

FROM THE FAMILY PRACTICE INQUIRIES NETWORK

TYPE I CLINICAL INQUIRIES**Are antibiotics effective in preventing pneumonia for nursing home patients?****■ EVIDENCE-BASED ANSWER**

Antibiotics should not be used for prophylaxis of pneumonia in nursing homes. We found no studies testing the effectiveness of antibiotics in preventing pneumonia in any population, including persons with predisposing conditions such as influenza. Three measures effectively prevent pneumonia in nursing home patients: influenza vaccination of residents (strength of recommendation [SOR]: **B**, based on systematic review of homogenous cohort observational studies); influenza vaccination of caregivers (SOR: **B**, based on individual randomized controlled trial); pneumococcal vaccination of residents (SOR: **B**, based on randomized, nonblinded clinical trials and consistent case-control studies).

Two other suggested interventions have not been extensively tested: antiviral chemoprophylaxis during an influenza outbreak in the nursing home, and oral hygiene programs for nursing home residents.

■ EVIDENCE SUMMARY

Overuse of antibiotics is already a problem in nursing homes. A large portion of bacterial pneumonia in the nursing home population results from aspiration of oropharyngeal bacteria, which is more likely to be drug-resistant if the resident has been on antibiotics.¹ We found no studies that testing antibacterial agents for prevention of pneumonia in nursing home patients. However,

3 measures are clearly helpful in preventing pneumonia in nursing home patients:

1) *Influenza vaccination of residents*: A meta-analysis of 20 cohort studies showed a 53% efficacy (95% confidence interval [CI], 35–66)—defined as 1 minus the odds ratio—for influenza immunization in preventing pneumonia.²

2) *Influenza vaccination of caregivers*: A cluster randomized trial in British long-term care facilities demonstrated that influenza vaccination of health care workers (61% of 1078 workers) reduced the total nursing home mortality rate (odds ratio [OR]=0.56 [95% CI, 0.4–0.8]) for a drop in mortality rate from 17% to 10% (number

What are Clinical Inquiries?

Clinical Inquiries answer recent questions from the practices of family physicians. Practicing family physicians choose the most relevant questions submitted through a web-based voting system operated by the Family Physicians Inquiries Network (FPIN; online at www.fpin.org).

FPIN is national, not-for-profit consortium of family medicine departments, community residency programs, academic health sciences libraries, primary care practice-based research networks, and other specialists. Once questions are selected, FPIN editors then organize teams of clinicians and librarians to answer them based on systematic review of the world literature.

Answers are developed through an explicit, systematic method:

- FPIN librarians and editors identify questions recently answered in best evidence sources (e.g. Cochrane Reviews, Clinical Evidence, the US Preventive Services Task Force, Evidence Based Guidelines, a published systematic review).
- FPIN librarians then conduct systematic and standardized literature searches of best evidence sources, Medline, and other databases in collaboration with an FPIN clinician or clinicians. If a best evidence source has been identified, the search begins from the date of the search conducted for that source. Otherwise, the searches are comprehensive.
- FPIN clinician authors then choose the highest quality original research sources, and critically appraise the research and integrate the findings in the Evidence Based Answer and Evidence Summary section of Clinical Inquiries. Authoritative sources are also quoted in the "Recommendations from Others" section of the Clinical Inquiry.
- Each Clinical Inquiry is reviewed by 4 or more peers or editors before publication in *JFP*.
- FPIN medical librarians are accountable for the thoroughness of the literature search, for recording the databases searched, search hedges used and the search terms. The details of each search is available to any interested reader (contact managingeditor@fpin.org).
- Finally, a practicing family physician or other clinician writes an accompanying commentary to provide a clinical perspective.

TABLE

Available treatment and prophylactic regimens for influenza

Drug name	Regimen for treatment*	Regimen for prophylaxis†	Comments	Cost‡
Oseltamivir (Tamiflu)	75 mg orally twice daily for 5 days	75 mg orally once daily for >7 days	Influenza A and B	10 tabs \$59.99 (no generic)
Rimantidine (Flumadine)	100 mg orally twice daily (100 mg orally once daily in elderly)	100 mg orally twice daily (100 mg orally once daily in elderly)	Influenza A only	14 tabs \$33.45 (no generic)
Amantadine (Symmetrel)	100 mg orally twice daily (100 mg orally once daily in elderly)	100 mg orally twice daily (100 mg orally once daily in elderly)	Influenza A only (consider lower doses in debilitated patients)	60 tabs \$75.58 (brand), \$18.99 (generic)
Zanamivir (Relenza)	2 inhalations (10 mg) every 12 hours for 5 days	Not indicated	Influenza A and B (inhalations may be difficult to administer to debilitated patients)	20 inhalation doses \$54.41 (no generic)

Source: Epocrates RX: Online and PDA-Based Reference, June 12, 2004.
 * Start treatment within 48 hours of onset of symptoms.
 † Start prophylaxis immediately or within 48 hours of exposure.
 ‡ Approximate retail price from www.drugstore.com, June 2004.

needed to treat [NNT]=14.3).³

3) *Pneumococcal vaccination of residents*: This evidence was reviewed in a prior Clinical Inquiry.⁴ The evidence comes primarily from 2 clinical trials in which the NNT to prevent 1 episode of pneumonia was about 35.

Two other proposed interventions require further study to evaluate their role in prophylaxis. Antiviral prophylaxis to prevent pneumonia during nursing home outbreaks of influenza has not been evaluated in controlled trials. Observational studies strongly suggest that amantadine, rimantadine, and oseltamivir are all effective in reducing spread of influenza during outbreaks in nursing homes (Table). Oseltamivir acts against influenza B as well as A and has fewer side effects, but it is more expensive.^{5,6} Presumably, decreasing the rate of influenza also reduces the rate of subsequent pneumonia.

Oral hygiene programs for nursing home residents may also reduce pneumonia. In a single study, 366 patients in 11 Japanese nursing homes were divided into controls (self-care) and those treated with rigorous oral care (by staff). The intervention group had a relative risk of 0.6 (95% CI, 0.36–0.99; NNT=12.5) for pneumonia over a 2-year period.⁷ The NNT for preventing a death by pneumonia was 11 ($P<.01$). This intriguing result merits follow up in larger groups in US nursing homes to see if this approach is feasible.

■ RECOMMENDATIONS FROM OTHERS

There are no recommendations about the use of antibiotic prophylaxis for pneumonia in either the nursing home or in the outpatient settings; however, there are clear recommendations against the overuse of antibiotics.⁸

The CDC Advisory Committee on Immunization

CONTINUED

Practices (ACIP) recommends:

- annual influenza vaccine for persons residing in nursing homes⁹
- annual influenza vaccine for health care workers in long-term care facilities⁹
- pneumococcal vaccine for persons residing in a nursing home (the schedule for an immunocompetent adult is a single dose, followed by a booster after age 65 if the first dose was before age 65, or after 5 years for persons <65 years with compromised immune status)¹⁰
- chemoprophylaxis for influenza outbreaks in nursing homes.¹¹

David R. Mouw, MD, PhD, John P. Langlois, MD, MAHEC Family Practice Residency Program, Asheville, NC, Department of Family Medicine, University of North Carolina at Chapel Hill; Linda F. Turner, MSLS, MAHEC Health Sciences Library, Asheville, NC

■ CLINICAL COMMENTARY

Prevention is key for reducing pneumonia mortality

Pneumonia is one of the most common causes of death for nursing home patients. While pneumonia can present with the classic fever, productive cough, and air hunger, it often presents with such nonspecific findings as altered mental status or mild tachypnea, which can significantly delay diagnosis. Additionally, many older adults poorly tolerate the metabolic demands of the disease and become critically ill very rapidly. Thus, prevention remains a key strategy for reducing mortality. Nursing home policies that facilitate vaccination and reduce disease transmission are critically important in this regard.

Jon O. Neher, MD, Valley Medical Center, Renton, Wash

REFERENCES

1. Yamaya M, Yanai M, Ohru T, Arai H, Sasaki H. Interventions to prevent pneumonia among older adults. *J Am Geriatr Soc* 2001; 49:85–90.
2. Gross PA, Hermogenes AW, Sacks HS, Lau J, Levandowski RA. The efficacy of influenza vaccine in elderly persons. A meta-analysis and review of the literature. *Ann Intern Med* 1995; 123:518–527.
3. Potter J, Stott DJ, Roberts MA, et al. Influenza vaccination of health care workers in long-term-care hospitals reduces the mortality of elderly patients. *J Infect Dis* 1997; 175:1–6.
4. McCormack O, Meza J, Martin S, Tatum P. Is pneumococcal vaccine effective in nursing home patients? *J Fam Pract* 2003; 52:150–154.
5. Arden NH, Patriarca PA, Fasano MB, et al. The roles of vaccination and amantadine prophylaxis in controlling an outbreak of influenza A (H3N2) in a nursing home. *Arch Intern Med* 1988; 148:865–868.
6. Parker R, Loewen N, Skowronski D. Experience with oseltamivir in the control of a nursing home influenza B outbreak. *Can Commun Dis Rep* 2001; 27:37–40.
7. Yoneyama T, Yoshida M, Ohru T, et al. Oral care reduces pneumonia in older patients in nursing homes. *J Am Geriatr Soc* 2002; 50:430–433.
8. Strassbaugh LJ, Crossley KB, Nurse BA, Thrupp LD. Antimicrobial resistance in long-term care facilities. *Infection Control and Hospital Epidemiology* 1996; 17:129–140.
9. Prevention and control of influenza: recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR Recomm Rep* 1999; 48(RR-4):1–28.
10. Prevention of Pneumococcal Disease: recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR Recomm Rep* 1997; 46(RR-8):1–24.
11. Bridges CB, Fukuda K, Uyeki TM, Cox NJ, Singleton JA; Centers for Disease Control and Prevention, Advisory Committee on Immunization Practices. Prevention and Control of Influenza. Recommendations of the Advisory Committee on Immunization Practices. *MMWR Recomm Rep* 2002; 51(RR-3):1–31.

What is the best way to evaluate and manage diarrhea in the febrile infant?

■ EVIDENCE-BASED ANSWER

Routine infant diarrhea requires no lab work or cultures (strength of recommendation [SOR]: **C**); the degree of dehydration can be determined reliably by percent body weight change (SOR: **B**). However, bicarbonate may help rule out dehydration (SOR: **B**); electrolytes and blood urea nitrogen may be useful in evaluating complicated diarrhea with severe dehydration or when intravenous fluids are required; stool cultures are indicated for bloody or prolonged diarrhea, suspected food poisoning, or recent travel abroad (SOR: **C**).

Oral rehydrating solution is adequate fluid replacement for diarrhea associated with mild to moderate dehydration, followed by prompt refeeding with an age-appropriate diet (SOR: **A**); intravenous fluids are recommended for severe

CONTINUED