



Special Announcement

Due to state budget constraints, Kentucky Epidemiologic Notes & Reports will be migrating our publication to an online only format in the near future. To learn more and sign up to receive notification via e-mail when new issues are posted, please visit our new Web site at <http://chfs.ky.gov/epinotes>, or contact the editor at christopherv.rowe@ky.gov.

2007-2008 Influenza Season Overview for the Commonwealth of Kentucky

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Introduction

The Kentucky Department for Public Health, in collaboration with local health departments, private physicians and the U.S. Centers for Disease Control and Prevention (CDC), conducts influenza surveillance each year from October through May. Influenza surveillance activities in the state include laboratory reporting, monitoring of school absenteeism, long-term care facility surveillance, reporting of influenza-like illnesses by health care providers enrolled in the CDC's Sentinel Provider Surveillance Network, and other surveillance activities. The week of Sept. 30, 2007, was the first official reporting week for the 2007-2008 season and the week of May 11, 2008, was the last official week of the 2007-2008 influenza season. A summary of the season is below, followed by supplemental and supporting data in the form of tables.

Influenza activity patterns in Kentucky during the 2007-2008 influenza season were similar to what was observed nationally.

Here are some significant events from Kentucky's 2007-2008 influenza season:

- Adequate influenza vaccine was available throughout the 2007-2008 influenza season for Kentuckians who wanted to be vaccinated.
- 69,000 doses of influenza vaccine were ordered by the Vaccines For Children program for the 2007-2008 season, which was 16,930 more

doses than the amount ordered for the 2006-2007 season (52,070).

- 162,210 doses of flu vaccine were ordered by the Local Health Department Coalition for the 2007-2008 flu season, which was 57,790 doses less than the amount ordered for the 2006-2007 season (220,000).
- MedImmune sponsored some FluMist nasal vaccine clinics in Kentucky schools.
- Nationally, most circulating strains were not well matched to the season's vaccine.
- Surveillance sites were increased from 13 sites (10 LHDs and 3 private) to 34 sites (13 LHDs and 21 private).
- Sporadic cases of influenza-like illness (ILI) began to appear in Kentucky during the week of Oct. 7, 2007.
- During the week of Nov. 16, 2007, the first culture-confirmed case of influenza in Kentucky was reported by the State Public Health Laboratory.
- Influenza activity peaked in Kentucky during the week of Feb. 3, 2008.
- No influenza activity was identified in Kentucky from April 13-May 17.
- There were no influenza-associated pediatric deaths reported in Kentucky during the 2007-2008 flu season.

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2008-2009 Vaccine and Vaccine Supply

According to the CDC, each year in the United States on average: 5% to 20% of the population gets the flu, more than 200,000 people are hospitalized from complications of influenza, and more than 36,000 deaths are reported. The most effective strategy for preventing influenza is annual vaccination. During the 2007-2008 influenza season, 113 million doses of influenza vaccine were distributed in the United States. Total production of influenza vaccine for the United States is anticipated to be >130 million doses for the entire 2008-2009 season. The minimum anticipated influenza vaccine supply should be adequate to satisfy demand among persons considered by the Advisory Committee on Immunization Practices (ACIP) to be the target groups for influenza vaccination. All three antigens contained in the influenza vaccine have been replaced for this influenza season. The 2008–2009 trivalent vaccine virus strains for both trivalent inactivated influenza vaccine (TIV) and live, attenuated influenza vaccine (LAIV) are A/Brisbane/59/2007 (H1N1)-like, A/Brisbane/10/2007 (H3N2)-like, and B/Florida/4/2006-like antigens.

When Should Vaccination Occur?

The Kentucky Department for Public Health encourages all physicians and other health care providers to begin offering influenza vaccinations as soon as their vaccine becomes available in September and, if possible, by October, at the latest. To avoid a missed opportunity, influenza vaccinations should be offered during routine office visits (or, if a patient is hospitalized, before discharge). Health care providers should identify potential vaccination opportunities during all health care encounters. Office staff should advocate for and offer vaccine whenever patients contact the office or health care facility.

According to the ACIP's 2008 recommendations for the "Prevention and Control of Influenza," "Vaccination efforts should be structured to ensure the vaccination of as many persons as possible over the course of several months, with emphasis on vaccinating before influenza activity in the community begins. Vaccination efforts should continue throughout the season, because the duration of the influenza season varies, and influenza might not appear in certain communities until February or March. Providers should offer influenza vaccine routinely, and organized vaccination campaigns should continue throughout the influenza season, including after influenza activity has begun in the community.

Vaccine administered in December or later, even if influenza activity has already begun, is likely to be beneficial in the majority of influenza seasons." Those planning vaccination campaigns are encouraged to develop the capacity and flexibility to schedule at least one vaccination clinic in December. The 2008 "National Influenza Vaccination Week" (NIVW) was December 8 -14. Please visit the CDC's NIVW webpage at <http://www.cdc.gov/flu/nivw/NIVW2008-index.htm> for more information on this annual observance.

Who Should be Vaccinated?

Influenza vaccine should be provided to all children aged 6 months to 18 years and to all adults who want to reduce the risk of becoming ill with influenza or of transmitting it to others. However, emphasis on providing routine vaccination annually to certain groups at higher risk for influenza infection or complications is advised.

Vaccination to prevent influenza is particularly important for the following persons who are at increased risk for severe complications from influenza:

- all children aged 6 months-4 years (59 months);
- all persons aged ≥ 50 years;
- children and adolescents (aged 6 months-18 years) who are receiving long-term aspirin therapy and who might be at risk for experiencing Reye syndrome after influenza virus infection;
- women who will be pregnant during the influenza season;
- adults and children who have chronic pulmonary (including asthma), cardiovascular (except hypertension), renal, hepatic, hematological, or metabolic disorders (including diabetes mellitus);
- adults and children who have immunosuppression (including immunosuppression caused by medications or by HIV);
- adults and children who have any condition (e.g., cognitive dysfunction, spinal cord injuries, seizure disorders, or other neuromuscular disorders) that can compromise respiratory function or the handling of respiratory secretions or that can increase the risk for aspiration; and
- residents of nursing homes and other chronic-care facilities.

To prevent transmission to persons at increased risk, influenza vaccination (unless contraindicated) is also recommended for the following persons:

- health care providers (HCP);
- healthy household contacts (including children aged 6 months and older) and caregivers of children aged ≤ 59 months (i.e., aged < 5 years) and adults aged ≥ 50 years; and
- healthy household contacts (including children) and caregivers of persons with medical conditions that put them at higher risk for severe complications from influenza.

In addition to HCP, groups that can transmit influenza to high-risk persons and that should be vaccinated include:

- employees of assisted living and other residences for persons in groups at high risk;
- persons who provide home care to persons in groups at high risk; and
- household contacts (including children aged 6 months and older) of persons in groups at high risk.

Approximately 83% of the United States population is included in one or more of these target groups; however, $< 40\%$ of the U.S. population received an influenza vaccination during the 2007-2008 season.

Health care administrators should consider the level of vaccination coverage among HCP to be one measure of a patient safety quality program and consider obtaining signed declinations from personnel who decline influenza vaccination for reasons other than medical contraindications. The Joint Commission on Accreditation of Health Care Organizations has approved an infection-control standard that requires accredited organizations to offer influenza vaccinations to staff, including volunteers and licensed independent practitioners with close patient contact. The standard became an accreditation requirement beginning January 1, 2007. Persons who provide essential community services should be considered for vaccination in order to minimize disruption of essential activities during influenza outbreaks. Students or other persons in institutional settings should be encouraged to receive vaccine to minimize morbidity and the disruption of routine activities during epidemics.

What Type of Vaccine Should be Used?

Healthy, non-pregnant persons aged 2-49 years can choose to receive either trivalent inactivated influenza vaccine (TIV) or live attenuated influenza vaccine (LAIV), all other persons aged 6 months and older should receive TIV (use of the term "healthy" refers to persons who do not have any of the underlying medical conditions that pose high risk for severe complications). TIV is licensed for use in persons with high-risk conditions. When vaccinating children aged 6-35 months with TIV, health care providers should use TIV that has been licensed by the FDA for this age group. No preference is indicated for LAIV or TIV when considering vaccination of healthy, non-pregnant persons aged 2-49 years. However, during periods when inactivated vaccine is in short supply, use of LAIV is encouraged when feasible for eligible persons (including HCP) because use of LAIV by these persons might increase availability of TIV for persons in groups targeted for vaccination, but who cannot receive LAIV. All children aged 6 months-8 years who have not been vaccinated previously at any time with at least 1 dose of influenza vaccine should receive 2 doses of age-appropriate vaccine in the same season, with a single dose during subsequent seasons. Those children should receive their first dose as soon after vaccine becomes available as is possible. This increases the opportunity for both doses to be administered before or shortly after the onset of influenza activity.

Sentinel Providers

The Kentucky Immunization Program is currently recruiting additional physician practices to be influenza sentinel surveillance sites for the 2008-2009 influenza season. Each week, influenza sentinel surveillance sites report directly to CDC via a dedicated website on the numbers of patients seen exhibiting influenza-like illness (ILI) along with the total number of patients seen (as a reference). The information on weekly ILI activity contributes to the ongoing assessment of influenza activity in Kentucky. If you are, or know of, a private physician practice that may be willing to participate in this important work as a CDC-approved influenza sentinel surveillance site, please contact: Emily Adkins, RN, State Influenza Coordinator, Emily.Adkins@ky.gov or (502)564-4478, ext. 3516.

See following page for supporting tables.

Table 1: Kentucky's 2007-2008 Influenza Activity Level for Each Recorded Week

MMWR Week	Activity Level	MMWR Week	Activity Level
40	No Activity	4	Regional
41	Sporadic	5	Widespread
42	Sporadic	6	Widespread
43	Sporadic	7	Widespread
44	Sporadic	8	Widespread
45	Sporadic	9	Widespread
46	Sporadic	10	Widespread
47	Sporadic	11	Widespread
48	Sporadic	12	Regional
49	Sporadic	13	Local
50	Sporadic	14	Local
51	Sporadic	15	Sporadic
52	Sporadic	16	Sporadic
1	Sporadic	17	No Activity
2	Sporadic	18	No Activity
3	Sporadic	19	No Activity

- **No Activity:** No laboratory-confirmed cases of influenza and no reported increase in the number of cases of influenza-like illness (ILI).
- **Sporadic:** Small numbers of laboratory-confirmed influenza cases or a single laboratory-confirmed influenza outbreak has been reported, but there is no increase in cases of ILI.
- **Local:** Outbreaks of influenza or increases in ILI cases and recent laboratory-confirmed influenza in a single region of the state.
- **Regional:** Outbreaks of influenza or increases in ILI and recent laboratory-confirmed influenza in at least two but less than half the regions of the state.
- **Widespread:** Outbreaks of influenza or increases in ILI cases and recent laboratory-confirmed influenza in at least half the regions of the state.

Table 2: 2007-2008 Total Number of Culture Confirmed Influenza Cases by MMWR Week

MMWR Week	Total Number	MMWR Week	Total Number
46	1	7	194
47	0	8	174
48	1	9	178
49	0	10	112
50	1	11	66
51	1	12	45
52	3	13	31
1	4	14	22
2	7	15	10
3	7	16	3
4	35	17	unavailable
5	110	18	unavailable
6	238	19	unavailable

Table 3: 2007-2008 Culture Confirmed Influenza Cases Reported in Kentucky by Type

Strain (Type) of Influenza	Total Number of Cases
A	298
A/B	49
A:H3	677
A:H1	25
B	194

Kentucky Department for Public Health Influenza Information Sheet

The Kentucky Department for Public Health (KDPH) wants you to know:

- Manufacturers predict that greater than 130 million doses of influenza vaccine will be available for the 2008-2009 influenza season, more than ever before.
- The Centers for Disease Control and Prevention (CDC) will continue to assess vaccine supply throughout the season and make decisions regarding the need, if any, for tiered timing of vaccination of risk groups if there are shortages or significant delays.
- When adequate vaccine is available, vaccination is recommended for anyone who wishes to reduce the likelihood of becoming ill with influenza or transmitting influenza to others.
- For any influenza vaccine supply scenario: In and after September, during routine visits or hospitalizations, begin vaccinating those at risk for complications, their household contacts, children less than 9 years of age who are being vaccinated for the first time, and health care personnel.
- **Vaccinate throughout the season:** Flu season usually does not peak in Kentucky until January or February and can continue into May. Whatever the situation early in the fall, vaccine will likely be available later in the season.
- All health care workers should be offered annual influenza vaccine by their employer, and employees who decline for any reason should be required to provide a signed declination.
- Healthy, non-pregnant persons aged 2-49 years can receive either trivalent inactivated flu vaccine (TIV) or live, attenuated flu vaccine (LAIV). All others should receive only TIV.
- Children aged six months through eight years who received influenza vaccine for the first time in the previous season, but who did not receive the recommended second dose of vaccine within that first season, should receive two vaccine doses this season.
- Medicare reimbursement for administration of flu and pneumococcal vaccines in the 2008-2009 season is increased to \$18.40/dose.
- Vaccine Information Statements (VIS) in many languages are available at the CDC website: <http://www.cdc.gov/vaccines/pubs/vis/default.htm>
- For information on influenza prevention and control, visit the Kentucky Department for Public Health website at: <http://chfs.ky.gov/dph/epi/Influenza.htm>
- For flyers, posters, and brochures, including "late season" materials to encourage vaccination in December and later, visit the CDC Flu Gallery: <http://www.cdc.gov/flu/professionals/flugallery/index.htm>
- For the 2008-2009 ACIP Influenza Recommendations, visit the CDC Influenza site: <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr57e717a1.htm>
- Information regarding influenza surveillance, prevention, detection, and control (updated weekly from October-May) is available at the CDC Influenza site: <http://www.cdc.gov/flu/weekly/fluactivity.htm>
- "Influenza-associated pediatric mortality" is a nationally notifiable condition. Laboratory-confirmed influenza-associated deaths in children less than 18 years old are reported to the CDC. Please note that while Kentucky regulations do not specify reporting of pediatric mortality associated with influenza, any cases should be reported.

Pregnancy and Influenza in the MMWR: Literature Report and Overview

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The Advisory Committee on Immunization Practices (ACIP), the Centers for Disease Control and Prevention (CDC), and the American College of Obstetricians and Gynecologists (ACOG) recommend influenza vaccinations for all women who will be pregnant during influenza season. In North America, peak influenza season is usually November to March. Because the influenza vaccine injection is made from killed (inactivated) influenza virus (trivalent inactivated influenza vaccine – TIV), it is considered safe during any stage of pregnancy. However, pregnant women should not use the nasal-spray influenza vaccine, which is made with live, weakened influenza virus (live, attenuated influenza vaccine – LAIV).

Pregnancy can affect the immune system and also put extra stress on the heart and lungs. As a result, pregnant women may be at increased risk of not only contracting influenza, but of developing serious complications due to the virus, including pneumonia. In addition, pregnant women with influenza are far more likely to require hospitalization for such complications than are women with influenza who are not pregnant.

According to the MMWR Vol. 57/RR-7 “Prevention and Control of Influenza, Recommendations of the Advisory Committee on Immunization Practices (ACIP), 2008”:

“Pregnant Women and Neonates”

“Pregnant women have protective levels of anti-influenza antibodies after vaccination. Passive transfer of anti-influenza antibodies that might provide protection from vaccinated women to neonates has been reported. A retrospective, clinic-based study conducted during 1998–2003 documented a non-significant trend towards fewer episodes of medically attended acute respiratory illness (MAARI) during one influenza season among vaccinated pregnant women compared with unvaccinated pregnant women and substantially fewer episodes of MAARI during the peak influenza season. However, a retrospective study conducted during 1997–2002 that used clinical records data did not indicate a reduction in ILI among vaccinated pregnant women or their infants. In another study conducted during 1995–2001, medical visits for respiratory illness among the infants were not substantially reduced.

However, studies of influenza vaccine effectiveness among pregnant women have not included specific outcomes such as laboratory-confirmed influenza in women or their infants.”

“FDA has classified TIV as a “Pregnancy Category C” medication, indicating that animal reproduction studies have not been conducted to support a labeling change. Available data indicate that influenza vaccine does not cause fetal harm when administered to a pregnant woman or affect reproductive capacity. One study of approximately 2,000 pregnant women who received TIV during pregnancy demonstrated no adverse fetal effects and no adverse effects during infancy or early childhood. A matched case-control study of 252 pregnant women who received TIV within the 6 months before delivery determined no adverse events after vaccination among pregnant women and no difference in pregnancy outcomes compared with 826 pregnant women who were not vaccinated. During 2000–2003, an estimated 2 million pregnant women were vaccinated, and only 20 adverse events among women who received TIV were reported to VAERS during this time, including nine injection-site reactions and eight systemic reactions (e.g., fever, headache, and myalgias). In addition, three miscarriages were reported, but these were not known to be causally related to vaccination. Similar results have been reported in certain smaller studies, and a recent international review of data on the safety of TIV concluded that no evidence exists to suggest harm to the fetus.”

“Pregnant Women”

“Pregnant women are at risk for influenza complications, and all women who are pregnant or will be pregnant during influenza season should be vaccinated. The American College of Obstetricians and Gynecologists and the American Academy of Family Physicians also have recommended routine vaccination of all pregnant women. No preference is indicated for use of TIV that does not contain thimerosal as a preservative (see Vaccine Preservative [Thimerosal] in Multidose Vials of TIV) for any group recommended for vaccination, including pregnant women. LAIV is not licensed for use in pregnant women. However, pregnant women do not need to avoid contact with persons recently vaccinated with LAIV.”

Summary:

Please contact Emily Adkins at Emily.Adkins@ky.gov or (502)564-4478, ext. 3516, for more information or with questions regarding influenza vaccine or immunization of pregnant women.

CDC Advisory

December 19, 2008

Interim Recommendations for the Use of Influenza Antiviral Medications in the Setting of Oseltamivir Resistance among Circulating Influenza A (H1N1) Viruses

Although influenza activity is low in the United States to date, preliminary data from a limited number of states indicate that the prevalence of influenza A (H1N1) virus strains resistant to the antiviral medication oseltamivir is high. Therefore, CDC is issuing interim recommendations for antiviral treatment and chemoprophylaxis of influenza during the 2008-09 influenza season. When influenza A (H1N1) virus infection or exposure is suspected, zanamivir or a combination of oseltamivir and rimantadine are more appropriate options than oseltamivir alone. Local influenza surveillance data and laboratory testing can help with physician decision-making regarding the choice of antiviral agents for their patients. The 2008-09 influenza vaccine is expected to be effective in preventing or reducing the severity of illness with currently circulating influenza viruses, including oseltamivir-resistant influenza A (H1N1) virus strains. Since influenza activity remains low and is expected to increase in the weeks and months to come, CDC recommends that influenza vaccination efforts continue.

Background

Influenza A viruses, including two subtypes (H1N1) and (H3N2), and influenza B viruses, currently circulate worldwide, but the prevalence of each can vary among communities and within a single community over the course of an influenza season. In the United States, four prescription antiviral medications (oseltamivir, zanamivir, amantadine and rimantadine) are approved for treatment and chemoprophylaxis of influenza. Since January 2006, the neuraminidase inhibitors (oseltamivir, zanamivir) have been the only recommended influenza antiviral drugs because of widespread resistance to the adamantanes (amantadine, rimantadine) among influenza A (H3N2) virus strains. The neuraminidase inhibitors have activity against influenza A and B viruses while the adamantanes have activity only against influenza A viruses. In 2007-08, a significant increase in the prevalence of oseltamivir resistance was reported among influenza A (H1N1) viruses worldwide. During

the 2007-08 influenza season, 10.9% of H1N1 viruses tested in the U.S. were resistant to oseltamivir.

Influenza activity has been low thus far this season in the United States. As of December 19, 2008, a limited number of influenza viruses isolated in the U.S. since October 1 have been available for antiviral resistance testing at CDC. Of the 50 H1N1 viruses tested to date from 12 states, 98% were resistant to oseltamivir, and all were susceptible to zanamivir, amantadine and rimantadine. Preliminary data indicate that oseltamivir-resistant influenza A (H1N1) viruses do not cause different or more severe symptoms compared to oseltamivir sensitive influenza A (H1N1) viruses. Influenza A (H3N2) and B viruses remain susceptible to oseltamivir. The proportion of influenza A (H1N1) viruses among all influenza A and B viruses that will circulate during the 2008-09 season cannot be predicted, and will likely vary over the course of the season and among communities. Oseltamivir-resistant influenza A (H1N1) viruses are antigenically similar to the influenza A (H1N1) virus strain represented in 2008-09 influenza vaccine, and CDC recommends that influenza vaccination efforts continue as the primary method to prevent influenza.

Oseltamivir resistance among circulating influenza A (H1N1) virus strains presents challenges for the selection of antiviral medications for treatment and chemoprophylaxis of influenza, and provides additional reasons for clinicians to test patients for influenza virus infection and to consult surveillance data when evaluating persons with acute respiratory illnesses during influenza season. These interim guidelines provide options for treatment or chemoprophylaxis of influenza in the United States if oseltamivir-resistant H1N1 viruses are circulating widely in a community or if the prevalence of oseltamivir resistant H1N1 viruses is uncertain.

Interim Recommendations

Persons providing medical care for patients with suspected influenza or persons who are candidates for chemoprophylaxis against influenza should consider the following guidance for assessing and treating patients during the 2008-2009 influenza season (see Antiviral Guidance Table, below):

- 1)** Review local or state influenza virus surveillance data weekly during influenza season, to determine which types (A or B) and subtypes of influenza A virus (H3N2 or H1N1) are currently circulating in the area.

For some communities, surveillance data might not be available or timely enough to provide information useful to clinicians.

2) Consider use of influenza tests that can distinguish influenza A from influenza B.

- Patients testing positive for influenza B may be given either oseltamivir or zanamivir (no preference) if treatment is indicated.
- At this time, if a patient tests positive for influenza A, use of zanamivir should be considered if treatment is indicated. Oseltamivir should be used alone only if recent local surveillance data indicate that circulating viruses are likely to be influenza A (H3N2) or influenza B viruses. Combination treatment with oseltamivir and rimantadine is an acceptable alternative, and might be necessary for patients that cannot receive zanamivir, (e.g., patient is <7 years old, has chronic underlying airways disease, or cannot use the zanamivir inhalation device), or zanamivir is unavailable. Amantadine can be substituted for rimantadine if rimantadine is unavailable.
- If a patient tests negative for influenza, consider treatment options based on local influenza activity and clinical impression of the likelihood of influenza. Because rapid antigen tests may have low sensitivity, treatment should still be considered during periods of high influenza activity for persons with respiratory symptoms consistent with influenza who test negative and have no alternative diagnosis. Use of zanamivir should be considered if treatment is indicated. Combination treatment with oseltamivir and rimantadine (substitute amantadine if rimantadine unavailable) is an acceptable alternative. Oseltamivir should be used alone only if recent local surveillance data indicates that circulating viruses are likely to be influenza A(H3N2) or influenza B viruses.
- If available, confirmatory testing with a diagnostic test capable of distinguishing influenza caused by influenza A (H1N1) virus from influenza caused by influenza A (H3N2) or influenza B virus can also be used to guide treatment. When treatment is indicated, influenza A (H3N2) and influenza B virus

infections should be treated with oseltamivir or zanamivir (no preference). Influenza A (H1N1) virus infections should be treated with zanamivir or combination treatment with oseltamivir and rimantadine is an acceptable alternative.

3) Persons who are candidates for chemoprophylaxis (e.g., residents in an assisted living facility during an influenza outbreak, or persons who are at higher risk for influenza-related complications and have had recent household or other close contact with a person with laboratory confirmed influenza) should be provided with medications most likely to be effective against the influenza virus that is the cause of the outbreak, if known. Respiratory specimens from ill persons during institutional outbreaks should be obtained and sent for testing to determine the type and subtype of influenza A viruses associated with the outbreak and to guide antiviral therapy decisions. Persons whose need for chemoprophylaxis is due to potential exposure to a person with laboratory-confirmed influenza A (H3N2) or influenza B should receive oseltamivir or zanamivir (no preference). Zanamivir should be used when persons require chemoprophylaxis due to exposure to influenza A (H1N1) virus. Rimantadine can be used if zanamivir use is contraindicated.

Enhanced surveillance for influenza antiviral resistance is ongoing at CDC in collaboration with local and state health departments. Clinicians should remain alert for additional changes in recommendations that might occur as the 2008--09 influenza season progresses. Oseltamivir resistant influenza A (H1N1) viruses are antigenically similar to the influenza A (H1N1) viruses represented in the vaccine, and vaccination should continue to be considered the primary prevention strategy regardless of oseltamivir sensitivity. Information on antiviral resistance will be updated in weekly surveillance reports (available at <http://www.cdc.gov/flu/weekly/fluactivity.htm>).

For more information on antiviral medications and additional considerations related to antiviral use during the 2008-09 influenza season, visit <http://www.cdc.gov/flu/professionals/antivirals/index.htm>.

TABLE
Interim recommendations for the selection of antiviral treatment using laboratory test results and viral surveillance data, United States, 2008-09 season‡

Rapid antigen or other laboratory test	Predominant virus(es) in community	Preferred medication(s)	Alternative (combination antiviral treatment)
Not done or negative, but clinical suspicion for influenza	H1N1 or unknown	Zanamivir	Oseltamivir + Rimantadine*
Not done or negative, but clinical suspicion for influenza	H3N2 or B	Oseltamivir or Zanamivir	None
Positive A	H1N1 or unknown	Zanamivir	Oseltamivir + Rimantadine*
Positive A	H3N2 or B	Oseltamivir or Zanamivir	None
Positive B	Any	Oseltamivir or Zanamivir	None
Positive A+B**	H1N1 or unknown	Zanamivir	Oseltamivir + Rimantadine*
Positive A+B**	H3N2 or B	Oseltamivir or Zanamivir	None

*Amantadine can be substituted for rimantadine but has increased risk of adverse events. Human data are lacking to support the benefits of combination antiviral treatment of influenza; however, these interim recommendations are intended to assist clinicians treating patients who might be infected with oseltamivir-resistant influenza A (H1N1) virus.

**Positive A+B indicates a rapid antigen test that cannot distinguish between influenza and influenza B viruses

‡ Influenza antiviral medications used for treatment are most beneficial when initiated within the first two days of illness. Clinicians should consult the package insert of each antiviral medication for specific dosing information, approved indications and ages, contraindications/warnings/precautions, and adverse effects.

Reducing Costs While Effectively Administering Influenza Vaccine to the Community: A Case Study

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Background

The influenza (flu) vaccine season impacts the time, energy and resources of every Kentucky health department. The public health (PH) role is to prevent the spread of infectious disease. According to the Centers for Disease Control and Prevention (CDC), influenza and flu-related pneumonia combine to become the eighth leading cause of death in this country. More than 36,000 Americans die annually from influenza, and an additional 200,000 are hospitalized due to influenza virus and its complications (National Foundation for Infectious Diseases, 2005). CDC estimates that for each million high-risk individuals vaccinated, approximately 900 deaths and 1,300 hospitalizations are prevented during an average influenza season. Senior citizens, young children and people with weakened immune systems are at the highest risk of becoming infected (CDC, 2002). While flu vaccine distribution is a necessity, it is not clear what is the most cost efficient means of providing the vaccine to the community. Reported here, a comparative two-year cost analysis was performed among different clinic types, yielding a set of recommendations aimed at producing an efficient and effective method for offering the flu vaccine in an urban setting.

Methods

Two influenza campaign seasons, 2005-06 and 2006-07, were analyzed utilizing stratified random samples of five categories of flu administration clinics executed by the Public Health Nurses (PHN) from the Lexington-Fayette County Health Department's (HD) Community Nursing Division.

The five categories are:

1. Private businesses that request a PHN to provide vaccine.
2. Community walk-in clinics open to the public with no appointment.
3. Scheduled appointments utilized in 2005-06 flu season to administer flu vaccine on the 4th floor of the HD. This clinic type was substituted for the following season by a walk-in clinic at an off-site PH clinic.
4. Targeted populations such as nonprofit civic organizations and churches.
5. Senior high rises (residential sites for senior citizens).

There were 33 of a total 151 clinic sites sampled in 2005-06, and 43 of a total 180 clinic sites sampled in 2006-07.

Revenue varied by type of reimbursement. This was offset by the following costs: manpower costs at the site, including nursing and clerical staff; the vaccine/supply cost; and indirect costs. This yielded a profit/loss for each clinic. Specific cost assumptions are listed in Table 1.

Table 1: Reimbursement rates and costs

<i>Rates/Cost</i>	2005/06	2006/07
Reimbursements rates:		
Private Pay	\$20.00	\$20.00
Medicaid	\$ 3.30	\$14.96
Medicare	\$19.06	\$22.06
Private Insurance	NA	\$20.00
Staff time (average hourly rate):		
Public Health Nurse	\$26.50	\$26.50
Clerical	\$15.54	\$15.54
Temp Nurse	NA	\$45.00
Vaccine:		
Cost/unit dose/vial dose	\$13.09	\$10.50
Supplies/one dose	\$ 0.25	\$ 0.25
Indirect Cost:		
<i>labor /vaccine</i>	15%	15%

Statistical Methods

A stratified sampling plan, in which strata with more variable clinic categories were allocated larger sample sizes in relation to their stratum size, was used to select sites.

With the profit and cost potential determined for each sampled site, the statistical program (Procedure *Surveymeans* in PC_SAS, Version 9.1) was used to estimate the mean profit, the standard error of the mean and the 95% confidence interval

for the mean per clinic category, as well as the entire population.

Results

Profit/loss in administering vaccines in the randomly sampled flu clinics for 2005-06 and 2006-07 are displayed in Table 2. Please note that if the upper and lower bounds of the 95% CI are both above \$0.00, this would mean that the clinics were profitable. Likewise, if the upper and lower bounds of the 95% CI are both below \$0.00, this would mean that the clinics operated at a loss. If the bounds encompass \$0.00 that would mean that the clinics “broke even.”

Notice that the fourth floor appointment clinic and the HD walk-ins were not shown to be profitable, since the 95% CI for both clinic types did not contain \$0.00. Senior high rises, by contrast, were profitable both years. Results were mixed for the other clinic categories. Overall in 2005-06 the flu vaccine administration was a “break even” program (\$7.49

profit with a 95% CI containing \$0.00.) In 2006-07, overall profitability was attained with \$77.83 average profit per each of the 43 clinics sampled.

Discussion

A helpful recommendation for all clinic categories would be to inform the public of the service with a news release in early October, including an outline of the scheduled clinics, with guidelines tailored to specific populations. The manager of the vaccine campaign should also:

- Review the individual flu clinic participation from the previous year’s statistics prior to assigning staff.
- Consider the possibility of reassigning all nurses for one or more days each season to cover the flu clinics.
- Use a call in “Hotline” recording to announce the vaccine community walk-in clinic times available.

Table 2: Number of Clinics Sampled in This Analysis (n), Total Number of Clinics (N), Mean Profit (in dollars), Standard Error of the Mean (SEM), and 95% Confidence Interval for the True Mean.

Clinic Category	n	N	Mean (\$)	SEM	95% CI
Community Walk-Ins—2005-06	4	4	359.50	0	N/A
—2006-07	8	11	-13.75	73.23	-186.91 to 159.41
Fourth Floor Appointments—2005-06	5	41	-83.00	24.60	-151.31 to -14.69
Health Dept. Walk-Ins at 805 PH Clinic (substitute for 4th Fl. Apts.)—2006-07	8	53	-304.13	64.83	-457.43 to -150.82
Private Businesses—2005-06	10	78	27.90	9.27	6.90 to 48.87
—2006-07	7	78	66.14	27.39	-0.88 to 133.17
Senior High Rises—2005-06	7	18	49.00	14.85	12.67 to 85.32
—2006-07	8	18	148.00	42.74	46.93 to 249.07
Targeted Populations—2005-06	7	10	3.86	71.04	-169.98 to 177.69
—2006-07	12	20	182.50	68.59	31.28 to 333.22
All Sites Combined—2005-06	33	151	7.49	9.63	-12.24 to 27.23
—2006-07	43	180	77.83	36.64	3.65 to 151.99

Further useful guidance

Community Walk-in Clinics: Be imaginative with ideas for increasing community sites. Request university college nursing senior students, with their instructors, to assist in the community walk-ins for extra nursing hands-on experience and community outreach. Schedule community walk-in clinics weekly or biweekly by supervisors in facilities with personnel appropriate to assist as possible with people/traffic flow. An example would be scheduling within senior citizen centers. In 06-07, an increase in community walk-in sites were scheduled, with the analysis yielding a modest loss of \$13.75 per clinic. The walk-in clinic sites that operated in a deficit were overstaffed for the demand. While there is always uncertainty about how many members of the general public will attend a community walk-in clinic, the profitability of such clinics can be increased by scheduling a conservative number of PHNs and clerical staff and placing additional staff on call to assist if the volume exceeds expectations.

Community walk-in clinic sites can also be utilized as “practice” for emergency preparedness, by providing mass immunizations in a short time period. In fact, on October 21, 2005, the Garrard, Jessamine and Fayette County Health Departments successfully partnered to conduct a point of dispensing (POD) emergency preparedness clinic. In addition, drive-through clinics in 2007 and 2008 were planned as exercises funded by preparedness funds to provide flu vaccine to a larger portion of the public on a walk-in/drive-in basis.

Private businesses: Appoint one individual in charge of scheduling businesses to avoid overbooking clinics, and to explain the HD policy to make this outreach cost effective. Consider charging a set-up fee, requiring businesses to guarantee a minimum number of vaccinees at their site. Schedule a time at the health department for private businesses immediately prior to work, after work hours or at an off-site clinic. One PHN who gives 20 vaccines, for a total of three hours, with one clerical assistant can break even with a \$20.00 set-up fee.

Senior High Rises: These made a profit both years due to the captive audience, the small number of staff assigned, and the reimbursement rate.

Targeted Populations: These efforts moved to the profitable category on the second year, and are usually a captive population that should be compared to the previous year for determining staff needs. If the site is

opened to the public, assign staff to be on-call following the recommendations given for community walk-ins.

Conclusion

This analysis has proven to be an excellent resource to the Lexington-Fayette County Health Department in preparation for future influenza vaccination seasons. The results of the analysis have and will continue to be utilized by the HD to make evidence-based decisions about the most effective and efficient methods for administering flu vaccine to the public, while still considering cost effectiveness for the HD management. While individual communities may have different needs, this analysis provides a starting place to consider the most cost-effective, efficient methods local health departments can use to administer influenza vaccine. By accomplishing this task, we further our most important public health mission, to preserve the health of the community.

Additional Information

This is only one case-study. The author contacted local health department staff from several other counties who manage influenza vaccine administration to obtain their innovative ideas.

Their ideas discussed include:

- Providing vaccine en masse for one or two complete weeks or one day per week with no regular HD services offered.
- Provide vaccine at as many public places as manageable.
- Use regular on-call nurses to assist as needed.
- Set up a special clinic for flu vaccine at the health department.
- Combine staff of a small HD with a larger HD and provide flu vaccine near the county line to reach a greater number of vaccinees in a shorter time frame.
- Use the airport, baseball field, libraries, post offices, fire stations, factories, extension office, hospitals, and rehabilitation centers to provide vaccine to their populations.

Continued on Page 13.

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References

Center for Disease Control and Prevention, (2002) Prevention and Control of Influenza;

Recommendations of Advisory Committee on Immunization Practices. *MMWR*, 51(RR-3): 1-31.

National Center for Health Statistics. (2001) *Healthy People 2000 Final Review*. Hyattsville, MD: US Department of Health and Human Services; 2001. DHHS Publication 01-0256.

Nichol, KL., Goodman, M. (1999) The Health and Economics Benefits of Influenza Vaccination for healthy and at Risk Persons Aged 65 to 74. *Pharmacoeconomics* 16 (1); 63-71.

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