

City Health Information

Volume 38 (2019) | No 4; 25-38

New York City Department of Health and Mental Hygiene

INFLUENZA PREVENTION AND CONTROL, 2019-2020

- Every influenza season is associated with hospitalizations and deaths, including pediatric deaths; strongly recommend and offer vaccine each influenza season.
- Ensure that you and your entire staff receive flu vaccine and that all staff counsel patients and caregivers on the benefits of flu vaccine.
- Vaccinate all patients aged 6 months and older as soon as flu vaccine is available.
- Be aware that the NYC Board of Health requires all children aged 6 through 59 months attending city-licensed and -regulated child care to receive the flu vaccine by December 31 of each year.
- Give inactivated flu vaccine to all pregnant patients in any trimester to prevent influenza infection and complications in both the patient and infant.
- For patients aged 65 years and older, the NYC Health Department recommends high-dose or adjuvanted flu vaccine.

INSIDE THIS ISSUE [\(click to access\)](#)

INTRODUCTION

Important groups to vaccinate (box)

Medical conditions that increase risk of severe complications (box)

MAKE SURE YOU AND YOUR STAFF ARE VACCINATED

Vaccination requirements for health care workers (box)

IMPROVE VACCINATION COVERAGE

National Vaccine Advisory Committee (NVAC) Standards for Adult Immunization Practice (box)

PROVIDER RECOMMENDATION IS THE STRONGEST PREDICTOR OF VACCINATION

Common questions about the importance of flu vaccination (box)
Immunization and pharmacists (box)

DISCUSS VACCINE SAFETY

What to tell patients about flu vaccine safety (box)

VACCINATE CHILDREN AS EARLY AS POSSIBLE

VACCINATE PREGNANT PATIENTS AGAINST INFLUENZA AND PERTUSSIS

Reasons to give flu vaccine in any trimester of pregnancy (box)

VACCINATE OLDER ADULTS

THIS SEASON'S VACCINES

Available flu vaccines for the 2019-2020 season (table)

ASSESS FOR CONTRAINDICATIONS AND PRECAUTIONS

Administering the flu vaccine to patients with egg allergies (figure)

VACCINATE AGAINST PNEUMOCOCCAL DISEASE

Pneumococcal vaccine administration for adults aged 19 years and older (table)

REPORTING, ALERTS, AND SURVEILLANCE

PRESCRIBE ANTIVIRALS FOR TREATMENT AND PROPHYLAXIS

SUMMARY

Influenza quiz (box)

Flu vaccine reminders (box)

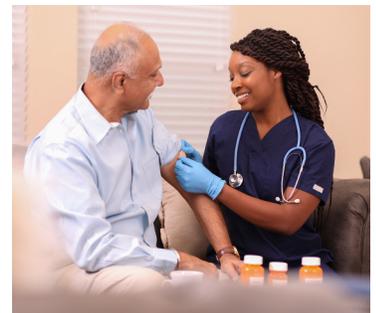
RESOURCES FOR PROVIDERS

RESOURCES FOR PATIENTS

REFERENCES

Influenza is a highly contagious viral infection that results in serious illness, hospitalizations, and deaths every season. Infants, pregnant patients, older adults, and people of any age with chronic medical conditions are at higher risk of serious complications.¹ The 2018-2019 influenza season was the longest recorded in a decade, lasting 21 weeks.^{2,3} During the season, influenza resulted in^{3,4}

- an estimated 531,000 to 647,000 hospitalizations nationwide and
- 136 influenza-related pediatric deaths, including 3 children in New York City (NYC).



Vaccination is our best defense against influenza and its complications. An estimated 7.1 million influenza cases, 109,000 hospitalizations, and 8,000 deaths were prevented by vaccination in the United States during the 2017-2018 influenza season, which was severe for all ages.⁵ Among children aged 6 months to 4 years, vaccination averted an estimated 41% of hospitalizations during the 2017-2018 season.⁵

Despite the importance of flu vaccination, coverage in NYC falls short of the Healthy People 2020 target of 70%

BOX 1. IMPORTANT GROUPS TO VACCINATE¹

- All children aged 6 through 59 months, especially children aged younger than 2 years
- Adults aged 50 years and older, especially those 65 years and older
- Patients who are or may be pregnant during influenza season
- Residents of nursing homes and other long-term care facilities
- American Indians and Alaska Natives
- Adults and children with certain high-risk medical conditions (**Box 2**)
- Health care workers
- Household contacts and caregivers of
 - children aged younger than 5 years, especially those younger than 6 months
 - adults aged 50 years and older
 - people with certain medical conditions (**Box 2**)

The New York City Board of Health requires all children aged 6 through 59 months attending city-licensed and -regulated day care, school-based child care, Head Start, and prekindergarten programs to receive an annual flu vaccine by December 31 of each year.

BOX 2. MEDICAL CONDITIONS THAT INCREASE RISK OF SEVERE COMPLICATIONS¹

- Asthma and chronic lung disease (eg, chronic obstructive pulmonary disease, cystic fibrosis)
- Heart disease (eg, congenital heart disease, congestive heart failure, coronary artery disease)
- Renal, hepatic, neurologic, hematologic, or metabolic disorders, including diabetes
- Immunocompromise due to any cause, including immunosuppression caused by medications or by HIV infection
- Conditions requiring aspirin- or salicylate-containing medications in people aged younger than 19 years because of risk of Reye syndrome after influenza infection
- Morbid obesity (body mass index ≥ 40)

for all age groups, except ages 6 through 59 months.⁶ Coverage among children aged 6 through 59 months increased from 64.0% in 2017-2018 to 74.2% in 2018-2019 (unpublished Citywide Immunization Registry [CIR] data), after implementation of the NYC Board of Health flu vaccination requirement for children attending NYC-licensed and -regulated child care.⁷ In contrast, the overall coverage rate for children aged 18 years and younger was 52.9% during the 2018-2019 season (unpublished CIR data). Based on 2018 Community Health Survey data, coverage was 47.0% for adults aged 18 years and older and 62.8% for adults aged 65 years and older (unpublished NYC Health Department data). Among adults aged 65 years and older, non-Latino Blacks had the lowest coverage at 49.5%, compared with 64.7% among non-Latino Whites, 67.4% among Latinos, and 73.1% among Asians (unpublished NYC Health Department data).

Strongly recommend and offer flu vaccine for all patients aged 6 months and older as soon as vaccine becomes available, especially for people at highest risk of influenza and its complications (**Box 1** and **2¹**).

MAKE SURE YOU AND YOUR STAFF ARE VACCINATED

All health care workers should be vaccinated as soon as vaccine is available to protect themselves, their families, and their patients from influenza infection and transmission (**Box 3^{8,9}**). Flu vaccine coverage among NYC health care workers in regulated facilities increased after New York State (NYS) influenza prevention regulations were established in 2013; in the 2018-2019 season, coverage was 72% (unpublished NYS Health Department data).

BOX 3. VACCINATION REQUIREMENTS FOR HEALTH CARE WORKERS^{8,9}

- When the New York State Commissioner of Health declares that influenza is prevalent, Articles 28, 36, and 40 require health care and residential facilities to
 - document the flu vaccination status of all health care workers
 - provide masks for unvaccinated workers and ensure that masks are worn in the presence of patients or residents as long as influenza is prevalent
- Many health care facilities must also report health care workers' vaccination status to the Centers for Medicare and Medicaid Services (CMS) using the National Healthcare Safety Network platform. See [CMS Reporting Requirements](#) for more information

IMPROVE VACCINATION COVERAGE

Improve vaccination coverage by using standing orders, reminder-recall systems, self-screening tools, posters, and patient handouts (**Resources for Providers**), and follow the National Vaccine Advisory Committee (NVAC) Standards for Adult Immunization Practice (**Box 4**^{10,11}).

PROVIDER RECOMMENDATION IS THE STRONGEST PREDICTOR OF VACCINATION

Provider recommendation is the strongest predictor of whether patients receive needed vaccines.^{12,13} Explain the importance of annual flu vaccination in plain language, respectfully addressing the patient's or parent's questions or concerns related to safety, potential side effects, effectiveness, or other issues that keep them from readily accepting vaccination (**Box 5**¹⁴ and **6**^{1,15-17}).

- Tell your patients that you consider vaccinations, including flu vaccine, to be a health care priority.
- Explain why you, your staff, and your family get vaccinated each year.
- Ensure that all staff members who have patient contact give the same culturally competent, affirmative, and accurate messages about flu vaccination (**Resources for Providers**).

BOX 4. NATIONAL VACCINE ADVISORY COMMITTEE (NVAC) STANDARDS FOR ADULT IMMUNIZATION PRACTICE^{10,11}

1. **ASSESS** the immunization status of all patients at every visit
2. **STRONGLY RECOMMEND** needed vaccines
3. **ADMINISTER** needed vaccines or **REFER** patients to another vaccinator
 - a. Use [standing orders](#) to allow registered nurses to independently assess patient vaccination status and administer needed vaccines without a direct order from the physician; this will save time and reduce missed opportunities for vaccination (**Resources for Providers**)
 - b. If you do not stock vaccine, use [NYC HealthMap](#) to find a local vaccine provider such as a pharmacist for referral (**Box 7**)
4. **DOCUMENT** all vaccines that patients receive
 - a. Use the Citywide Immunization Registry (CIR) to document vaccinations and to let other providers know which vaccines patients have received
 - b. Report immunizations given to adult patients to the CIR, with the patient's written or verbal consent

- Advise patients that flu vaccination is covered by most insurance plans and is available at no cost under the Affordable Care Act (ACA), though there may be a copayment for office visits and restrictions about out-of-network providers. In NYC, 70% of children are eligible for publicly funded vaccine distributed through the Vaccines for Children program (unpublished 2019 CDC Population Estimate Survey data) (**Resources for Providers**).
- If you do not offer vaccinations, refer patients to other vaccine providers, including pharmacies (**Box 7**¹¹).

BOX 5. COMMON QUESTIONS ABOUT THE IMPORTANCE OF FLU VACCINATION¹⁴

Q: Why do I need a flu vaccine?

A: You need a flu vaccine because influenza can cause serious illness, especially in young children, pregnant patients, older adults, and people with certain chronic medical conditions such as asthma, heart disease, and/or diabetes. Influenza can cause complications that lead to hospitalization and/or death, even in otherwise healthy children and adults.

Q: Will a flu vaccine do any good? I got a flu vaccine once and got the flu anyway.

A: Yes, a flu vaccine will give you protection against the influenza virus and prevent many influenza infections, even though it may not be 100% effective. If you do get influenza, the vaccine can make your illness milder and reduce the risk of complications, including hospitalization and death.

Q: How late is too late to get a flu vaccine?

A: You can be vaccinated against influenza at any time during the influenza season. Influenza viruses circulate all year. Influenza activity usually peaks between January and March, but outbreaks have occurred as late as May; in 2018-2019, influenza activity remained elevated for more than 5 months. If you didn't get a flu vaccine at the start of influenza season, you should still be vaccinated after December and into the new year.

Q: Do I need a flu vaccine every year?

A: Yes, everyone aged 6 months and older needs a flu vaccine every year. Influenza viruses can change each influenza season, so you need a flu vaccine every year. This year's flu vaccine includes 2 new influenza strains.

Q: Why do I need a flu vaccine if other people are vaccinated? Won't that keep me from getting influenza?

A: Your best protection against influenza is getting vaccinated yourself. Influenza is highly contagious. People who don't get vaccinated can get influenza themselves and pass it on to people who may be more likely to have serious complications, including infants younger than 6 months, pregnant patients, older adults, and people with chronic health conditions.

DISCUSS VACCINE SAFETY

Explain that vaccines are safe, generally causing only mild reactions, and discuss any concerns patients may have (**Box 6**^{1,15-17}). Before vaccinating, give the CDC Vaccine Information Statement (VIS) as required by law. VISs are available in more than 30 languages and should be given in a language that the recipient or parent can understand (see [Immunization Action Coalition](#) and [Resources](#)).

BOX 6. WHAT TO TELL PATIENTS ABOUT FLU VACCINE SAFETY^{1,15-17}

Vaccines generally cause only mild reactions

- Flu vaccines have a long safety track record and are thoroughly tested by the FDA for purity and potency before they are released for distribution
- Most side effects are minor and pass quickly
- The flu shot can cause soreness, redness, or swelling at the injection site, headache, fatigue, muscle aches, and low-grade fever
- The nasal spray flu vaccine may cause a localized reaction, such as nasal congestion
- Serious side effects are very rare
- The FDA and CDC maintain robust surveillance systems for detection and identification of any safety issues

The flu vaccine is made from safe ingredients

- Thimerosal is a vaccine preservative made with ethyl mercury. Ethyl mercury is not the same as the type of mercury associated with fish (which is called methylmercury). Ethyl mercury is quickly excreted from the body and does not cause harm
- There is no thimerosal in single-dose preparations of flu vaccine
- All multidose vials of flu vaccines contain a small amount of thimerosal

The flu vaccine is unlikely to cause a severe allergic reaction

- Before I vaccinate, I ask all my patients if they have an allergy to any of the vaccine ingredients or if they had a reaction to a previous vaccination
- Many forms of flu vaccine don't contain common allergens such as preservatives, antibiotics, or gelatin; some are egg-free. There is no latex in any of this season's vaccines

The flu vaccine cannot cause influenza

- The inactivated flu shot does not contain live viruses, so it cannot cause influenza
- The nasal spray flu shot does contain live viruses; however, the viruses are weakened so that they cannot cause influenza but may cause nasal congestion

VACCINATE CHILDREN AS EARLY AS POSSIBLE

Young children are at high risk of serious complications from influenza. It is especially important to protect infants aged younger than 6 months because they are at high risk of influenza-related hospitalizations and medically attended visits but are too young to be vaccinated. Strongly encourage household contacts and child care providers to also get vaccinated.

The NYC Board of Health requires all children aged 6 through 59 months attending city-licensed and -regulated child care to receive an annual flu vaccine by December 31 of each year.⁷ With implementation of the flu vaccine mandate during the 2018-2019 flu season, the coverage rate for children in this age group was 74.2%, a 10% increase from last season (unpublished CIR data).

The CDC recommends administering 2 doses of flu vaccine (at least 4 weeks apart) to all children aged 6 months through 8 years, if they have not received 2 or more doses of flu vaccine before July 1, 2019. For those doses received before July 1, 2019, the 2 doses of flu vaccine need not have been administered in the same season or in consecutive seasons. All other children should receive 1 dose of flu vaccine.¹ As of April 1, 2018, pharmacists in NYS can administer flu vaccine to children aged as young as 2 years (**Box 7**¹¹).¹¹

BOX 7. IMMUNIZATION AND PHARMACISTS¹¹

- Pharmacists in New York State are authorized to administer
 - flu vaccine to everyone aged 2 years and older
 - tetanus-containing (Td/Tdap), pneumococcal (PCV13 and PPSV23), meningococcal (MenACWY and MenB), and zoster vaccines to adults aged 18 years and older
- Patients can check with their local pharmacy directly or visit [NYC HealthMap](#) to search for vaccines available, ages served,^a and payment and insurance information, including participation in the Vaccines for Children Program
- Pharmacists administering flu vaccine should check the Citywide Immunization Registry (CIR) to assess for and coadminister any other vaccines that are due
- Pharmacies routinely report flu (and other) vaccines to the CIR; during the 2018-2019 season, they reported administering more than 460,000 doses of flu vaccine (unpublished CIR data)

^aNew York State pharmacists may vaccinate children aged as young as 2 years, but each pharmacy may have its own age limits

For the 2019-2020 influenza season, the Advisory Committee on Immunization Practices (ACIP) and the American Academy of Pediatrics (AAP) recommend any licensed, age-appropriate influenza vaccine.¹⁸

VACCINATE PREGNANT PATIENTS AGAINST INFLUENZA AND PERTUSSIS

Influenza

Influenza can be dangerous to pregnant patients and their infants who are too young to receive the vaccine. The American College of Obstetricians and Gynecologists (ACOG)¹⁹ and ACIP¹ recommend flu vaccination in pregnancy as the standard of care. In 2016, almost 1 in 5 pregnant NYC patients reported that they did not get a recommendation from their health care provider to receive a flu vaccine during the 12 months before delivery. Only 59% of pregnant patients reported receiving the flu vaccine that year (unpublished Pregnancy Risk Assessment Monitoring System [PRAMS] data), which is lower than the Healthy People 2020 goal of 80% flu vaccine coverage among pregnant patients.⁶

As provider recommendation is the strongest predictor of vaccination,^{12,13} strongly recommend and offer inactivated flu vaccine to all pregnant patients in any trimester as soon as vaccine becomes available (**Box 8**²⁰⁻²⁵).

Pertussis

When offering and administering flu vaccine, providers should also strongly recommend and offer tetanus, diphtheria, and pertussis (Tdap) vaccine to all pregnant patients during each pregnancy, preferably during 27 to 36 weeks' gestation. Young infants are at greatest risk of severe disease, hospitalizations, and

BOX 8. REASONS TO GIVE FLU VACCINE IN ANY TRIMESTER OF PREGNANCY²⁰⁻²⁵

- Pregnant patients are 4 times more likely to have an influenza-related hospitalization than nonpregnant patients
- Influenza increases the risk of premature labor and delivery
- Vaccination prevents influenza infection in the infant through transplacental antibody transfer, which protects infants aged younger than 6 months who are too young to get vaccinated and at high risk of complications
- Vaccination with inactivated vaccine during pregnancy is safe in any trimester
- Inactivated flu vaccine has been given to millions of pregnant patients without harm and is available in single-dose preparation without thimerosal

death from pertussis.²⁶ The Tdap vaccine protects newborns in the first few months of life against pertussis through transplacental transfer of antibodies during pregnancy. A large US study concluded that maternal Tdap vaccination prevented 91.4% of pertussis infections among infants in the first 2 months of life, before the first infant dose of diphtheria, tetanus, and pertussis (DTaP) vaccine is typically administered.²⁷

In 2016, only 65% of pregnant patients in NYC reported that their provider recommended Tdap vaccine during any prenatal care visit, and 61% reported receiving Tdap vaccine (unpublished PRAMS data, 2016).

See [ACIP's complete Tdap vaccination recommendations](#) for pregnancy and pertussis.

VACCINATE OLDER ADULTS

For adults aged 65 years and older, the NYC Health Department recommends high-dose or adjuvanted flu vaccines, which are currently only available as trivalent inactivated vaccines. High-dose trivalent inactivated influenza vaccine (IIV3) has demonstrated higher effectiveness compared with standard-dose (SD) IIV3 in preventing laboratory-confirmed influenza (relative vaccine efficacy [VE], 24.2%) and hospitalizations due to influenza (relative VE, 17.8%) among adults aged 65 years and older.¹ Limited data have shown increased effectiveness of adjuvanted IIV3 compared with SD IIV3 in preventing laboratory-confirmed influenza (relative VE, 63%).¹ However, if you only have SD quadrivalent inactivated vaccine, do not delay vaccinating your patients aged 65 years and older.

THIS SEASON'S VACCINES

For the 2019-2020 season, IIV3 contains an A/Brisbane/02/2018 (H1N1)pdm09-like virus, an A/Kansas/14/2017 (H3N2)-like virus, and a B/Colorado/06/2017-like (B/Victoria lineage) virus. The trivalent vaccine will be available in high-dose and adjuvanted formulations only. All other flu vaccine types are quadrivalent vaccines. The quadrivalent flu vaccine includes the trivalent vaccine viruses as well as a B/Phuket/3073/2013-like (B/Yamagata lineage) virus. Both A components (H1N1 and H3N2) of the trivalent and quadrivalent vaccines have changed from last season's formulations to better match circulating strains.

Administer any licensed, age-appropriate influenza vaccine (IIV, cell culture-based influenza vaccine [ccIIV4], recombinant influenza vaccine [RIV4], or intranasally administered live attenuated influenza vaccine [LAIV4]).¹ See **Table 1**^{1,28} for information on this season's vaccines.

ASSESS FOR CONTRAINDICATIONS AND PRECAUTIONS

Ask about patients' current health status, including any acute illness and history of reactions to flu vaccine.

For people with a history of egg allergy, ACIP recommendations for administering the flu vaccine remain the same since the 2016-2017 season (**Figure**³⁰).^{1,29} Alert patients to potential reactions to the vaccine and tell them to report any concerning reactions.

- Current illness: A patient with mild illness, such as diarrhea, upper respiratory tract illness, or otitis media, or on current antimicrobial therapy can be safely vaccinated. If illness is moderate to severe, with or without fever, consider the risks and benefits of administering flu vaccine.¹⁵

TABLE 1. AVAILABLE FLU VACCINES FOR THE 2019-2020 SEASON^{1,28}

Trade Name (Manufacturer)	Presentation ^a	Age Indication
Inactivated influenza vaccines, quadrivalent (IIV4s), standard-dose (IM)		
Afluria Quadrivalent (Seqirus)	0.25-mL prefilled syringe	6-35 months
	0.5-mL prefilled syringe	≥3 years
	5.0-mL multidose vial (24.5 mcg mercury/0.5 mL)	≥6 months
	5.0-mL multidose vial, jet injector (24.5 mcg mercury/0.5 mL)	18-64 years
Fluarix Quadrivalent (GlaxoSmithKline)	0.5-mL prefilled syringe	≥6 months
FluLaval Quadrivalent (ID Biomedical Corp of Quebec)	0.5-mL prefilled syringe	≥6 months
	5.0-mL multidose vial (<25 mcg mercury/0.5 mL)	≥6 months
Fluzone Quadrivalent (Sanofi Pasteur)	0.25-mL prefilled syringe	6-35 months ^b
	0.5-mL prefilled syringe	≥6 months ^b
	0.5-mL single-dose vial	≥6 months ^b
	5.0-mL multidose vial (25 mcg mercury/0.5 mL)	≥6 months ^b
Inactivated influenza vaccine, quadrivalent, cell culture-based (ccIIV4) (IM)		
Flucelvac Quadrivalent (Seqirus)	0.5-mL prefilled syringe	≥4 years
	5.0-mL multidose vial (25 mcg mercury/0.5 mL)	≥4 years
Recombinant influenza vaccine, quadrivalent (RIV4) (IM)		
Flublok Quadrivalent (Sanofi Pasteur)	0.5-mL prefilled syringe	≥18 years
Inactivated influenza vaccine, trivalent (IIV3), high-dose (IM)		
Fluzone High-Dose (Sanofi Pasteur)	0.5-mL prefilled syringe	≥65 years
Adjuvanted inactivated influenza vaccine, trivalent (aIIV3), standard-dose (IM)		
FLUAD (Seqirus)	0.5-mL prefilled syringe	≥65 years
Live attenuated influenza vaccine (LAIV), quadrivalent (NAS)		
FluMist Quadrivalent (AstraZeneca)	0.2-mL single-dose prefilled intranasal sprayer	2-49 years

IM, intramuscular; NAS, intranasal

^aThe information in parentheses indicates the quantity of thimerosal (mcg mercury/0.5 mL) that the vaccine contains. Vaccines without parentheses do not contain thimerosal. New York State law prohibits the administration of vaccines containing more than trace amounts of thimerosal to pregnant patients and children aged younger than 3 years, unless this vaccine cannot be obtained despite good-faith effort. In these instances, vaccination of children aged less than 3 years and pregnant patients is still recommended because the substantial risk of complications or death from influenza in these groups outweighs the unproven risk of vaccination with thimerosal-containing vaccine

^bChildren aged 6 through 35 months may receive either 0.25 mL or 0.5 mL per dose of Fluzone Quadrivalent. People aged ≥36 months should receive 0.5 mL per dose

- History of Guillain-Barré Syndrome (GBS): Explain the risks and benefits of vaccination in patients with a history of GBS within 6 weeks of receipt of a previous flu vaccination. If such patients are also at high risk of severe influenza complications, the benefits might outweigh the risks.^{1,15}

Inform patients that alternate formulations of flu vaccine are available if they have a known allergy to one or more vaccine components, including preservatives, antibiotics, and/or gelatin. None of the 2019-2020 vaccines contains latex. Check the [CDC Vaccine Contents Table](#) or vaccine package inserts to find a formulation without the implicated ingredient.

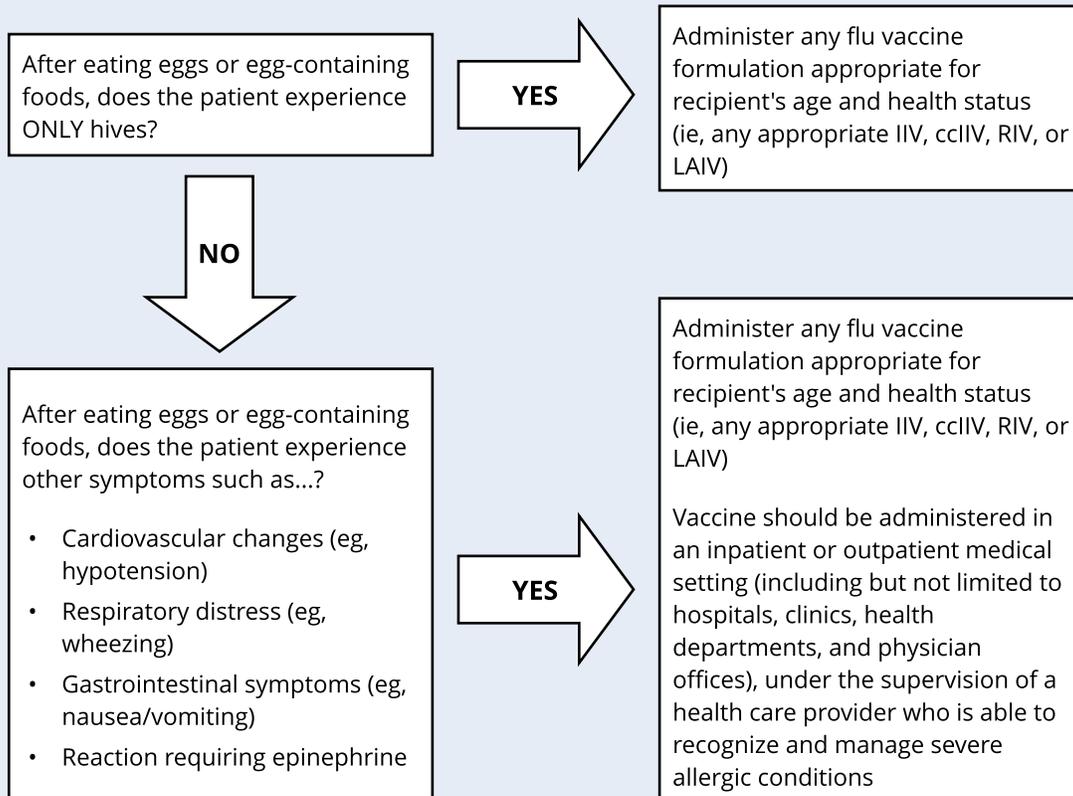
A previous severe allergic reaction to flu vaccine, such as anaphylaxis, is a contraindication to future receipt of the vaccine, regardless of the component suspected to be responsible for the reaction.¹

In addition to the labeled contraindications, ACIP recommends that LAIV should not be administered to the following groups¹:

- children aged 2 through 4 years
 - who have received a diagnosis of asthma or
 - whose parents report (or medical record notes) that the child had wheezing or asthma during the preceding 12 months,
- immunocompromised people,
- close contacts and caregivers of severely immunosuppressed persons who require a protected environment,
- pregnant patients, and
- persons who have taken influenza antiviral medications within the previous 48 hours.

Precautions to LAIV use include asthma in persons aged 5 years and older and presence of certain medical conditions that might predispose to complications after wild-type influenza infection (eg, chronic pulmonary, cardiovascular [except isolated hypertension], renal, hepatic, neurologic, hematologic, or metabolic disorders [including diabetes]).¹

FIGURE. ADMINISTERING THE FLU VACCINE TO PATIENTS WITH EGG ALLERGIES³⁰



ccIIV, cell culture-based inactivated influenza vaccine; IIV, inactivated influenza vaccine; LAIV, live attenuated influenza vaccine; RIV, recombinant influenza vaccine

NOTE: Regardless of a recipient's egg allergy history, all vaccination providers should be familiar with the office emergency plan and be currently certified in cardiopulmonary resuscitation. Epinephrine and equipment for maintaining an airway should be available for immediate use

VACCINATE AGAINST PNEUMOCOCCAL DISEASE

Pneumococcal infection is a serious complication of influenza that can lead to severe pneumonia, meningitis, bacteremia, and sinus and ear infections.³¹ In NYC, influenza and pneumonia together are the third leading cause of death.³²

Two vaccines are approved to prevent pneumococcal disease: pneumococcal conjugate vaccine (PCV13) and pneumococcal polysaccharide vaccine (PPSV23). Per ACIP recommendations, children aged 5 years and younger should routinely receive the PCV13 series. People aged 6 through 64 years who do not have a qualifying medical condition are not routinely recommended to receive pneumococcal vaccine. However, many people aged 6 through 64 years do have a qualifying medical condition requiring one or both pneumococcal vaccines and should receive PCV13 followed by PPSV23 at a minimum interval of 8 weeks (**Table 2³³**). Adults aged 65 years and older with a qualifying medical condition should also receive both pneumococcal vaccines, with administration of PCV13 followed by PPSV23 at a minimum interval of 8 weeks.

In 2019, ACIP updated its guidance for immunocompetent adults aged 65 years and older, and now recommends administration of PCV13 with shared clinical decision-making (publication forthcoming in *Morbidity and Mortality Weekly Report*). ACIP continues to recommend routine administration of PPSV23 to all adults aged 65 years and older. Immunocompetent adults receiving both pneumococcal vaccines should have PCV13 followed by PPSV23 at a minimum interval of 1 year (**Table 2³³**).

The Centers for Medicare & Medicaid Services covers the cost of both PCV13 and PPSV23, administered at least 11 months apart, in accordance with current ACIP recommendations, for Medicare patients.

See [Pneumococcal ACIP Vaccine Recommendations and Intervals Between PCV13 and PPSV23 Vaccines: Recommendations of the Advisory Committee on Immunization Practices \(ACIP\)](#) for detailed guidance.

REPORTING, ALERTS, AND SURVEILLANCE

Reporting vaccinations

- Report all vaccinations administered to children aged 18 years and younger to the CIR within 2 weeks of administration. To register with or access the CIR, log on to [NYCMED](#).

- For patients aged 19 years and older, physicians are strongly encouraged to report vaccines administered to the CIR with the patient's verbal or written consent.
- Pharmacists and registered nurses **must** report vaccinations administered to the CIR for patients aged 19 years and older with the patient's verbal or written consent.
- The NYC Health Department recommends incorporating CIR consent into a general consent process.

Use your electronic health record (EHR) system to report immunizations to the CIR. Contact cir@health.nyc.gov with your facility address, contact information, and current EHR, or call 347-396-2400 to learn more. Providers may be eligible to receive Meaningful Use or Medicare Access and CHIP Reauthorization Act of 2015 (MACRA) incentive payments when using their EHR to report to the CIR. For more information, see [Overview of Meaningful Use and Immunization Reporting](#) and the [Centers for Medicare and Medicaid Services](#).

Report immunizations to the CIR using your electronic health record (EHR) system. Contact cir@health.nyc.gov with your facility address, contact information, and current EHR, or call 347-396-2400 to learn more.

Reporting influenza cases and deaths

- Report nosocomial cases of even 1 laboratory-confirmed case of influenza or clusters of 2 or more cases of influenza-like illness in Article 28 facilities. Either
 - call the New York State Department of Health at 518-474-1142 **or**
 - use the [Health Commerce System Nosocomial Outbreak Reporting Application](#) **or**
 - complete a [Healthcare Facility Infection Control \(Nosocomial\) Report](#) and fax it to 518-402-5165.
- Report deaths in children aged younger than 18 years 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's Provider Access Line (PAL) at 866-NYC-DOH1 (692-3641).

Visit [Reporting Diseases and Conditions](#) for further information.

TABLE 2. PNEUMOCOCCAL VACCINE ADMINISTRATION FOR ADULTS AGED 19 YEARS AND OLDER³³

Medical Indication	Underlying Medical Condition	PCV13 ^a for ≥19 y	PPSV23 ^b for 19 through 64 y		PCV13 ^a at ≥65 y	PPSV23 at ≥65 y
		Recommended	Recommended	Revaccination	Recommended	Recommended
None	None of the below				✓ With shared clinical decision making ^c	✓ ^d
Immuno-competent persons	Alcoholism				✓ With shared clinical decision making ^c	✓ ^d ≥5 y after any PPSV23 at <65 y
	Chronic heart disease ^e		✓			
	Chronic liver disease					
	Chronic lung disease ^f					
	Cigarette smoking					
	Diabetes mellitus					
	Cochlear implants					
	Cerebrospinal fluid leaks	✓	✓ ≥8 wk after PCV13		✓ If no previous PCV13 vaccination	✓ ≥8 wk after PCV13, ≥5 y after any PPSV23 at <65 y
Persons with functional or anatomic asplenia	Congenital or acquired asplenia	✓	✓ ≥8 wk after PCV13	✓ ≥5 y after first dose of PPSV23	✓ If no previous PCV13 vaccination	✓ ≥8 wk after PCV13, ≥5 y after any PPSV23 at <65 y
	Sickle cell disease/other hemoglobinopathies					
Immuno-compromised persons	Chronic renal failure				✓ If no previous PCV13 vaccination	✓ ≥8 wk after PCV13, ≥5 y after any PPSV23 at <65 y
	Congenital or acquired immunodeficiencies ^g					
	Generalized malignancy					
	HIV infection					
	Hodgkin disease	✓	✓ ≥8 wk after PCV13	✓ ≥5 y after first dose of PPSV23		
	Iatrogenic immunosuppression ^h					
	Leukemia					
	Lymphoma					
	Multiple myeloma					
	Nephrotic syndrome					
	Solid organ transplant					

^aIf PPSV23 is administered before PCV13, PCV13 can be given 1 year after PPSV23 for adults aged 19 years and older

^bAdults who received PPSV23 between ages 19 and 64 years need an additional dose of PPSV23 at age 65 years or older and 5 or more years after any prior dose of PPSV23. No additional doses of PPSV23 should be given following the dose administered at age 65 years or older

^cUpdated guidance from the Advisory Committee on Immunization Practices no longer routinely recommends PCV13 for immunocompetent adults aged 65 years and older, but recommends the administration of PCV13 with shared clinical decision making (publication forthcoming in *Morbidity and Mortality Weekly Report*)

^dAll adults aged 65 years and older should receive PPSV23. In immunocompetent adults receiving both pneumococcal vaccines, PPSV23 should be administered at a minimum interval of 1 year after PCV13

^eIncluding congestive heart failure and cardiomyopathies

^fIncluding chronic obstructive pulmonary disease, emphysema, and asthma

^gIncludes B- (humoral) or T-lymphocyte deficiency, complement deficiencies (particularly C1, C2, C3, and C4 deficiencies), and phagocytic disorders (excluding chronic granulomatous disease)

^hDiseases requiring treatment with immunosuppressive drugs, including long-term systemic corticosteroids and radiation therapy

Updates, alerts, and surveillance

- Register for Health Department influenza alerts through the [Health Alert Network](#) or by calling 866-692-3641.
- Regularly visit the Health Department's [influenza web page](#) for information about local influenza activity, flu vaccine recommendations, and vaccine supply.
- Consider joining the Health Department's ILINet Influenza Surveillance Program as a sentinel physician. You will receive a weekly e-mail influenza update and guidance on influenza management. Contact Alice Yeung at 347-396-2608 or e-mail ayeung@health.nyc.gov for information.

PRESCRIBE ANTIVIRALS FOR TREATMENT AND PROPHYLAXIS

Treatment

The following groups are at higher risk of complications from influenza and should receive antiviral treatment:

- children aged younger than 2 years;
- adults aged 65 years and older;
- people with
 - asthma and chronic lung disease (eg, chronic obstructive pulmonary disease, cystic fibrosis),
 - heart disease (eg, congenital heart disease, congestive heart failure, coronary artery disease),
 - renal, hepatic, neurologic, hematologic, or metabolic disorders, including diabetes,
 - immunosuppression, including that caused by medications or by HIV infection, and
 - morbid obesity (ie, body mass index ≥ 40);
- patients who are pregnant or postpartum (within 2 weeks after delivery);
- people aged younger than 19 years who are receiving long-term aspirin- or salicylate-containing medications because of the risk of Reye syndrome after influenza infection;
- American Indians/Alaska Natives; and
- residents of nursing homes and other chronic care facilities.

Four antiviral medications are approved to treat influenza A and B.^{34,35}

- Oral oseltamivir (Tamiflu®) for patients aged 2 weeks and older: Adverse events include nausea, vomiting, and headache. Off-label use of oseltamivir

for treatment of influenza in infants aged younger than 14 days is recommended by the CDC and the AAP.

- Inhaled zanamivir (Relenza®) for patients aged 7 years and older: Allergic reactions include oropharyngeal or facial edema and skin rash; adverse events include sinusitis, dizziness, and ear, nose, and throat infections. Zanamivir is not recommended for people with underlying respiratory diseases such as asthma or chronic obstructive pulmonary disease.
- Intravenous peramivir (Rapivab®) for patients aged 2 years and older: The most common side effect is diarrhea.
- Oral baloxavir (Xofluza™) for patients aged 12 years and older: The most commonly reported adverse reactions include diarrhea, bronchitis, nasopharyngitis, headache, and nausea, but the incidence of these side effects is not significantly higher than in a placebo group.

Prophylaxis

Use oseltamivir (ages 3 months and older) and zanamivir (ages 5 years and older) for prophylaxis if³⁴

- the patient is at high risk of complications after they are exposed to influenza **and**
- the vaccine is medically contraindicated or was administered within 2 weeks after exposure.

If a child is aged younger than 3 months, use of oseltamivir for chemoprophylaxis is not recommended unless the situation is judged critical, due to limited data in this age group.³⁴

Prophylaxis with oseltamivir and zanamivir is generally not recommended if it has been more than 48 hours since initial exposure to influenza. Peramivir is not recommended for prophylaxis. See package inserts for complete product safety information.³⁴

Amantadine (Symmetrel®, Symadine®) and rimantadine (Flumadine®) are not recommended for treatment or prophylaxis of currently circulating influenza A viruses due to high levels of drug resistance; these agents are ineffective against influenza B viruses.³⁴

Influenza antiviral medications may reduce the effectiveness of LAIV if given within 48 hours before to 14 days after LAIV administration.¹

SUMMARY

Hospitalizations and deaths occur during every influenza season. Vaccination is the best way to prevent these outcomes. Improve flu vaccine coverage by following the NVAC recommendations for organizational or office-level strategies (**Box 4^{10,11}**). Get vaccinated, ensure your staff do the same, and vaccinate all patients aged 6 months and older (especially those at high risk) as soon as vaccine is available to prevent influenza and its complications.

INFLUENZA QUIZ

1. In addition to flu vaccine, pharmacists in New York State can administer which of the following vaccines to adults?
 - a. tetanus-containing (Td/Tdap) and pneumococcal (PCV13 and PPSV23)
 - b. tetanus-containing (Td/Tdap), pneumococcal (PCV13 and PPSV23), meningococcal (MenACWY and MenB), and zoster
 - c. meningococcal (MenACWY and MenB) and zoster
2. For adults aged 65 years and older, the NYC Health Department recommends
 - a. high-dose flu vaccine only
 - b. adjuvanted flu vaccine only
 - c. high-dose or adjuvanted flu vaccine
3. Providers must use the Citywide Immunization Registry to report vaccines, including flu vaccine, administered to children aged
 - a. 18 years or younger
 - b. 6 through 59 months only
 - c. 6 months to 10 years only

Answers: 1-b; 2-c; 3-a

FLU VACCINE REMINDERS^{36,37}

1. **Order enough vaccine**, including enough preservative-free vaccine for pregnant patients and children aged younger than 3 years, as required by New York State public health law. See [Influenza Vaccine Availability Tracking System - IVATS](#) for information
 - a. If you are enrolled in the Vaccines for Children program, please order flu vaccine now if you have not already done so at the [Citywide Immunization Registry \(CIR\)](#). See [Dear Colleague letter](#) for details
2. **Store vaccines safely** to ensure full potency. See [Checklist for Safe Vaccine Storage and Handling](#)
3. **Use your electronic health record (EHR) system** or CIR to identify and contact patients who need vaccination and to monitor vaccination coverage in your practice
4. **Document vaccines** administered and other required information in the patient's record. Provide a [Vaccine Information Statement \(VIS\)](#) in the appropriate language, record the date the VIS was given, and the edition date of the VIS (**Resources for Providers**)
5. **Report all immunizations administered to all patients using the CIR**
 - a. Pediatric care practices should report all administered flu vaccine doses to the CIR. You can access up-to-date influenza reports any time during influenza season. Contact cir@health.nyc.gov with your facility address, contact information, and current EHR or call 347-396-2400
 - b. To inform vaccination quality improvement initiatives, facilities can also use the CIR to generate practice-level vaccine coverage reports, identify unvaccinated patients, and use the CIR texting function for reminder and recall messages
6. **Report adverse reactions to the federal Vaccine Adverse Event Reporting System (VAERS)**, 800-822-7967

See **Resources for Providers** for tips on increasing the vaccination rate in your practice

RESOURCES FOR PROVIDERS

New York City (NYC) Health Department

- Provider Access Line: 866-NYC-DOH1 (692-3641)
- Immunization website: <http://www1.nyc.gov/site/doh/providers/health-topics/immunization-information-for-healthcare-providers.page>
See section on Influenza and Pneumococcal Information
- NYC Vaccines for Children program website: <https://www1.nyc.gov/site/doh/providers/nyc-med-cir/vaccines-for-children-program.page>
- Health Alert Network (HAN): sign up at <https://a816-healthpsi.nyc.gov/NYCMED/Account/HANSubscribe> or 866-692-3641
- E-mail questions to NYC Health Department: nycflu@health.nyc.gov

Reporting and documentation

- New York State (NYS) Department of Health
 - Bureau of Communicable Disease Control: 518-473-4439
 - Health Care Facility Infection Control (Nosocomial) Report Form DOH 4018: www.health.state.ny.us/forms/doh-4018.pdf
- Centers for Medicare & Medicaid Services Reporting Requirements: <https://www.cdc.gov/nhsn/pdfs/cms/cms-reporting-requirements.pdf>
- Centers for Disease Control and Prevention (CDC). Vaccine Information Statements: www.cdc.gov/vaccines/hcp/vis/index.html

Immunization recommendations

- CDC. Seasonal influenza (flu). Information for health professionals: www.cdc.gov/flu/professionals
- Advisory Committee for Immunization Practices (ACIP)
 - Immunization schedules: www.cdc.gov/vaccines/schedules
 - Pneumococcal ACIP vaccine recommendations: www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/pneumo.html
- CDC. Vaccine administration: <https://www.cdc.gov/vaccines/hcp/admin/admin-protocols.html>
- NYS Department of Health regulation for health care workers: www.health.ny.gov/diseases/communicable/influenza/seasonal/providers/prevention_of_influenza_transmission
- Immunization Action Coalition. Influenza vaccine: www.immunize.org/influenza
- American College of Physicians. Adult Immunization: <https://www.acponline.org/clinical-information/clinical-resources-products/adult-immunization>
- American College of Obstetricians and Gynecologists. Immunization information for Ob-Gyns and their patients: www.immunizationforwomen.org

Improving vaccination coverage

- NYC Health Department. Adult Immunization Action Toolkit: <https://www1.nyc.gov/site/doh/providers/resources/public-health-action-kits-adult-immunization.page>
- NYC Vaccines for Children Program provider requirements. Enrollment and re-certification: <https://www1.nyc.gov/site/doh/providers/nyc-med-cir/vaccines-for-children-requirements.page>
- Standing orders
 - <http://www.op.nysed.gov/prof/nurse/immunguide.htm>
 - <https://www.cdc.gov/mmwr/preview/mmwrhtml/rr4901a2.htm>
 - <http://www.immunize.org/standing-orders>
- Reminder and recall: <https://www.cdc.gov/mmwr/preview/mmwrhtml/00054628.htm>
- Centers for Medicare & Medicaid Services: The CMS Innovation Center. Influenza vaccination strategies: <https://innovation.cms.gov/files/x/pgp-flu-vaccination.pdf>
- CDC. Print materials: <https://www.cdc.gov/flu/resource-center/freeresources/print/index.htm>
Downloadable posters and patient handouts by audience in different sizes, formats, and languages

Cultural competence

- Think Cultural Health: <https://cccm.thinkculturalhealth.hhs.gov>
Free online educational program accredited for physicians, physician assistants, and nurse practitioners (registration required)
- EthnoMed: <http://ethnomed.org>
Community cultural profiles and subjects related to ethnic groups; patient education materials in various languages
- Culture Clues™: <https://depts.washington.edu/pfes/CultureClues.htm>
Tip sheets about concepts and preferences of patients from diverse cultures

Coding and billing information

- American College of Physicians. Billing and coding adult immunizations: www.acponline.org/system/files/documents/running_practice/payment_coding/coding/billvaccines.pdf
- Centers for Medicare & Medicaid Services. Medicare immunization billing:
 - https://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/downloads/qr_immun_bill.pdf
 - <https://www.cms.gov/outreach-and-education/medicare-learning-network-mln/mlnproducts/downloads/vaccines-part-d-factsheet-icn908764.pdf>

City Health Information archives: <https://www1.nyc.gov/site/doh/providers/resources/city-health-information-chi.page>

RESOURCES FOR PATIENTS

General information

- National Foundation for Infectious Diseases. Influenza (Flu): <https://www.nfid.org/infectious-diseases/influenza-and-adults>

Educational materials

- NYC Health Department: www.nyc.gov/flu
Publications, brochures, and posters
- NYC Health Department. Adult Immunization Action Kit: <https://www1.nyc.gov/site/doh/providers/resources/public-health-action-kits-adult-immunization.page>
- NYC Health Department. Vaccinations and pregnancy: <https://www1.nyc.gov/site/doh/health/publications/health-bulletin/health-bulletin-119.page>
- Immunization Action Coalition. Vaccine Information Statements (VIS): <http://www.immunize.org/vi>
Available in English and multiple other languages

- CDC. Free resources: www.cdc.gov/flu/freeresources/index.htm
Flyers, posters, brochures, and VIS forms for the general public, families, children, and high-risk groups

Vaccination locations

- NYC Health Department. Immunization clinics: <http://www1.nyc.gov/site/doh/services/immunization-clinics.page>
- NYC Health + Hospitals health care centers: https://www.nychealthandhospitals.org/health_care
- NYC HealthMap: <https://a816-healthpsi.nyc.gov/nychealthmap>
Searchable map of health services
- Federally Qualified Health Centers (FQHCs): <https://findahealthcenter.hrsa.gov>

REFERENCES

- Grohskopf LA, Alyanak E, Broder KR, Walter EB, Fry AM, Jernigan DB. Prevention and control of seasonal influenza with vaccines: recommendations of the Advisory Committee on Immunization Practices—United States, 2019–20 influenza season. *MMWR Recomm Rep*. 2019;68(3):1–21. <https://www.cdc.gov/mmwr/volumes/68/rr/rr6803a1.htm>. Accessed September 18, 2019.
- Xu X, Blanton L, Elal AI, et al. Update: influenza activity in the United States during the 2018–19 season and composition of the 2019–20 influenza vaccine. *MMWR Morb Mortal Wkly Rep*. 2019;68(24):544–551. <https://www.cdc.gov/mmwr/volumes/68/wr/mm6824a3.htm>. Accessed September 18, 2019.
- Centers for Disease Control and Prevention (CDC). Weekly US influenza surveillance report. <https://www.cdc.gov/flu/weekly/index.htm>. Accessed September 18, 2019.
- CDC. 2018–2019 US flu season: preliminary burden estimates. <https://www.cdc.gov/flu/about/burden/preliminary-in-season-estimates.htm>. Accessed September 18, 2019.
- Rolfes MA, Flannery B, Chung JR, et al. Effects of influenza vaccination in the United States during the 2017–2018 influenza season. *Clin Infect Dis*. 2019 Feb 2;:ciz075. <https://doi.org/10.1093/cid/ciz075> [Epub ahead of print]
- US Department of Health and Human Services. HealthyPeople.gov. Immunization and infectious diseases. <https://www.healthypeople.gov/2020/topics-objectives/topic/immunization-and-infectious-diseases/objectives>. Accessed September 18, 2019.
- New York City (NYC) Department of Health and Mental Hygiene. Statements from Health Commissioner Dr. Mary T. Bassett and Corporation Counsel Chief of Appeals Richard Dearing on NY Court of Appeals upholding mandated flu vaccines for daycare and preschool children. June 28, 2018. <https://www1.nyc.gov/assets/doh/downloads/pdf/press/2018/20180628-statement-flu-vaccines-children.pdf>. Accessed September 18, 2019.
- New York State (NYS) Department of Health. Regulation for prevention of influenza transmission by healthcare and residential facility and agency personnel. www.health.ny.gov/diseases/communicable/influenza/seasonal/providers/prevention_of_influenza_transmission. Accessed September 18, 2019.
- Centers for Medicare & Medicaid Services. Ambulatory Surgical Center Quality Reporting Program. Quality Measure Specifications Manual, Version 6.0a. www.ascaconnect.org/HigherLogic/System/DownloadDocumentFile.ashx?DocumentFileKey=0adda08c-c416-c07c-ac0b-7e1b11646d2b. Accessed September 18, 2019.
- National Vaccine Advisory Committee. Reports and recommendations. Recommendations from the National Vaccine Advisory Committee: standards for adult immunization practice. *Public Health Rep*. 2014;129(2):115–123.
- NYS Office of the Professions. Frequently asked questions: administration of immunizations. <http://www.op.nysed.gov/prof/pharm/pharm-immunizationfaq.htm>. Accessed September 18, 2019.
- Benedict KM, Kennedy ED, Santibanez TA, et al. Recommendations and offers for adult influenza vaccination, 2011–2012 season, United States. *Vaccine*. 2016;35(9):1353–1361.
- Sevin AM, Romeo C, Gagne B, Brown NV, Rodis JL. Factors influencing adults' immunization practices: a pilot survey study of a diverse, urban community in central Ohio. *BMC Public Health*. 2016;16(1):424.
- CDC. Misconceptions about seasonal flu and flu vaccines. <https://www.cdc.gov/flu/about/qa/misconceptions.htm>. Accessed September 18, 2019.
- CDC. Influenza (flu) vaccine safety. <https://www.cdc.gov/flu/protect/vaccine/vaccinesafety.htm>. Accessed September 18, 2019.
- CDC. Live attenuated influenza vaccine (LAIV) (the nasal spray flu vaccine). <https://www.cdc.gov/flu/about/qa/nasalspray.htm>. Accessed September 18, 2019.
- CDC. Vaccines and immunizations. Possible side effects from vaccines. Updated August 15, 2019. www.cdc.gov/vaccines/vac-gen/side-effects.htm. Accessed September 18, 2019.
- American Academy of Pediatrics. AAP updates vaccine recommendations for 2019–2020 flu season. March 14, 2019. <https://www.aap.org/en-us/about-the-aap/aap-press-room/pages/aap-updates-vaccine-recommendations-for-2019-2020-flu-season.aspx>. Accessed September 18, 2019.
- The American College of Obstetricians and Gynecologists. Committee Opinion No. 732. Influenza vaccination during pregnancy. April 2018. <https://www.acog.org/clinical-guidance-and-publications/committee-opinions/committee-on-obstetric-practice/influenza-vaccination-during-pregnancy>. Accessed September 18, 2019.
- CDC. Influenza. In: Hamborsky J, Kroger A, Wolf C, eds. *Epidemiology and Prevention of Vaccine-Preventable Diseases*. 13th ed. Washington, DC: Public Health Foundation; 2015:chap 12.
- Martin A, Cox S, Jamieson DJ, Whiteman MK, Kulkani A, Tepper NK. Respiratory illness hospitalizations among pregnant women during influenza season, 1998–2008. *Matern Child Health J*. 2013;17(7):1325–1331.

(Continued on next page)

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

Bill de Blasio
Mayor

Oxiris Barbot, MD
Commissioner of Health and Mental Hygiene

Division of Disease Control
Demetre Daskalakis, MD, MPH, Deputy Commissioner

Bureau of Immunization
Jane R. Zucker, MD, MSc, Assistant Commissioner
Bindy L. Crouch, MD, MPH, Adult Immunization and Clinic Services Director
Edward Wake, Adult Immunization Unit Chief
Krishika A. Graham, MD, MPH, Adult Immunization Medical Specialist

Division of Epidemiology
R. Charon Gwynn, PhD, Deputy Commissioner

Bureau of Public Health Training and Information Dissemination
Calaine Hemans-Henry, MPH, CHES, Assistant Commissioner
Joanna Osolnik, MPH, CHES, Senior Director, Office of Information Dissemination
Peggy Millstone, Director, Scientific Education Unit
Sandhya George, Medical Editor
Liz Selkove, Medical Editor
Melissa Donze, MPH, Program Manager

Copyright ©2019 The New York City Department of Health and Mental Hygiene
E-mail *City Health Information* at: nycdohrp@health.nyc.gov
New York City Department of Health and Mental Hygiene.
Influenza prevention and control, 2019-2020.
City Health Information. 2019;38(4):25-38.



REFERENCES (continued)

22. 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.
23. 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.
24. 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.
25. CDC. Influenza (flu) vaccine and pregnancy. Updated August 10, 2017. <https://www.cdc.gov/vaccines/pregnancy/hcp-toolkit/flu-vaccine-pregnancy.html>. Accessed September 18, 2019.
26. Winter K, Zipprich J, Harriman K, et al. Risk factors associated with infant deaths from pertussis: a case-control study. *Clin Infect Dis*. 2015;61(7):1099-1106.
27. Baxter R, Bartlett J, Fireman B, Lewis E, Klein NP. Effectiveness of vaccination during pregnancy to prevent infant pertussis. *Pediatrics*. 2017;139(5):e20164091.
28. NYS Department of Health. New York State law prohibits the administration of vaccines containing more than trace amounts of thimerosal to children less than 3 years of age and pregnant women. Published April 23, 2008. https://www.health.ny.gov/prevention/immunization/providers/state_law_restricting_thimerosal_2008-04-23.htm. Accessed September 18, 2019.
29. Grohskopf LA, Sokolow LZ, Broder KR, et al. Prevention and control of seasonal influenza with vaccines: recommendations of the Advisory Committee on Immunization Practices—United States, 2016-17 influenza season. *MMWR Recomm Rep*. 2016;65(5):1-54. <https://www.cdc.gov/mmwr/volumes/65/rr/rr6505a1.htm>. Accessed September 18, 2019.
30. CDC. Flu vaccine and people with egg allergies. Updated December 28, 2017. www.cdc.gov/flu/protect/vaccine/egg-allergies.htm. Accessed September 18, 2019.
31. CDC. Pneumococcal disease. Symptoms and complications. Updated September 6, 2017. www.cdc.gov/pneumococcal/about/symptoms-complications.html. Accessed September 18, 2019.
32. Li W, Zheng P, Huynh M, et al. *Summary of Vital Statistics, 2016*. New York, NY: New York City Department of Health and Mental Hygiene, Bureau of Vital Statistics; 2018. <https://www1.nyc.gov/assets/doh/downloads/pdf/vs/2016sum.pdf>. Accessed September 18, 2019.
33. CDC. Pneumococcal vaccine timing for adults. www.cdc.gov/vaccines/vpd/pneumo/downloads/pneumo-vaccine-timing.pdf. Accessed September 18, 2019.
34. CDC. Influenza antiviral medications: summary for clinicians. Updated December 27, 2018. <https://www.cdc.gov/flu/professionals/antivirals/summary-clinicians.htm>. Accessed September 18, 2019.
35. Ng KE. Xofluza (baloxavir marboxil) for the treatment of acute uncomplicated influenza. *P T*. 2019;44(1):9-11.
36. Immunization Action Coalition. Standing orders for administering influenza vaccine to adults. www.immunize.org/catg.d/p3074.pdf. Accessed September 18, 2019.
37. NYS Department of Health. Bureau of Immunization. New York State (NYS) law restricting use of thimerosal-containing influenza vaccines. October 23, 2009. www.health.ny.gov/regulations/public_health_law/section/2112/information_for_physicians/docs/update_to_state_law_restricting_thimerosal.pdf. Accessed September 18, 2019.