



# City Health Information

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## INFLUENZA PREVENTION AND CONTROL, 2014-2015

- Vaccination is the most effective means of preventing influenza and its complications, including pneumococcal disease.
- Vaccinate everyone aged 6 months and older as soon as vaccine is available.
  - Vaccination is mandatory for children aged 6 months to 5 years who attend a City-licensed day care, nursery, Head Start, or prekindergarten program.
- Give inactivated vaccine to all pregnant women in any trimester to prevent influenza infection and complications in both the woman and her infant.
- Get your flu vaccine as soon as it becomes available and make sure your staff does the same.

Influenza is a highly infectious viral illness that can have serious complications—especially in young children, older adults, pregnant women, and people with chronic medical or immunocompromising conditions. In the 2013-2014 influenza season, 1,826 New Yorkers died from influenza and pneumonia (unpublished preliminary data). Most recent data show that about one third of adult New Yorkers aged 65 and older and one third of children 6 months to 5 years of age are unvaccinated (unpublished data).

To protect patients and improve vaccination coverage, strongly recommend vaccination for all patients aged 6 months and older at every visit. The influenza season can begin as early as October and continue through May, but activity can be unpredictable and occur year-round. Vaccinate patients aged 6 months and older as soon as vaccine is available and continue until vaccine expires. Pay special attention to patients at higher risk for complications (**Boxes 1 and 2**).<sup>1</sup> Use your electronic health record (EHR) system to identify these patients, and proactively contact them to recommend flu vaccination and, if indicated, pneumococcal vaccine (**Box 3**).

If you do not provide flu vaccine in your practice, refer patients to a provider who does, such as a pharmacist. In New York State (NYS), pharmacists can vaccinate adults aged 18 and older and have helped

raise vaccination rates, especially in medically underserved populations.<sup>2</sup>

Influenza vaccination is a covered benefit under the Affordable Care Act (ACA), and patients enrolled in new health plans can receive vaccine at no cost, though there may be copayment for an office visit and restrictions about in-network providers.

***Strongly recommend vaccination for all patients aged 6 months and older.***



### BOX 1. GROUPS TO TARGET FOR INFLUENZA VACCINATION<sup>1</sup>

- Children aged 6 through 59 months
- People aged 50 and older
- People with certain high-risk medical conditions (**Box 2**)
- Women who are pregnant or plan to become pregnant
- Health care workers
- Children and adults who live in long-term care facilities
- American Indians/Alaskan Natives
- People with body mass index at or above 40
- Household contacts and caregivers of
  - Children younger than 5 years, especially those younger than 6 months
  - Adults aged 50 and older
  - People with certain medical conditions (**Box 2**)

### BOX 2. CONDITIONS THAT INCREASE RISK OF SEVERE INFLUENZA COMPLICATIONS<sup>1</sup>

- Chronic pulmonary disorders, including asthma
- Cardiovascular diseases, except hypertension
- Renal, hepatic, neurologic/neurodevelopmental, hematologic, metabolic, or endocrine disorders, including diabetes
- Weakened immune system due to diseases such as HIV or AIDS, medications such as chronic steroids, or cancer treatment (ie, radiation or chemotherapy)
- Long-term aspirin therapy in children and adolescents <19 years of age because of risk for Reye syndrome after influenza infection

*Make sure you have the most up-to-date ACIP immunization recommendations. Visit [www.cdc.gov/vaccines/hcp/acip-recs/index.html](http://www.cdc.gov/vaccines/hcp/acip-recs/index.html).*

## IMPORTANT POINTS

### Vaccinate children as early as possible

- Children younger than 5 years of age have the highest influenza infection rates.<sup>3</sup>
- Severe complications are most common in children younger than 2 years of age and those with other medical conditions.<sup>1</sup>
- Since children can easily spread influenza, vaccination also protects their families and the community.<sup>4</sup>
- *Children aged 6 months through 5 years who attend an NYC-licensed day care, nursery, Head Start, or prekindergarten program must receive at least 1 dose of influenza vaccine between July 1 and December 31 of each year.*

- Parents may have questions and concerns about flu vaccination. Visit [www.nyc.gov/html/doh/flu/html/vaccination/facts.shtml](http://www.nyc.gov/html/doh/flu/html/vaccination/facts.shtml) for information addressing their concerns.
- See Centers for Disease Control and Prevention (CDC) Advisory Committee on Immunization Practices (ACIP)-recommended influenza dosing schedule at [www.cdc.gov/mmwr/preview/mmwrhtml/mm6332a3.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6332a3.htm).

### Vaccinate against pneumococcal disease

- Pneumococcal disease is a serious complication of influenza, causing thousands of cases of pneumonia, meningitis, sepsis, and ear infections each year.<sup>5</sup>
- Though they are at high risk, only 50% of New Yorkers aged 65 and older were vaccinated against pneumococcal disease in 2012.<sup>6</sup>

### BOX 3. VACCINATE AGAINST PNEUMOCOCCAL DISEASE

There are 2 vaccines that protect against pneumococcal disease: pneumococcal conjugate vaccine (PCV13) and pneumococcal polysaccharide vaccine (PPSV23).

#### Routine vaccinations

- Through age 5: PCV13
  - Children born on or after January 1, 2008, must be vaccinated to enter a New York State-licensed day care center or prekindergarten.
- Ages 65 and older: should receive both PCV13 and PPSV23 at the recommended interval.

#### Vaccinations for people with high-risk conditions

- Ages 2 through 64 with chronic heart or lung disease (including asthma), chronic liver disease, alcoholism, or diabetes mellitus, or cigarette smokers: PPSV23.
- Ages 2 through 64 with immunocompromising conditions, functional or anatomic asplenia, cerebrospinal fluid leaks, or cochlear implants: PCV13 followed by PPSV23.
  - Ages 6 through 64 years with immunocompromising conditions or functional or anatomic asplenia: PCV13 followed by 2 doses of PPSV23.
- The interval between doses of PCV13 and PPSV23 varies depending on age group and vaccination history.

**See full details on ACIP pneumococcal vaccine dosing recommendations for PCV13 and PPSV23 at [www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/pneumo.html](http://www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/pneumo.html).**

*For healthy children 2 through 8 years old, live-attenuated influenza vaccine (LAIV) is preferred, but don't delay vaccination if LAIV is unavailable.<sup>7</sup>*

### **Vaccinate all pregnant women in any trimester**

Influenza is dangerous to pregnant women and their babies<sup>1</sup> (**Box 4<sup>8-15</sup>**).

Use this opportunity to administer Tdap vaccine, as recommended for every pregnancy. Tdap vaccination protects the mother from being infected by and transmitting pertussis—and the antibodies transferred from mother to newborn may protect the infant against pertussis for the first few months of life, when the baby is most vulnerable. See [www.cdc.gov/mmwr/preview/mmwrhtml/mm6207a4.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6207a4.htm) for complete Tdap vaccination recommendations.

#### **BOX 4. RECOMMEND VACCINATION TO PREGNANT WOMEN**

Vaccination during pregnancy is the standard of care, recommended by the American Congress of Obstetricians and Gynecologists, American Academy of Family Physicians, Advisory Committee on Immunization Practices (ACIP), and other professional organizations.

- Pregnancy quadruples a woman's risk of influenza-related hospitalization.<sup>8</sup>
- Influenza increases risk of premature labor and delivery.<sup>9,10</sup>
- Vaccinating pregnant women also prevents influenza infection in their infants younger than 6 months, who are at high risk of influenza-related hospitalization<sup>11</sup> but too young to be vaccinated.
- Vaccination during pregnancy is safe.
  - In the last decade, millions of pregnant women have received inactivated influenza vaccine without harm.<sup>12</sup>
  - Inactivated vaccine is not associated with pregnancy complications (gestational hypertension or diabetes, preeclampsia/eclampsia, and chorioamnionitis)<sup>13</sup> or serious adverse events.<sup>14</sup>

**Pregnant women are 5 times more likely to be vaccinated if their providers offer or recommend influenza vaccination.<sup>15</sup>**



*Give inactivated preservative-free vaccine to all pregnant women in any trimester to prevent influenza infection and complications in both the mother and her infant.*

### **Get vaccinated and vaccinate other health care workers as soon as possible**

Health care workers should get their vaccinations as soon as vaccine is available to avoid transmitting influenza to vulnerable patients, such as adults aged 65 and older, for whom vaccine may be less effective.<sup>16</sup>

*Influenza vaccination requirements:* When the NYS Commissioner of Health declares that influenza is prevalent, licensed Article 28, 36, and 40 health care and residential facilities must<sup>17</sup>

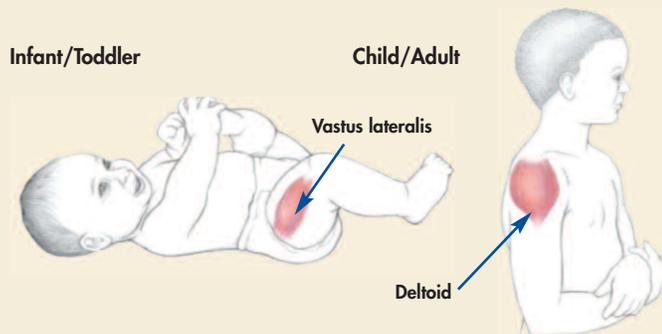
- document the influenza vaccination status of all health care workers,
- provide masks and ensure that unvaccinated workers wear them in areas where patients or residents may be present.

Last season, the median flu vaccination rate of health care personnel in these facilities was 85% (unpublished data)—the highest level ever achieved, demonstrating the regulation's success.

In addition to these NYS requirements, hospitals and ambulatory care centers<sup>18</sup> must report health care workers' vaccination coverage to the Centers for Medicare and Medicaid Services (CMS) using the National Healthcare Safety Network platform.

Evidence-based strategies to improve staff vaccination rates include extending availability of vaccine to weekends and evenings, using mobile carts, vaccinating senior staff,<sup>19</sup> and offering free onsite vaccination for more than 1 day.<sup>20</sup>

## FIGURE. ANATOMIC SITES FOR INTRAMUSCULAR IMMUNIZATION



### Vaccination sites

- Adults and older children: Deltoid muscle.
- Infants and children aged 6 through 35 months: Preferred site is the anterolateral aspect of the thigh.

### Recommended needle lengths

- Adults and older children:  $\geq 1$  in. ( $>25$  mm) (longer needles may be needed, depending on the patient's size).
- Children with adequate deltoid muscle mass: 7/8 in. to 1.25 in.
- Children aged  $<12$  months: 7/8 in. to 1 in.

Sources: ACIP recommendations and product prescribing information.

Figure used with permission of the California Department of Public Health Immunization Branch.

## THIS SEASON'S VACCINES

Vaccine composition varies each year according to circulating strains. Vaccines are available in intramuscular, intradermal, and intranasal forms.

Trivalent inactivated vaccines (IIV3) protect against 2 influenza A strains and 1 influenza B strain. Quadrivalent vaccines (IIV4 and LAIV4) protect against 2 influenza A and 2 influenza B strains. See the complete list of influenza vaccines available for the 2014-2015 influenza season at [www.cdc.gov/mmwr/preview/mmwrhtml/mm6332a3.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6332a3.htm).

Inject intramuscular vaccine at a  $90^\circ$  angle (**Figure**). The needle should be long enough to penetrate muscle mass and prevent vaccine from seeping into subcutaneous tissue (see [www.immunize.org/catg.d/p3085.pdf](http://www.immunize.org/catg.d/p3085.pdf)). See <https://public.health.oregon.gov/PreventionWellness/VaccinesImmunization/ImmunizationProviderResources/Training/LearningVideos/Pages/im.aspx> for a demonstration of intramuscular vaccination technique.

## VACCINE SAFETY

While vaccines are extensively tested for safety, all vaccines can potentially cause minor, transient reactions; serious reactions are rare.

## Common reactions

- Intramuscular and intradermal vaccines can cause injection site reactions (more common with intradermal vaccine), low-grade fever, muscle aches, headache, and fatigue.<sup>21</sup>
- Intranasal (LAIV4) vaccines can cause runny nose, nasal congestion, cough, sore throat, fever, headache, and wheezing.<sup>21</sup>

## Allergy concerns

Ask all patients about previous allergic reactions to influenza vaccine or its components (eg, egg protein, preservatives, latex). Vaccines without these components are available. Alert patients to possible reactions to the vaccine and tell them to report any concerning reactions.

*Egg protein:* Allergy to egg protein is not an absolute contraindication to receiving influenza vaccine when proper precautions are taken. *Administer flu vaccine in settings in which personnel and equipment for rapid recognition and treatment of anaphylaxis are available.*

- Patients with less severe egg allergy, that is, those who can eat lightly cooked egg without reaction, can receive IIV per the usual protocol.
- Patients who have experienced only hives after eating eggs or foods containing eggs can receive IIV (egg- or cell culture-based) or RIV3 (recombinant hemagglutinin, containing no egg protein), but not LAIV4. RIV3 is recommended for age-appropriate patients with mild

## INFLUENZA VACCINE—MYTHS AND FACTS

**Myth 1. Influenza vaccination causes a mild version of the flu.**

**Fact.** Inactivated influenza vaccine contains killed viruses that cannot cause infection. LAIV contains only weakened viruses that cannot infect tissue outside the nose.

**Myth 2. It's too late to get vaccinated after the end of November.**

**Fact.** Influenza virus circulates year-round and usually peaks January through March. While it's better to get protected early, you should still be vaccinated in or after November for protection during the influenza season.

**Myth 3. Influenza vaccine contains mercury, which is unsafe.**

**Fact.** Single-dose preparations of flu vaccine (single-dose vials or prefilled syringes) do not contain any thimerosal and are widely available.

Only influenza vaccines that come in multidose vials contain a small amount of the preservative thimerosal, which is made using ethylmercury. Ethylmercury is nontoxic and is quickly excreted from the body.

egg allergy. If RIV3 is unavailable<sup>22</sup> or the patient is outside the indicated age range, egg-based IIV is acceptable, but it should be administered by a provider familiar with the recognition and management of egg allergy, and the patient must be observed for at least 30 minutes for signs of a reaction.

- Patients aged 18 and older who have had severe symptoms (eg, cardiovascular changes, respiratory distress) or needed epinephrine or other emergency medical intervention after egg exposure may receive RIV3 if there are no other contraindications. If RIV3 is unavailable or the patient is outside the indicated age range, refer to a physician with expertise in managing allergic conditions for further assessment before receipt of vaccine.

*Other allergens:* Many formulations of influenza vaccine are available, including those without preservatives, antibiotics, latex, and/or gelatin. If a patient has a known sensitivity to one or more components, check vaccine package inserts to find a formulation that does not contain the implicated ingredient.

*Allergy-related contraindications:* **A previous severe allergic reaction to influenza vaccine is always a contraindication to vaccination if the allergic trigger is unknown.**<sup>1</sup>

### Other considerations

People with moderate to severe acute illness with or without fever should wait until they feel better before getting the influenza vaccine.<sup>23</sup>

Consider the risks and benefits of vaccination in individuals who have developed Guillain-Barré syndrome within 6 weeks of receipt of a prior influenza vaccine.

## USE ANTIVIRALS FOR TREATMENT AND PREVENTION

Recommend oseltamivir (Tamiflu<sup>®</sup> capsules) or zanamivir (Relenza<sup>®</sup> oral inhalation) to help reduce the severity of influenza illness. These antiviral agents are most effective when given within 48 hours after the first symptoms.<sup>24</sup>

- Oseltamivir is indicated for treatment of uncomplicated acute influenza illness in patients aged 2 weeks and older who have been symptomatic for no more than 2 days.
- Zanamivir is indicated for treatment of uncomplicated acute influenza illness in patients aged 7 and older who have been symptomatic for no more than 2 days. Zanamivir is not recommended for people with underlying respiratory disease such as asthma or COPD.

Use oseltamivir or zanamivir as chemoprophylaxis for health care workers and people at higher risk for complications who for medical reasons cannot be

vaccinated. Amantadine (Symmetrel<sup>®</sup>, Symadine<sup>®</sup>) and rimantadine (Flumadine<sup>®</sup>) are active only against influenza A viruses and are not recommended for treatment or prophylaxis of currently circulating viruses because influenza A strains are resistant.

## WHEN TO REPORT INFLUENZA CASES

### Always report the following:

- Nosocomial cases of lab-confirmed influenza, or clusters of 2 or more cases of influenza-like illness, in Article 28 facilities.
  - Call the NYS Department of Health at 518-474-1142, or
  - Use the Health Commerce System Nosocomial Outbreak Reporting Application at [https://commerce.health.state.ny.us/public/hcs\\_login.html](https://commerce.health.state.ny.us/public/hcs_login.html), or
  - Complete a Healthcare Facility Infection Control (Nosocomial) Report available at [www.health.ny.gov/forms/doh-4018.pdf](http://www.health.ny.gov/forms/doh-4018.pdf) and fax to 518-402-5165.
- Deaths in people aged 17 and younger that occurred from a clinically compatible illness in which there is a positive influenza test or from an unknown febrile respiratory illness.
  - Call the NYC Health Department at 347-396-2600.

## REGISTER FOR INFLUENZA ALERTS

Check the Health Department influenza website ([www.nyc.gov/flu](http://www.nyc.gov/flu)) for updates on local influenza activity and register for the Health Alert Network ([www.nyc.gov/health/nycmed](http://www.nyc.gov/health/nycmed)) to receive alerts about influenza and other emerging public health issues in NYC.

To join the Health Department's ILINet Influenza Surveillance Program as a sentinel physician and receive free influenza tests at the NYC Public Health Laboratory and guidance on influenza management, contact Beth Nivin at 347-396-2616 or e-mail [bnivin@health.nyc.gov](mailto:bnivin@health.nyc.gov).

## SUMMARY

Influenza is a highly infectious disease causing significant illness and even death. Strongly recommend influenza vaccination for everyone aged 6 months and older, especially infants and young children, older adults, and people of any age with chronic medical conditions or who are immunocompromised. Vaccinate children and health care workers as early as possible. Give women in any trimester of pregnancy inactivated vaccine as soon as vaccine is available. See **Influenza Season Basics** on page 43 for important vaccination information. ♦

## RESOURCES

### NYC Department of Health and Mental Hygiene Contact Information

- Provider Access Line: 9:00 AM to 5:00 PM: 866-692-3641/866-NYC-DOH1; after business hours: 212-764-7667
- Influenza Web site (includes Flu locator): [www.nyc.gov/flu](http://www.nyc.gov/flu)
- E-mail questions to NYC Health Department: [nycflu@health.nyc.gov](mailto:nycflu@health.nyc.gov)
- Health Alert Network (HAN): sign up at <https://a816-healthpsi.nyc.gov>, <https://a816-health29ssl.nyc.gov/sites/NYCHAN/WebPages/home.aspx>, or 888-692-3641.

### NYS Department of Health Reporting

- Bureau of Communicable Disease Control: 518-473-4439
- Nosocomial Report Form DOH 4018: [www.health.state.ny.us/forms/doh-4018.pdf](http://www.health.state.ny.us/forms/doh-4018.pdf)

### Immunization Recommendations

- CDC. Influenza vaccines, 2014-2015: [www.cdc.gov/mmwr/preview/mmwrhtml/mm6332a3.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6332a3.htm)
- Seasonal influenza vaccination resources for health professionals: [www.cdc.gov/flu/professionals/vaccination/](http://www.cdc.gov/flu/professionals/vaccination/)
- ACIP. Recommended Child and Adult Immunization Schedules—United States, 2014: [www.cdc.gov/vaccines/schedules/](http://www.cdc.gov/vaccines/schedules/)
- Vaccine administration information: [www.cdc.gov/vaccines/pubs/pinkbook/downloads/appendices/d/vacc\\_admin.pdf](http://www.cdc.gov/vaccines/pubs/pinkbook/downloads/appendices/d/vacc_admin.pdf)

- NYS influenza recommendations for health care workers: [www.health.ny.gov/diseases/communicable/influenza/seasonal/providers/prevention\\_of\\_influenza\\_transmission/](http://www.health.ny.gov/diseases/communicable/influenza/seasonal/providers/prevention_of_influenza_transmission/)
- NYC Departments of Health and Mental Hygiene and Education. September 2014 Medical Requirements for New School Entrants: [www.nyc.gov/html/doh/downloads/pdf/imm/sch-med-req.pdf](http://www.nyc.gov/html/doh/downloads/pdf/imm/sch-med-req.pdf)
- Immunization Action Coalition: [www.immunize.org/influenza](http://www.immunize.org/influenza)
- American College of Physicians Immunization Portal: <http://immunization.acponline.org>
- American College of Obstetricians and Gynecologists Immunization Information for Ob-Gyns and Their Patients: [www.immunizationforwomen.org](http://www.immunizationforwomen.org)

### Improving Vaccination Coverage

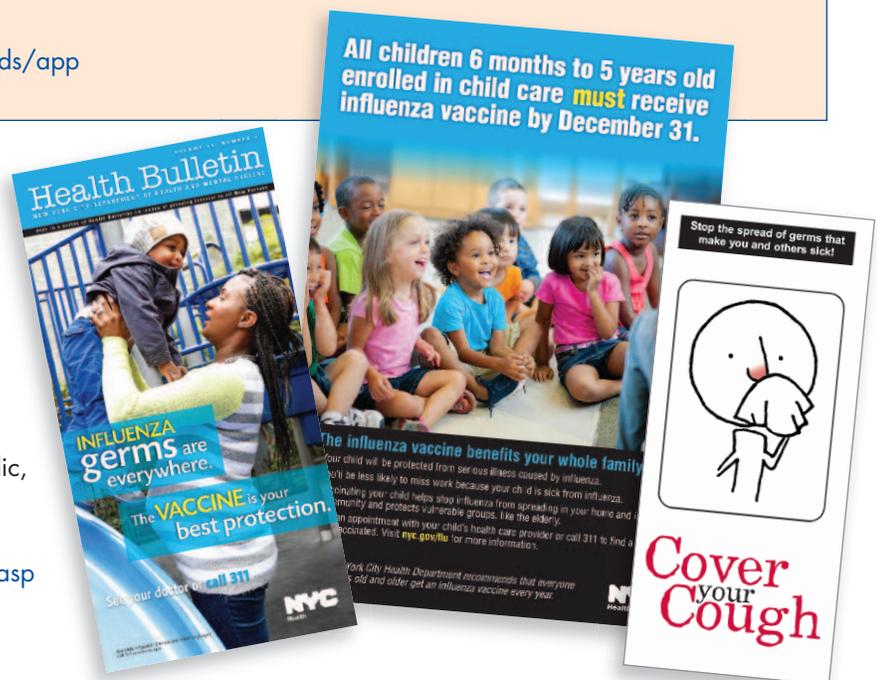
- Centers for Medicare & Medicaid Innovation. Influenza vaccination strategies: <http://innovation.cms.gov/Files/x/PGP-Flu-Vaccination.pdf>

### Coding and Billing Information

- American College of Physicians. Billing and coding adult immunizations: [www.acponline.org/running\\_practice/payment\\_coding/coding/billvaccines.pdf](http://www.acponline.org/running_practice/payment_coding/coding/billvaccines.pdf)

### Patient Education Materials

- NYC Department of Health and Mental Hygiene: [www.nyc.gov/html/doh/html/hcp/flu-patient-education.shtml](http://www.nyc.gov/html/doh/html/hcp/flu-patient-education.shtml)  
Materials are available in multiple languages.
- CDC: [www.cdc.gov/flu/freeresources/index.htm](http://www.cdc.gov/flu/freeresources/index.htm)  
Free flyers, posters, brochures for the general public, families and children, and high-risk groups
- Immunization Action Coalition: [www.immunize.org/handouts/influenza-vaccines.asp](http://www.immunize.org/handouts/influenza-vaccines.asp)



## INFLUENZA SEASON BASICS

1. **Order enough vaccine**, including an adequate supply of preservative-free vaccine for pregnant women. See [www.izsummitpartners.org/ivats/](http://www.izsummitpartners.org/ivats/) for information about influenza vaccine availability by vaccine manufacturers and distributors.

**If you are enrolled in the Vaccines for Children program, order vaccine at [www.nyc.gov/health/cir](http://www.nyc.gov/health/cir).** Order an adequate supply of preservative-free vaccine for young children.

2. **Store vaccine safely** to ensure full potency. See Checklist for Safe Vaccine Storage and Handling at [www.immunize.org/catg.d/p3035.pdf](http://www.immunize.org/catg.d/p3035.pdf) for vaccine safety steps.

3. **Document vaccines and forms** in the patient record. Record the edition date of the Vaccine Information Statement given to the patient (see [www.immunize.org/vis/](http://www.immunize.org/vis/)), and the signed Vaccine Refusal Form if applicable (see [www.nyc.gov/html/doh/downloads/pdf/imm/immiv-refusal.pdf](http://www.nyc.gov/html/doh/downloads/pdf/imm/immiv-refusal.pdf)).

4. **Report adverse reactions** to the federal Vaccine Adverse Event Reporting System (VAERS) at [www.vaers.hhs.gov](http://www.vaers.hhs.gov) or 1-800-822-7967.<sup>25</sup>

5. **Track vaccination coverage at your practice.**<sup>a</sup> Use your EHR to identify patients for vaccination and track your practice coverage level.

**See Resources—Improving Vaccination Coverage for tips on increasing the vaccination rate in your practice.**

<sup>a</sup> Pediatric care practices that report administered flu vaccine doses to the Citywide Immunization Registry (CIR) will soon be able to access up-to-date influenza reports anytime during flu season.





42-09 28th Street, Long Island City, NY 11101 (347) 396-2914

**Bill de Blasio**

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**Mary T. Bassett, MD, MPH**

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E-mail *City Health Information* at: [nycdohp@health.nyc.gov](mailto:nycdohp@health.nyc.gov)

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**REFERENCES**

- Grohskopf LA, Shay DK, Shimabukuro TT, et al; Centers for Disease Control and Prevention. Seasonal influenza (flu). Prevention and control of influenza with vaccines: recommendations of the Advisory Committee on Immunization Practices (ACIP)—United States, 2013-14. September 20, 2013. *MMWR Morb Mortal Wkly Rep*. 2013;62(RR07):1-43.
- Murphy PA, Frazee SG, Cantlin JP, Cohen E, Rosan JR, Harshburger DE. Pharmacy provision of influenza vaccinations in medically underserved communities. *J Am Pharm Assoc*. 2012;52(1):67-70. <http://japha.org/article.aspx?articleid=1043988>. Accessed October 9, 2014.
- American Academy of Pediatrics. Policy statement. Recommendations for prevention and control of influenza in children, 2013-2014. *Pediatrics*. 2013;132(4):1-16.
- National Institute of Allergy and Infectious Diseases. Health & Research Topics—Community immunity (“herd” immunity). Updated October 21, 2010. [www.niaid.nih.gov/topics/pages/communityimmunity.aspx](http://www.niaid.nih.gov/topics/pages/communityimmunity.aspx). Accessed March 12, 2014.
- Centers for Disease Control and Prevention. Pneumococcal disease. Symptoms & complications. [www.cdc.gov/pneumococcal/about/symptoms-complications.html](http://www.cdc.gov/pneumococcal/about/symptoms-complications.html). Accessed October 24, 2014.
- New York City Department of Health and Mental Hygiene. EpiQuery. New York City Community Health Surveys, 2010-2012. Pneumonia vaccination by race/ethnicity among adults aged 65 years or older and by age group. <https://a816-healthpsi.nyc.gov/epiquery/>. Accessed May 5, 2014.
- Centers for Disease Control and Prevention. Media statement. June 25, 2014. [www.cdc.gov/media/releases/2014/s0625-acip.html](http://www.cdc.gov/media/releases/2014/s0625-acip.html). Accessed August 12, 2014.
- Centers for Disease Control and Prevention. Influenza. In: Atkinson W, Wolfe C, Hamborsky J, eds. *Epidemiology and Prevention of Vaccine-Preventable Disease*. 12th ed. Washington, DC: Public Health Foundation; 2012:chap 11.
- Martin A, Cox S, Jamieson DJ, Whiteman MK, Kulkarni A, Tepper NK. Respiratory illness hospitalizations among pregnant women during influenza season, 1998-2008. *Matern Child Health J*. 2013;17(7):1325-1331.
- Cox S, Posner SF, McPheeters M, Jamieson DJ, Kourtis AP, Meikle S. Hospitalizations with respiratory illness among pregnant women during influenza season. *Obstet Gynecol*. 2006;107(6):1315-1322.
- Zaman K, Roy E, Arifeen SE, et al. Effectiveness of maternal influenza immunization in mothers and infants. *N Engl J Med*. 2008;359(15):1555-1564.
- Centers for Disease Control and Prevention. Seasonal influenza (flu). Seasonal flu vaccine safety and pregnant women. Updated November 7, 2013. [www.cdc.gov/flu/protect/vaccine/qa\\_vacpregnant.htm](http://www.cdc.gov/flu/protect/vaccine/qa_vacpregnant.htm). Accessed May 5, 2014.
- Naleway AL, Irving SA, Henning ML, et al; for the Vaccine Safety Datalink and Pregnancy and Influenza Project. Safety of influenza vaccination during pregnancy: A review of subsequent maternal obstetric events and findings from two recent cohort studies. *Vaccine*. 2014;32(26):3122-3127.
- Jefferson T, Di Pierantonj C, Rivetti A, Bawazeer GA, Al-Ansary LA, Ferroni E. Vaccines for preventing influenza in healthy adults. *Cochrane Database Syst Rev*. 2014 March 13;3:CD001269. doi: 10.1002/14651858.CD001269.pub5.
- Centers for Disease Control and Prevention. Influenza vaccination coverage among pregnant women—29 states and New York City, 2009-2010 season. *MMWR Morb Mortal Wkly Rep*. 2012;61(07):113-118.
- Flannery B, Thaker SN, Clippard J, et al. Interim estimates of 2013-14 seasonal influenza vaccine effectiveness—United States, February 2014. *MMWR Morb Mortal Wkly Rep*. 2014;63(07):137-141.
- New York State Department of Health. Prevention of influenza transmission by healthcare and residential facility and agency personnel. Effective date: 7/31/13. [www.health.ny.gov/regulations/recently\\_adopted/docs/2013-07-31\\_prevention\\_of\\_influenza\\_transmission\\_by\\_healthcare\\_and\\_residential\\_facility\\_and\\_agency\\_personnel.pdf](http://www.health.ny.gov/regulations/recently_adopted/docs/2013-07-31_prevention_of_influenza_transmission_by_healthcare_and_residential_facility_and_agency_personnel.pdf). Accessed August 8, 2014.
- Centers for Medicare & Medicaid Services. Ambulatory Surgical Center Quality Reporting Program Quality Measures Specifications Manual. [www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier2&cid=1228772475754](http://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier2&cid=1228772475754). Accessed October 24, 2014.
- Talbot TR, Dellit TH, Hebden J, Sama D, Cuny J. Factors associated with increased healthcare worker influenza vaccination rates: results from a national survey of university hospitals and medical centers. *Infect Control Hosp Epidemiol*. 2010;31(5):456-462.
- Centers for Disease Control and Prevention. Influenza vaccination coverage among health-care personnel—United States, 2010-11 influenza season. *MMWR Morb Mortal Wkly Rep*. 2011;60(32):1073-1077.
- Centers for Disease Control and Prevention. Vaccines and immunizations. Possible side-effects from vaccine. Updated February 4, 2014. [www.cdc.gov/vaccines/vac-gen/side-effects.htm#flu](http://www.cdc.gov/vaccines/vac-gen/side-effects.htm#flu). Accessed April 29, 2014.
- American Academy of Pediatrics. *Red Book: 2012 Report of the Committee on Infectious Diseases*. Pickering LK, ed. 29th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2012.
- Centers for Disease Control and Prevention. Vaccines and immunizations. Vaccine contraindications and precautions. Updated October 19, 2013. [www.cdc.gov/vaccines/recs/vac-admin/contraindications.htm](http://www.cdc.gov/vaccines/recs/vac-admin/contraindications.htm). Accessed June 12, 2014.
- Centers for Disease Control and Prevention. Seasonal influenza (flu). Influenza antiviral medications: summary for clinicians. March 21, 2014. [www.cdc.gov/flu/professionals/antivirals/summary-clinicians.htm](http://www.cdc.gov/flu/professionals/antivirals/summary-clinicians.htm). Accessed May 1, 2014.
- Immunization Action Coalition. Standing orders for administering influenza vaccine to adults. [www.immunize.org/catg.d/p3074.pdf](http://www.immunize.org/catg.d/p3074.pdf). Accessed October 9, 2014.