

Influenza-Like Illness Diagnosis and Management in the Acute Care Setting

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Abstract: During influenza season, acute respiratory illness due to influenza is difficult to distinguish from other influenza-like illnesses, but testing should be reserved for situations when timely results will influence management or infection control measures. Immunization status and timing of disease onset notwithstanding, a neuraminidase inhibitor should be offered immediately for certain high-risk children; neuraminidase inhibitor treatment should be considered if shorter illness is warranted or an at-risk sibling may be protected. Antipyretics and cough control may be useful. Immunization with an age-appropriate dose of an inactivated influenza vaccine is the cornerstone of prevention for health care personnel and our patients.

Key Words: influenza, influenza-like illness, acute respiratory illness, immunization

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TARGET AUDIENCE

This CME activity is intended for physicians who care for children. Physicians and allied health professionals working in emergency and pediatric emergency departments, urgent care and pediatric urgent care centers, as well as pediatric and family medicine primary care practices will find this article helpful.

LEARNING OBJECTIVES

After completion of this article, the reader should be able to:

1. Identify how to diagnose influenza and differentiate it from other causes of influenza-like illness.
2. Understand the different treatment and management options for influenza.
3. Understand methods for protecting oneself and one's patients from the spread of influenza.

Everyone who has worked in an acute care setting through even one of the annual winter-spring spikes in patient volume fears and loathes influenza disease and the other illnesses that present with similar acute respiratory symptoms (ie, influenza-like illnesses [ILI]). Effler¹ points out that “Every year is an influenza

pandemic for children.” That is, each winter, 10% to 40% of children are infected with influenza, an attack rate similar to that reported for children during the 2009 H1N1 pandemic.^{2,3} The large number of infections and the virulence of certain strains lead to the pediatric burden of seasonal influenza disease: a large number of hospitalizations, emergency department visits, and outpatient visits among children.^{4,5}

This article is designed to serve as a practical review for acute care health care professionals trying to stay afloat in the annual tsunami of febrile coughing children. We will focus on patient diagnosis and treatment as well as on preventing influenza in yourself and others. The questions posed are meant to represent the questions that might run through your head as you are seeing your twenty-third patient with ILI.

BACKGROUND

Question

What are the key facts on influenza epidemiology? (Note: This is included in the American Board of Pediatrics “Content Outline” for General Pediatrics, but not Pediatric Emergency Medicine).

Influenza virus causes disease worldwide. Importantly, influenza type A viruses may infect both humans and animals, but humans are the only known reservoir of influenza types B and C. There is no chronic carrier state. Adults can transmit influenza from the day before symptom onset to approximately 5 days after symptoms begin; children can transmit the virus for 10 or more days. People spread the virus via secretions spewed when coughing or sneezing. Large virus-laden droplets (>5 μm in diameter) settle on the upper respiratory tract mucosa of susceptible persons who are within 6 f. of infected persons.⁶ Alternatively, the virus is spread indirectly when a susceptible host touches a contaminated surface and autoinoculates his eyes, nose, or mouth.⁷ Influenza A virus can survive on hard, nonporous surfaces (eg, doorknobs, keyboards, pens) for 24 to 48 hours and on porous materials (eg, cloth, paper) for less than 8 to 12 hours in ambient temperatures⁸ and much longer if the surface is moist or wet.⁹

Unlike tropical areas where influenza occurs all year, in the United States, peak influenza activity usually occurs in February (14 of the past 34 seasons), followed by December (7 seasons), March (6 seasons), and January (5 seasons).¹⁰ The Influenza Division of the Centers for Disease Control and Prevention (CDC) prepares a weekly influenza surveillance report regarding influenza activity in the United States. The most recent US flu activity map is available at <http://www.cdc.gov/flu/weekly/usmap.htm>.

Question

My patient's mother just asked me, “If it isn't the flu, what could it be?” What viruses cause acute respiratory illness other than influenza?

Several respiratory infections cause a syndrome clinically indistinguishable from influenza. A succinct review of these has previously been published in *Pediatric Emergency Care*.¹¹ A few examples of viruses that cause such respiratory infections can be found in Table 1.

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The authors and staff in a position to control the content of this CME activity and their spouses/life partners (if any) have disclosed that they have no financial relationships with, or financial interest in, any commercial organizations pertaining to this educational activity.

Dr. Humiston has disclosed that the U.S. Food and Drug Administration has not yet approved the use of intravenous zanamivir as discussed in this article. It is an investigational product that, according to CDC's Advisory Committee on Immunization Practices, “may be obtained on a compassionate use basis for seriously ill children, especially those who are immunocompromised or cannot tolerate or absorb orally or enterically administered oseltamivir.”

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TABLE 1. Viruses Other Than Influenza That Cause Pediatric Febrile Respiratory Illness (ie, ILI)

Name	Disease	Seasonality	Notes
Respiratory syncytial virus (RSV)	Major cause of lower respiratory tract disease (specifically bronchiolitis and pneumonia) in children before their first birthday	The incidence of RSV infection generally peaks between January and March.	Children are at increased risk for a more severe course of illness if they have a history of prematurity or underlying cardiac/respiratory disorders.
Human metapneumovirus (HMV)	Produces a disease spectrum much like that of RSV including upper respiratory tract infections, bronchiolitis, and pneumonia. Mean and median ages of HMV infection range from 6-20 mo, slightly older than for RSV, but like RSV. There is an association between HMV infection and subsequent development of wheezing.	In areas with a temperate climate, disease activity increases from December to May with peaks in March and April, slightly after that of RSV.	Approximately 3/4 of children will be seropositive by 5 y, and >90% will be seropositive by 10 y. Not surprisingly, children who attend day care are at increased risk of infection.
Adenovirus	Causes several different syndromes including upper and lower respiratory tract disease, keratoconjunctivitis, hemorrhagic cystitis, and gastroenteritis with diarrhea. The diarrhea often accompanies the respiratory tract symptoms.	The winter seasonal peak can be followed by a second peak in spring/summer.	
Parainfluenza viruses types 1 to 4	Primarily known as the cause of croup, but up to 15% of bronchiolitis/pneumonia can be attributed to this	Late fall/winter peak	
Human coronaviruses*	Human coronavirus NL63, first described in 2004, can cause fever and LRI, but usually causes URI. Coinfections are commonly reported.	Seasonal peaks from January to March in temperate climates	Human coronavirus HKU1, also relatively newly described, causes URI and LRI in children <2 y. HKU1 also has been associated with febrile seizures.
Human bocavirus (HBoV)	Studies have shown that bocavirus causes both URI and LRI. It seems to be a relatively common pediatric respiratory virus with a disease spectrum similar to that of RSV and HMV.	Most authors in temperate climates have observed a higher occurrence of HBoV detections during the winter and spring months.	HBoV, a recently discovered type of parvovirus, is frequently a copathogen.

*Other than the severe acute respiratory syndrome (SARS) coronavirus.

LRI indicates lower respiratory infection; URI, upper respiratory infection.

Question

I am seeing *so many* kids with fever and malaise... I am worried that I will get lax and miss something important. What might I miss?

Of course, you do not want to become so jaded that you miss a child with serious dehydration or poor oxygenation because you walk into the room assuming that this is “only the flu.” In addition, be alert to signs of meningitis, which can be mistaken for influenza, especially in the early stages. In at least 1 study, there was a significant increase in meningococcal disease among patients with serological evidence of recent influenza A infection,¹² so encourage parents to return or to see the primary care provider if there are signs of deterioration.

Question

What signs and symptoms are most predictive of influenza?

A prospective study across 2 influenza seasons in 2 metropolitan areas of Taiwan showed that fever, cough, rhinorrhea, sneezing, and nasal congestion were significant predictors for influenza infection. The combination of fever plus cough had the best sensitivity (86%), but the combination of fever plus cough and sneezing had the best specificity (77%).¹³

INFLUENZA TESTING

In September 2016, the American Academy of Pediatrics (AAP) Committee on Infectious Diseases published their Recommendations for Prevention and Control of Influenza in Children, 2016–2017.¹⁴ This policy statement will be referred to frequently throughout the remainder of this review.

Question

What do I need to know about the influenza tests?

As the saying goes, “We offer three kinds of service: good, fast, cheap: pick any two.” Antigen detection through direct and indirect immunofluorescence assays (processed in 1–4 hours) and rapid influenza diagnostic tests (processed in less than 30 minutes) are widely available and relatively inexpensive, but their sensitivity varies widely. That is, not all tests reliably identify positives as positives. In contrast, rapid influenza molecular assays — although also widely available — are costly, but their ability to reliably correctly identify positives is high. An excellent table reviewing the characteristics of the influenza tests is available at the *Pediatrics* Web site (<http://pediatrics.aappublications.org/content/early/2016/09/01/peds.2016-2527.figures-only>).

Question

Who should be tested?

The AAP recommendations state that testing should be performed “when timely results will be available to influence clinical management or infection control measures,” but emphasize that antivirals should not be withheld while waiting for a definitive influenza test result because early, rather than delayed, treatment yields better outcomes.¹⁴ As noted previously, commonly used influenza testing is fraught with great potential for false-negatives, so you may choose not to test patients you plan to treat irrespective of their test results. Rather than overrelying on test results, you are invited to use clinical judgment based on the patient's medical history, presenting disease onset and severity, and local influenza activity.

ANTIVIRAL TREATMENT AND CHEMOPROPHYLAXIS

Question

I am admitting a pediatric asthma patient who is getting worse on his third day of this ILI. His mother thinks he was vaccinated against influenza. His influenza test is not back and it may not be back soon. Given the wait for a bed, it may take a while to transfer him. Should I treat him with an antiviral now?

- **Age**
 - Children aged <2 years
 - Adults aged ≥65 years
- **Chronic illness**, including disorders of any of the following organ systems
 - Chronic pulmonary (including asthma)
 - Cardiovascular (except hypertension alone)
 - Renal
 - Hepatic
 - Hematologic (including sickle cell disease)
 - Metabolic disorders (including diabetes mellitus)
 - Neurologic and neurodevelopment conditions [including disorders of the brain, spinal cord, peripheral nerve, and muscle such as cerebral palsy, epilepsy (seizure disorders), stroke, intellectual disability, moderate to severe developmental delay, muscular dystrophy, or spinal cord injury]
- **Immunosuppression**, including that caused by medications or by HIV infection
- **Pregnancy or postpartum status** (within 2 weeks after delivery)
- **Long-term aspirin therapy** among persons aged <19 y
- **AIAN**: American Indian/Alaska Native persons
- **Residency** in a nursing home or other chronic care facility

FIGURE 1. Conditions that put people at high risk of influenza complications.

The AAP Committee on Infectious Diseases stresses that regardless of influenza immunization status or whether the onset of illness has been greater than 48 hours, treatment *should be offered* as early as possible for 3 groups of children: those (1) hospitalized with presumed influenza disease; (2) hospitalized for severe, complicated, or progressive illness attributable to influenza; and (3) with presumed influenza (of any severity) and at high risk of complications. (See Fig. 1 for a list of conditions that put a person at high risk.)

Question

This patient with ILI has no underlying risk factor and does not have serious disease. Should I treat her with an antiviral? If so, should I wait for definitive influenza test results?

The AAP states that treatment *should be considered* for otherwise healthy children with presumed influenza under certain circumstances: (1) Shorter illness is warranted — an otherwise healthy child with presumed influenza may be treated if the team believes a decrease in duration of clinical symptoms is warranted. Although treatment within 48 hours of illness onset will yield the greatest effect, treatment still should be considered if the patient presents later. (2) At-risk sibling — an otherwise healthy child with presumed influenza may be treated if siblings either (a) are younger than 6 months or (b) have underlying medical condition(s) that predispose them to complications of influenza. (Fig. 1

shows a list of conditions that put a person at high risk.) Your clinical decision to give an antiviral need not be delayed until definitive influenza test results come back. Instead, the antiviral should be started as soon after disease onset as possible to provide the best outcome.

Question

Which antiviral should I prescribe for the management of influenza infection?

Two neuraminidase inhibitors (NAIs) are recommended for use in children, oseltamivir and zanamivir. (Another NAI, peramivir, was licensed for use in persons 18 years or older but has not been studied fully in children.) At this time, oral oseltamivir (Tamiflu) remains the antiviral of choice for the management of influenza. Inhaled zanamivir (Relenza) is equally effective, but oseltamivir is less difficult to administer. In August 2016, the

US Food and Drug Administration (FDA) approved the first generic version of oseltamivir since it was first approved in 1999. Key issues regarding oseltamivir include the following:

- **Dosage?** A useful table reviewing the recommended dosage and schedule of influenza antiviral medications for treatment and chemoprophylaxis for the 2016–2017 influenza season is included (Table 2). In addition, the CDC posts a table of NAIs dosages, “Recommended Dosage and Duration of Influenza Antiviral Medications for Treatment or Chemoprophylaxis” (<http://www.cdc.gov/flu/professionals/antivirals/summary-clinicians.htm#dosage>).
- **Double dose?** A randomized, prospective trial that included primarily pediatric subjects showed no benefit of double-dose over standard dose oseltamivir.¹⁵
- **Got liquid?** Oseltamivir is manufactured as a capsule and as a liquid with a concentration of 6 mg/mL. If supplies of

TABLE 2. Recommended Dosage and Schedule of Influenza Antiviral Medications for Treatment and Chemoprophylaxis for the 2016–2017 Influenza Season: United States

Medication	Amount per Dose	Frequency of Doses	
		Treatment (5 days)	Chemoprophylaxis (10 days)
Oseltamivir*			
Adults	75 mg	Twice daily	Once daily
Children aged ≥12 mo			
Body weight:			
≤15 kg (≤33 lb)	30 mg	Twice daily	Once daily
>15–23 kg (33–51 lb)	45 mg	Twice daily	Once daily
>23–40 kg (>51–88 lb)	60 mg	Twice daily	Once daily
>40 kg (>88 lb)	75 mg	Twice daily	Once daily
Infants aged 9–11 mo [†]	3.5 mg/kg per dose	Twice daily	Once daily
Term infants aged 0–8 mo [†]	3.0 mg/kg per dose	Twice daily	Once daily for infants 3–8 mo; not recommended for infants <3 mo unless situation is judged critical because of limited safety and efficacy data in this age group
Preterm infants		See details [‡]	
Zanamivir[§]			
Adults	10 mg (2 5-mg inhalations)	Twice daily	Once daily
Children (≥7 y for treatment, ≥5 y for chemoprophylaxis)	10 mg (2 5-mg inhalations)	Twice daily	Once daily

*Oseltamivir is administered orally without regard to meals, although administration with meals may improve gastrointestinal tolerability. Oseltamivir is available as Tamiflu in 30-, 45-, and 75-mg capsules and as a powder for oral suspension that is reconstituted to provide a final concentration of 6 mg/mL. For the 6-mg/mL suspension, a 30-mg dose is given with 5 mL oral suspension, a 45-mg dose is given with 7.5 mL oral suspension, a 60-mg dose is given with 10 mL oral suspension, and a 75-mg dose is given with 12.5 mL oral suspension. If the commercially manufactured oral suspension is not available, a suspension can be compounded by retail pharmacies (final concentration is also 6 mg/mL), based on instructions that are present in the package label. In patients with renal insufficiency, the dose should be adjusted on the basis of creatinine clearance. For the treatment of patients with creatinine clearance of 10–30 mL/min: 75 mg, once daily, for 5 d. For chemoprophylaxis of patients with creatinine clearance of 10–30 mL/min: 30 mg, once daily, for 10 d after exposure or 75 mg, once every other day, for 10 d after exposure (5 doses). See <http://cdc.gov/flu/professionals/antivirals/antiviral-drug-resistance.htm>.

[†]Approved by the FDA for children as young as 2 weeks. Given preliminary pharmacokinetic data and limited safety data, oseltamivir can be used to treat influenza in both term and preterm infants from birth because benefits of therapy are likely to outweigh possible risks of treatment.

[‡]Oseltamivir dosing for preterm infants. The weight-based dosing recommendation for preterm infants is lower than for term infants. Preterm infants may have lower clearance of oseltamivir because of immature renal function, and doses recommended for full-term infants may lead to very high drug concentrations in this age group. Limited data from the National Institute of Allergy and Infectious Diseases Collaborative Antiviral Study Group provides the basis for dosing preterm infants by using their postmenstrual age (gestational age + chronological age): 1.0 mg/kg per dose, orally, twice daily, for those <38 weeks' postmenstrual age; 1.5 mg/kg per dose, orally, twice daily, for those 38 through 40 weeks' postmenstrual age; 3.0 mg/kg per dose, orally, twice daily, for those >40 weeks' postmenstrual age. For extremely preterm infants (<28 weeks), consult a pediatric infectious diseases physician.

[§]Zanamivir is administered by inhalation with the use of a proprietary “Diskhaler” device distributed together with the medication. Zanamivir is a dry powder, not an aerosol, and should not be administered using nebulizers, ventilators, or other devices typically used for administering medications in aerosolized solutions. Zanamivir is not recommended for people with chronic respiratory diseases, such as asthma or chronic obstructive pulmonary disease, which increase the risk of bronchospasm.

the suspension run short of demand, retail pharmacies can open the capsule and mix the contents with simple syrup or Ora-Sweet SF (sugar free), creating a final concentration of 6 mg/mL.

- **Lower age limit?** The FDA has licensed oseltamivir for children as young as 2 weeks. Despite limited data, AAP states that oseltamivir can be used to treat influenza in both term and pre-term infants from birth because benefits of therapy are likely to outweigh possible risks of treatment.¹⁴ Of course, careful attention to dosing is essential, and treated infants should be monitored for adverse events.
- **Adverse events?** Only nausea and vomiting were reported more frequently among persons receiving oral oseltamivir (15% among children 1 through 12 years) than among age-matched placebo recipients (9%). (Fewer adults than children vomit — approximately 10% of oseltamivir-treated adults and 3% receiving placebo.)
- **Neuropsychiatric events in Japan?** A higher-than-expected reporting rate of neuropsychiatric events was associated with oseltamivir use among pediatric patients in Japan. The FDA has reviewed the available data and found that this was not caused by oseltamivir, but “most likely related to an increased awareness of influenza-associated encephalopathy, increased access to Tamiflu in that population, and a coincident period of intensive monitoring adverse events.”¹⁶
- **Effect on vaccination?** Oral oseltamivir will impede the effectiveness of live attenuated influenza vaccine (nasal spray), but this vaccine formulation is not recommended for use currently. Oseltamivir is not contraindicated by concurrent use of the inactivated influenza vaccines (injectables).
- **Drug resistance** — Antiviral resistance to the NAIs can emerge, so continuous population-based surveillance is done that would allow alterations in recommended empirical treatment. The proportion of adamantanes (amantadine and rimantadine) to which circulating influenza viruses are resistant remains too high for these drugs to be useful.
- **Intravenous antiviral?** In consultation with an infectious diseases specialist, intravenous zanamivir may be obtained on a compassionate-use basis for seriously ill children, especially those who are immunocompromised or cannot tolerate or absorb orally or enterically administered oseltamivir. Intravenous zanamivir might be recommended if an oseltamivir- or peramivir-resistant influenza virus emerged.¹⁴

Question

My patient seems to have influenza. Should his siblings receive chemoprophylaxis tonight?

The NAIs are efficacious when administered as chemoprophylaxis to household contacts of a family member with laboratory-confirmed influenza. Several factors should weigh into the decision of whether to prescribe antiviral chemoprophylaxis. For example, consider the person's vaccination status and risk of influenza complications (Fig. 1), the type and duration of contact, and guidance from the public health authorities. The AAP advises that “optimally, postexposure chemoprophylaxis should only be used when antiviral agents can be started within 48 hours of exposure.”¹⁴ In general, dosing frequency for oseltamivir chemoprophylaxis is once daily, whereas dosing frequency for treatment is twice daily (eg, the dosage of oseltamivir for a child ≤ 15 kg is 30 mg once daily for chemoprophylaxis and 30 mg twice daily for treatment). Chemoprophylaxis is given for 10 days, whereas treatment lasts only 5 days. These differences make it so that the prophylaxis dose should not be used for the treatment of symptomatic children. Therefore, in the question posed here, it

would be important to identify whether the sibling was actually asymptomatic. Referral of the sibling for evaluation in primary care may delay treatment, so this issue is fraught with acute care complexities.

HOME SUPPORTIVE CARE

Question

Should antipyretics be given during an ILI?

Fever is one of the most common clinical complaints and causes for pediatric acute care visits. Although it is a normal physiological response to infection, it causes great parental anxiety. Fever management in patients with an ILI should emphasize the child's comfort rather than actual temperature control.¹⁷ Ibuprofen and acetaminophen are the most common antipyretic medications used. Ibuprofen is given 10 mg/kg per dose every 6 to 8 hours, whereas acetaminophen is 10 to 15 mg/kg per dose every 4 to 6 hours. There have been discussions regarding monotherapy versus alternating/combotherapy in the literature during the past several years and a Cochrane review.¹⁸ In one survey of 256 parents/caregivers, 67% reported alternating acetaminophen and ibuprofen and, among these, 81% reported that it was done on the advice of their health care provider.¹⁹ At this time, there are no clinical guidelines regarding alternating/combotherapy. According to the AAP, although there is some evidence that combination therapy may lower temperature more effectively than monotherapy, there are concerns regarding safety and no conclusive evidence it improves comfort level more than monotherapy.¹⁷ As with any polydrug regimen, there is more risk for medication error or accidental ingestion. This is especially concerning regarding acetaminophen and its narrow window for hepatotoxicity. Given this evidence, clinicians should carefully counsel families regarding use of combination therapy for fever treatment, with the main focus on comfort, not temperature control.

Question

How should the cough be controlled?

Cough is a common symptom of ILI that greatly affects sleep quality for parents and children during illness. Over-the-counter cough medications are widely used by both parents and physicians. Medications commonly used include dextromethorphan, guaifenesin, diphenhydramine, and phenylephrine — just to name a few. Although these medications are commonly used in children, they have not been adequately studied or proven effective when compared with placebo in children younger than 6 years.²⁰ This has led the FDA to notify parents that these medicines should not be used for young children.²¹ They urge parents to use a cool mist humidifier, saline nose drops or spray, nasal suctioning with a bulb syringe either with or without saline nose drops, and antipyretics as well as drinking plenty of liquids, which will help the child stay well hydrated.

Another common recommendation for cough suppression in children is honey. A 2014 Cochrane Review²² evaluated the claim of antitussive properties when compared with no treatment, placebo, and over-the-counter cough medications, including diphenhydramine and dextromethorphan. Three randomized controlled trials with a total of 568 participants each evaluated based on primary outcomes of duration of cough and symptomatic relief and secondary outcome of improvement of sleep for children and parents, improvement of quality of life, adverse effects, appetite, and cost. Duration of symptoms was not evaluated because follow-up was only the next day for all studies. Overall, the authors concluded that honey was no better than dextromethorphan for symptomatic relief of cough but may be a little better than no treatment,

placebo, and diphenhydramine. Adverse effects of honey were comparable with dextromethorphan and diphenhydramine. Honey is not indicated for infants younger than 1 year because of risk for *Clostridium botulinum*.

HEALTH CARE PROFESSIONAL SELF-PROTECTION

Question

Should I get an influenza vaccine?

There are 3 main reasons for health care personnel (HCP) to receive an influenza vaccine: (1) personal protection, (2) reduction

of influenza-related morbidity and mortality among patients, and (3) reduction of absenteeism among HCP.²³ In addition, HCP should serve as role models for patients by being vaccinated annually and signifying this fact with a badge, button, or pin. In 2011, the US Advisory Committee on Immunization Practices updated its standing recommendation for annual influenza vaccination for all HCP.²⁴ Indeed, the vast majority of HCP now have been vaccinated. According to an opt-in Internet panel survey of almost 2000 HCP that CDC conducted during spring 2015, 77.3% of survey participants reported receiving an influenza vaccination during the 2014–15 vaccination season. By setting, vaccination coverage was highest among HCP working in

1. **Posting visual alerts** (e.g., signs, posters) at the entrance and in strategic places (e.g., waiting areas, elevators, cafeterias) to provide patients and HCP with instructions (in appropriate languages) about respiratory hygiene and cough etiquette, especially during periods when influenza virus is circulating in the community. Instructions should include:
 - How to use facemasks or tissues to cover nose and mouth when coughing or sneezing and to dispose of contaminated items in waste receptacles.
 - How and when to perform hand hygiene.
2. **Implement procedures during patient registration** that facilitate adherence to appropriate precautions (e.g., at the time of patient check-in, inquire about presence of symptoms of a respiratory infection, and if present, provide instructions).
3. **Provide facemasks** to patients with signs and symptoms of respiratory infection.
4. **Provide supplies to perform hand hygiene** to all patients upon arrival to facility (e.g., at entrances of facility, waiting rooms, at patient check-in) and throughout the entire duration of the visit to the healthcare setting.
5. **Provide space** and encourage persons with symptoms of respiratory infections to sit as far away from others as possible. If available, facilities may wish to place these patients in a separate area while waiting for care.
6. **During periods of increased community influenza activity**, facilities should consider setting up triage stations that facilitate rapid screening of patients for symptoms of influenza and separation from other patients.

FIGURE 2. The CDC's prevention strategies for seasonal influenza in health care settings: guidelines and recommendations/on entry and during visit to a health care setting.

hospitals (90.4%). Notably, influenza vaccination coverage was highest among HCP who were required by their employer to be vaccinated (96.0%).²⁵

Question

Should I take chemoprophylaxis if exposed?

As an adjunct to (but not a replacement for) influenza vaccination, HCP desiring personal protection may use antiviral drugs (currently NAIs) for either chemoprophylaxis or, if symptomatic, for treatment of influenza. Chemoprophylaxis consists of a single daily dose of either NAI for 10 days, whereas treatment consists of twice daily dosing for 5 days. As an example, if a health care worker were unvaccinated (or vaccinated less than 2 weeks ago) an NAI could be administered after a prolonged, intense exposure to an influenza-infected patient. However, people often prefer watchful waiting and early initiation of treatment if symptoms appear rather than chemoprophylaxis right after an exposure. The decision may be based, in part, on the underlying health conditions of the exposed worker. Note that antivirals do not interfere with the development of immunity to the infecting influenza strain, but their use does not — in itself — provide sustained immunity. For this reason, vaccination should be given as soon as possible even with chemoprophylaxis or treatment. Only the injectable vaccine is recommended at this time.

PROGRAMMATIC CONSIDERATIONS

Question

Many of our patients are at high risk for influenza complications. Should we offer influenza vaccine in our emergency department (ED) and urgent care center (UCC)?

Although not standard, there have been EDs that have vaccinated patients against influenza. Clearly, because of the large number of chronically ill patients who seek care in the acute care setting, there is room for expansion of vaccination programs if resources permit. As is true in primary care, EDs and UCCs are medical settings that are familiar with obtaining parent consent and with all aspects of medication administration (eg, storing and handling, documentation, billing) and even with vaccination, albeit usually to prevent tetanus. For a substantial number of patients, including patients at high risk of influenza complications, the acute care setting is the sole health care setting used. Several studies have demonstrated success with ED-based vaccination for children²⁶ as well as adults.^{27,28} Interestingly, paramedics have implemented influenza immunization programs in a host of settings such retail establishments, community events, emergency medical service stations, churches, senior citizen complexes, and private residences.²⁹

Question

Are we doing everything we should be doing to keep the uninfected children in the waiting room safe from respiratory viruses?

Person-to-person influenza virus spread occurs via direct and indirect contact and by airborne transmission.³⁰ As noted in the “Background” section, influenza virus can survive on hard, non-porous surfaces (eg, doorknobs, keyboards, pens) for 24 to 48 hours and on porous materials (eg, cloth, paper) for less than 8 to 12 hours in ambient temperatures and much longer if the surface is moist or wet. Bean et al⁸ noted that influenza A virus survived on hands for up to 5 minutes after transfer from the environmental surfaces. So, although the cornerstone of influenza disease prevention remains vaccination, preventing respiratory virus spread in health care settings, such as acute care waiting areas, warrants attention. In addition to vaccination and management of

ill health care professionals, CDC and AAP recommend 3 main groups of interventions: (1) covering the virus-spewing outlet manifests (ie, covering sick patients' faces with their inner elbow or a facemask), (2) cleaning fomites such as toys and hands, and (3) putting sufficient space between the infected and the uninfected.^{31,32} It should be noted that, based on evidence, some researchers are calling the value of currently recommended cough etiquette into question and highlighting the need “to search for new evidence-based procedures that effectively disrupt the transmission of respiratory pathogens.”³³ The full list of CDC's “Prevention Strategies for Seasonal Influenza in Healthcare Settings” is available at <http://www.cdc.gov/flu/professionals/infectioncontrol/healthcaresettings.htm>, but an abbreviated list of strategies relevant to the time of entry to the health care setting and during the visit is shown in Figure 2.

Question

What role would EDs and UCCs play if there were to be another worldwide influenza pandemic?

Many experts believe another pandemic is quite possible if antigenic shift occurs, and entire populations are without immunity to the new strain. A concerted worldwide effort to detect new strains as soon as they rise is in place, but, at present, there is no mechanism for the rapid mass production of relevant vaccines. As long as there are humans to serve as virus incubators and launch pads, pandemics of influenza will be a threat, so overcoming difficulties in vaccine development and manufacturing are important public health priorities. When the next influenza pandemic does occur, the acute care system — emergency medical services, EDs, and UCCs — are sure to be a primary interface of the health care system with those infected. It is essential that acute care health care workers be familiar with influenza illness, modes of transmission, means of prevention, and therapeutic options. Even during typical yearly epidemics, the impact of influenza on the acute health care setting is not inconsequential. The drama of pandemics should not lead us to underestimate the destructive power influenza exhibits year after year in this country and throughout the world.

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