes and was also the least expensive approach for children younger than 15 years of age. In seasons when influenza B was common, empirical oseltamivir replaced amantadine as the least expensive option in children 2 years of age.

Empirical treatment of older children with oseltamivir was less cost effective because these children require larger doses of medication based on their increased weight

“For all age groups, empirical therapy with antiviral medication resulted in the greatest benefit.”

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Disclosures:

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Influenza Update **CDC advises against use of** **two antivirals for 2005–2006** **influenza season**

Antiviral drugs for influenza are an adjunct to annual vaccination for the prophylaxis and treatment of influenza. Currently two major classes of antiviral agents, the adamantanes (amantadine and rimantadine) and the neuraminidase inhibitors (oseltamivir and zanamivir), are effective against influenza A viruses. Antiviral testing results on influenza A viruses circulating among people in the United States during the 2005–2006 season indicate that a high proportion of currently circulating virus isolates (91%) contain an amino acid change at position 31, which confers resistance to the adamantanes.

Based on this information, CDC issued a Health Alert Network advisory on January 16, 2006, recommending against the use of amantadine and rimantadine for the treatment or prophylaxis of influenza during the 2005–2006 influenza season. During this period, oseltamivir or zanamivir should be selected when antiviral drug therapy is warranted.

Monitoring of 2005–2006 influenza isolates for resistance to influenza antiviral medications is ongoing, and recommendations will be updated as needed. For updates and detailed information on indications for use of antiviral agents in influenza treatment and prophylaxis, dosage, and adverse effects and contraindications (all agents are pregnancy Category C), visit www.cdc.gov/flu.

Centers for Disease Control and Prevention. High levels of adamantane resistance among influenza A (H3N2) viruses and interim guidelines for use of antiviral agents—United States, 2005–06 influenza season. *MMWR Morb Mortal Wkly Rep*. 2006;55(02):44–46.

Empirical antiviral treatment offers better health outcomes and cost efficiency

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compared with those children 2 years of age. The probability of influenza, the cost and specificity of the rapid antigen test, influenza morbidity, costs of workdays lost, and cost of oseltamivir affected the choice of an antiviral in children older than 3 years. Rapid influenza testing was not found to be helpful regardless of influenza type. Testing was found to be more expensive and less effective than empirical therapy.

Overall, vaccinated children had lower associated costs and better health outcomes than nonvaccinated children, regardless of the chosen strategy. Thus, the authors suggest that empirical antiviral

treatment of children can provide a cost-effective approach to treating influenza. Empirical treatment may actually exhibit additional benefits that were not evident in this study. Such benefits include decreased hospitalizations and decreased transmission of influenza to other persons.

*QALY is defined as the equivalent of a completely well year of life or a year of life free of any symptoms, problems, or health-related disabilities.

Rothberg MB, Fisher D, Kelly B, Rose DN. Management of influenza symptoms in healthy children. *Arch Pediatr Adolesc Med*. 2005;159:1055–1062.

COMMENTARY

ROBERT B. BELSHE, MD, Diane and J. Joseph Adorjan Endowed Professor of Infectious Diseases and Immunology, Professor of Medicine, Pediatrics and Molecular Microbiology, Saint Louis University School of Medicine, St. Louis, Missouri.

The study by Rothberg and colleagues examined the cost-effectiveness of empirical therapy with antiviral treatment of children with suspected influenza and found amantadine more cost effective than oseltamivir. However, in view of the recent data from the Centers for Disease Control and Prevention indicating that more than 90% of influenza A is resistant to amantadine, the more expensive drug (oseltamivir) should be selected for the treatment of influenza. For children presenting with influenza-like illness during a confirmed local influenza outbreak, oseltamivir treatment offered the best outcome. Viral diagnostic testing was valuable in determining when influenza was present in the population, but was less effective in determining individual subjects with influenza because the tests lack 100% sensitivity.

Should healthy children be vaccinated against influenza?

In Europe vaccination of children 6 to 23 months of age is not currently recommended. However, influenza is associated with excess morbidity, increased numbers of office visits to treat acute respiratory disease, bacterial complications, and increased hospitalizations for infants and younger children. Influenza illness exerts a considerable socioeconomic impact on the families and the public. The presence of such a substantial pediatric disease burden raises the question of whether all healthy children should be vaccinated. Historically, pediatric vaccination has been recommended only for those at increased risk of complications. In the United States

annual influenza vaccination is now recommended for all children 6 to 23 months of age unless specifically contraindicated. A recent paper by Heikkinen and colleagues examined the pros and cons of a universal vaccination program for children.

The problems inherent in widespread vaccination are many and diverse:

- Adding additional injections to already tight routine vaccination schedules may be challenging.
- Requiring vaccine administration just before the expected epidemic means only a small proportion of vaccinations could be performed during well-baby visits.

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“Children younger than 3 years should be considered a high-risk group and accordingly, vaccination should be recommended to all children aged 6 months to 3 years.”

PRCI MISSION STATEMENT

The PRCI is a multicomponent educational program on pediatric respiratory disorders designed for pediatricians, primary care physicians, pediatric and family nurse practitioners, neonatologists, infectious disease specialists, allergists, pulmonologists, immunologists, and other healthcare professionals involved in the care and management of pediatric respiratory patients. PRCI programs address issues concerning asthma, respiratory syncytial virus, and other respiratory tract infections and disorders. Methods to prevent, control, and treat respiratory illnesses in children are also evaluated.

Should healthy children be vaccinated against influenza?

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- Requiring 2 doses, at least 1 month apart, for the initial year of vaccinations in children under 9 years of age is key.
- Licensing for inactivated influenza vaccine currently is only for children older than 6 months, and thus could not be offered to young infants who, ironically, are at the highest risk for hospitalization.
- Overcoming perception that vaccination may be pointless because, even with annual attack rates of 20% to 30%, the majority of children remain free of infection.

Variability in severity during different epidemics, along with potential mismatches between circulating strains and the available vaccine, may also decrease parental willingness to vaccinate children. Vaccine shortages are another concern. However, perhaps the greatest obstacle may be the poor appreciation of the potential severity of influenza among health professionals and the general public.

The pros to vaccination are also many and varied; foremost are that the vaccine

- Would reduce rates of influenza illness and its associated complications
- Has documented efficacy between 66% and 91%
- Is well tolerated, safe, and low-cost.

Implied in these items is a decrease in hospitalizations and overall office visits. Although indirect effects of vaccination

would be difficult to estimate, it is assumed that a reduction in child illness would translate into reductions in parental work loss, which is a major portion of the total costs associated with pediatric influenza. Widespread vaccination could also result in decreased morbidity and mortality in other age groups by reducing transmission from children to other children, family members, and other age groups in the community, especially the older population.

The authors recommend that children younger than 3 years should be considered a high-risk group and accordingly, vaccination should be recommended for all children aged 6 months to 3 years. For older healthy children, more research is required to examine the burden of illness, impact on other age groups, and cost-effectiveness. In the United States, live attenuated vaccine is available to all healthy children older than 5 years of age, and this strategy is an important alternative to the inactivated vaccine. In summary, education of physicians and parents about the impact of pediatric influenza is imperative.

Heikkinen T, Booy R, Campins M, et al. Should healthy children be vaccinated against influenza? A consensus report of the Summits of Independent European Vaccination Experts. *Eur J Pediatr*. 2005;Dec 21:1-6.

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