Massachusetts Department of Public Health

Recommendations and Resources for the Control of Influenza and Pneumococcal Disease: 2017 – 2018

Everyone aged 6 months and older should receive flu vaccine every year. The Advisory Committee on Immunization Practices (ACIP) recommends vaccination with either the inactivated influenza vaccine (IIV) or recombinant influenza vaccine (RIV). Vaccination should not be delayed to procure a specific vaccine formulation. Begin offering flu vaccine as soon as it is available. There is no preferential recommendation for any one age-appropriate inactivated flu formulation over another. Choice of which influenza vaccine formulation to use should primarily be driven by the age indication, contraindications and precautions. There is no current preference for quadrivalent vs. trivalent or high-dose vs. adjuvanted vs. standard dose.

What's New for the 2017-2018 Season?

- **2017-2018 influenza vaccine composition:**
  - Trivalent influenza vaccines contain:
    - an A/Michigan 45/2015 (H1N1)pdm09-like virus ***(New!)***
    - an A/Hong Kong/4801/2014 (H3N2)-like virus
    - a B/Brisbane/60/2008-like (Victoria lineage) virus
  - Quadrivalent vaccines contain the above three viruses and a second influenza B strain, B/Phuket/3073/2013-like/(Yamagata lineage) virus.

  This represents a change in the influenza A (H1N1) virus component from the previous season.
- **FluLaval.** FDA lowered the minimum age for use of FluLaval from 3 years old to 6 months in November 2016. **FluLaval** is now **as a 0.5 mL dose for everyone 6 months of age and older.** For children aged 6 through 35 months of age, two IIV products are currently licensed by the FDA. The approved dose volumes differ for these two products. Children in this age group may receive either: 1) a 0.5 mL dose of FluLaval Quadrivalent; or 2) a 0.25 mL dose of Fluzone Quadrivalent. Care must be taken to administer the **correct** dose volume for each dose of either product in this age group. See page 5 for additional information.
- **Afluria.** Afluria (Trivalent) and Afluria Quadrivalent inactivated influenza vaccines by (Seqirus) can both be used in persons 5 years of age and older.
- **Flublok**. Flublok Quadrivalent, a recombinant influenza vaccine (RIV4) by Protein Sciences, was licensed for use in those 18 years and older in October 2016.
- **Pregnant women** may receive any licensed, age-appropriate, recommended influenza vaccine.

Unchanged: Live attenuated influenza vaccine (LAIV) is not recommended for the 2017-2018 season. The ACIP recommendation that quadrivalent live attenuated influenza vaccine (**LAIV4)** should **not be used is extended for the 2017-2018 flu season**. Please see page 4 in this advisory for additional details.

Unchanged: Guidelines Related to Egg Allergy. Last year, the ACIP began to recommend that any licensed influenza vaccine formulation may be administered to persons with egg allergy of any severity. There are no changes to this guidance. Please see page 4 in this advisory for more detailed guidance to ensure proper evaluation and safe administration.

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Vaccine Supply: Early projections of influenza vaccine supply for the upcoming season were between 151-166 million doses. Providers who privately purchase flu vaccine can consult the Influenza Vaccine Availability Tracking System to order additional doses and see the report of manufacturers and distributors that have influenza vaccine. There is also an updated list of flu vaccine products available for the U.S. for the 2017-18 season.

VIS Information: Influenza VISs are no longer updated each year, unless needed. The current flu VIS posted on the CDC website is the one you can use for this upcoming flu season. If you need VISs in other languages, please visit http://www.immunize.org/vis/vis_flu_inactive.asp.

Influenza Vaccine Rates in Massachusetts

During the 2015-2016 flu season, 50% of Massachusetts residents received flu vaccine. The highest rate in Massachusetts was 85% among children 6 months - 4 years of age, where MA ranked 3rd in the nation. Massachusetts ranks highly for influenza rates in all children and children 5-12 years of age, while rates for all adults statistically decreased in 2015-16 to 44%. The lowest rate was 40% among adults 18-64 years of age.

Age Group	MA 2014-2015	MA 2015-2016	Change in Percentage Points between 2014-2015 and 2015-2016
Everyone 6 mos +	55%	50%	-5
Children 6 mos – 17 yrs	76%	75%	-1
• Children 6 mos – 4 yrs	81%	85%	+4
• Children 5 – 12 yrs	78%	79%	+1
• Adolescents 13 – 17 yrs	71%	63%	-8
Adults 18 yrs +	50%	44%	-6
• Adults 18 – 64 yrs	45%	40%	-5
• Adults, 18-64 yrs, High Risk	53%	48%	-5
• Adults 65 yrs +	67%	60%	-7

Source: NIS-Flu

Your recommendation and offer of vaccine are the most important determinants of whether or not your patient gets vaccinated: In 2014 (the most recent year where data are available), 72% of pregnant women in Massachusetts received a flu shot, compared with 66% in 2012 and 71% in 2013 (MA Pregnancy Risk Assessment Monitoring System [PRAMS], unpublished data). A recent CDC national survey of pregnant women found that 68% of pregnant women in the US whose provider recommended and offered them flu vaccine received the vaccine, compared with only 20% of pregnant women whose provider did not recommend vaccine. These data underscore the importance of providers not only strongly recommending vaccination, but also **offering vaccine on site.**

Healthcare provider vaccination rates: Healthcare personnel are at high risk for influenza exposure and illness, and may be a source of influenza virus transmission in healthcare settings. Annual influenza vaccination is the best method of preventing influenza and potentially serious complications. The current Healthy People 2020 goal for influenza vaccination among healthcare personnel is 90%.

The table below outlines influenza vaccination rates for different groups of healthcare workers. Vaccination rates in acute care hospitals, both nationally and in MA have surpassed the Healthy People 2020 goal and should be congratulated. However, rates for healthcare workers in general and in long term care are much lower.

Healthcare Personnel Setting	MA 2014-15	MA 2015-16	US 2014-15[3]	US 2015-16[3]
All Healthcare Personnel	N/A[1]	62%[1]	77%	79%
Acute Care Hospitals	92%[2]	92%[2]	90%	91%
Nursing Homes/Long Term Care Facilities	73%[2]	73%[2]	64%	69%

Source: [1]MA BRFSS [2]Influenza Vaccination of Health Care Personnel in MA Nursing Homes and Acute Care Hospitals [3]CDC Health Care Personnel Influenza Survey, MMWR 2016

DPH encourages facilities to review current healthcare personnel influenza policies implement processes to maximize vaccination coverage. All healthcare facilities should strive to reach the goal of having 90% of

healthcare personnel vaccinated annually against influenza in order to best protect patients, family members, and staff from influenza illness.

Please see the following resources to assist in improving influenza vaccination among healthcare personnel:

- CDC Influenza Resources for Health Care Professionals: https://www.cdc.gov/flu/professionals/index.htm
- CDC toolkit for Increasing Influenza Vaccination among Health Care Personnel in Long-term Care Settings: https://www.cdc.gov/flu/toolkit/long-term-care/index.htm
- Seasonal Influenza (Flu)-Free Resources: www.cdc.gov/flu/freeresources/index.htm
- Providing a Safer Environment for Health Care Personnel and Patients through Influenza Vaccination Strategies from Research and Practice: https://www.jointcommission.org/assets/1/18/Flu_Monograph.pdf
- Strategies to Achieve the Healthy People 2020 Annual Influenza Vaccine Coverage Goal for Health-Care Personnel: Recommendations from the National Vaccine Advisory Committee: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3514716/pdf/phr128000007.pdf
- MDPH Influenza Resources for Health Care Professionals: http://www.mass.gov/flu

Influenza Vaccine Recommendations

This year the Advisory Committee on Immunization Practices (ACIP) is publishing its recommendations regarding influenza vaccine in 3 separate documents. Below you will find the respective links:

- **2017-2018 ACIP influenza recommendations**: CDC. Prevention and Control of Influenza with Vaccines: Recommendations of the Advisory Committee on Immunization Practices (ACIP) - United States, 2017-18 Season. MMWR 2017; 66(RR-2):1-20. https://www.cdc.gov/mmwr/volumes/66/rr/pdfs/rr6602.pdf
  - See pages 5 and 6 for the primary changes and updates, which are not extensive this year.
- **A summary of this year's recommendations**: CDC. Prevention and Control of Influenza with Vaccines: Recommendations of the Advisory Committee on Immunization (ACIP) – United States, 2017-2018, Summary of Recommendations. Available at: https://www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/downloads/ACIP-recs-2017-18-summary.pdf
  - This 4 page 'Job Aid' is a new document that contains all the critical recommendations, tables and flow charts.
- **And a background document for this year's recommendations**: Background Document for "Prevention and Control of Seasonal Influenza with Vaccines: Recommendations of the Advisory Committee on Immunization Practices—United States, 2017-18 Influenza Season." Available at https://www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/downloads/ACIP-recs-2017-18-bkgd.pdf
  - This is also a new document that contains all of the background information, data and studies which informed the ACIP deliberations when making their recommendations.

The ACIP's 2017-2018 Influenza Vaccine Recommendations are summarized below.

Influenza Vaccine Formulations Available for the 2017-2018 Season:
Please see Table 1 on page 13 of this advisory for the approved inactivated influenza vaccine formulations for 2017-2018. Please take time to ensure you are using the age-appropriate formulation and dose for the person you are vaccinating. We hope Table 1 will assist you in this effort to reduce medical errors. For additional information, see page 3 in the ACIP Recommendations.

Timing of Flu Vaccination and Waning Immunity
The ACIP **continues** to recommend vaccination before the onset of influenza activity in a community and by the end of October, if possible. To avoid missed opportunities for vaccination, providers should offer flu vaccination at routine health visits and hospitalizations as soon as vaccine is available, particularly for young children who may need two doses.

Some available data indicate that early vaccination (e.g., in July and August) might be associated with suboptimal immunity before the end of the influenza season, particularly among older adults. However, this finding has not been found consistently across studies, age groups, influenza viral subtypes or seasons. The relative contribution of potential waning of immunity compared with those of other determinants of the impact of vaccination (e.g., timing, severity of the influenza season, emergence of drifted antigenic strains) and in particular the impact of missed opportunities when individuals delaying vaccination fail to return later in the season is **not** known. In addition, the ability to vaccinate a large population within a more constrained time period may result in decreased coverage rates. Vaccination programs need to balance maximizing likelihood of persistence of vaccine-induced protection through the season with avoiding missed opportunities to

vaccinate or vaccinating after onset of influenza circulation occurs in a community. Revaccination later in the season of persons who have already been fully vaccinated is not recommended.

Vaccination should continue to be offered in November and throughout the flu season as long as flu viruses are circulating. While seasonal influenza outbreaks can happen as early as October, most of the time influenza activity peaks in January or later. Since it takes about two weeks after vaccination for antibodies to develop in the body that protect against influenza virus infection, it is best that people get vaccinated so they are protected before influenza begins spreading in their community. In New England, flu activity usually lasts usually April and May.

As additional data about the duration of immunity and potential programmatic impact become available, ACIP will review them to determine if any changes in this policy should be made. For additional information, see page 6 in the ACIP Recommendations and pages 28-31 in the Background document.

Remember: Use annual flu vaccination to assess patients for the need for other vaccines, including Tdap and pneumococcal conjugate (PCV13) and pneumococcal polysaccharide (PPSV23) vaccines.

Live Attenuated Influenza Vaccine (LAIV) Not Recommended for the 2017-2018 Season

In light of low effectiveness against influenza A(H1N1)pdm09 in the United States during the 2013–14 and 2015–16 seasons, for the 2017–18 season, ACIP continues the recommendation that LAIV4 should **not** be used. In February 2017, ACIP reviewed information from the manufacturer about their research plan. Results from additional studies as well as data from LAIV use in other countries will be reviewed by the Committee as they become available. For more information, see pages 1, 4, 5, 7,and 15 in the ACIP Recommendations and pages 26-28 in the Background document.

Guidance related to the management of egg allergic persons:

Last season the ACIP modified its guidance for the management of egg allergic persons receiving flu vaccine. This season, their recommendations for this management are **unchanged**.

Background: Anaphylaxis after influenza vaccine is rare, about 1.3 to 1.5 events per million doses, about the same rate as anaphylaxis after other childhood vaccines. As is the case with other vaccines, influenza vaccines contain various different components that may cause allergic reactions. Reviews of studies of experience with the use of IIV, and more recently LAIV, indicate that **severe allergic reactions** to the currently available egg-based influenza vaccines in persons with **egg allergy of any severity are unlikely.**

Severe allergic reactions to vaccines, although rare, can occur at any time, despite a recipient's allergy history. Therefore, all vaccine providers should be familiar with the office emergency plan, and be certified in cardiopulmonary resuscitation.

Recommendation

Although history of severe allergic reaction is a labeled contraindication to influenza vaccines, the ACIP recommends that **any** licensed influenza vaccine formulation may be administered to persons with egg allergy of **any** severity. To ensure safety, providers should follow the guidance outlined below:

a. Persons with a history of egg allergy who have experienced only hives after exposure to egg should receive influenza vaccine. Any licensed and recommended influenza vaccine (i.e., any age-appropriate IIV or RIV) that is otherwise appropriate for the recipient's age and health status may be used.
b. Persons who report having had reactions to egg involving symptoms other than hives, such as angioedema, respiratory distress, lightheadedness, or recurrent emesis; or who required epinephrine or another emergency medical intervention, may similarly receive any licensed and recommended influenza vaccine (i.e., any age-appropriate IIV or RIV) that is otherwise appropriate for the recipient's age and health status. The selected vaccine should be administered in an inpatient or outpatient medical setting (including but not necessarily limited to hospitals, clinics, and physician offices). **Vaccine administration should be supervised by a healthcare provider who is able to recognize and manage severe allergic conditions**. Clinics and practices will need to determine if they have the trained staff, protocols and equipment in place to safely vaccinate those with severe egg allergy or refer them to their medical home or another provider.
c. A previous severe allergic reaction to influenza vaccine, regardless of vaccine component suspected of being responsible, is a contraindication to future receipt of the vaccine.

d. The ACIP does not express a preference for the use of egg-free flu formulations in egg-allergic patients. However, an egg-free recombinant flu vaccine (RIV), Flublok, is available for those ≥18 years of age and some providers may choose to administer RIV to their severely egg-allergic patients. For the cell culture vaccine, Flucelvax, viruses are propagated in mammalian cells rather than eggs, so it has a much smaller amount of egg protein. However, some of the viruses provided by the manufacturer are egg-derived, and therefore egg protein may potentially be introduced at the start of the manufacturing process. Once these viruses are received by the manufacturer, no eggs are used and dilutions at various steps during the manufacturing process result in a theoretical maximum of $5x10^{-8}$µg per 0.5 mL dose of total egg protein.

Observation period after vaccination
No period of postvaccination observation is recommended specifically for egg–allergic patients. However, providers should continue with the general best practice recommendation to observe all patients for 15 minutes after any vaccination to decrease the risk for injury should they experience syncope.

For full guidance on management of those with egg allergy, see pages 10-12 in the ACIP Recommendations and pages 48-49 in the Background document. Also see pages 66-81 'Preventing and Managing Adverse Events' of the General Best Practice Guidelines for Immunization. Best Practices Guidance of the Advisory Committee on Immunization Practices (ACIP) at: https://www.cdc.gov/vaccines/hcp/acip-recs/general-recs/downloads/general-recs.pdf.

Vaccine Dose Considerations for Children 6 Months through 8 Years of Age:
FDA lowered the minimum age for use of FluLaval from 3 years old to 6 months in November 2016. FluLaval is now approved for use as a 0.5 mL dose for everyone 6 months of age and older.

Safety and Efficacy of FluLaval in Young Children
Before November 2016, the only influenza vaccine formulation licensed for children aged 6 through 35 months was the 0.25 mL of Sanofi's Fluzone. The recommendation for use of a reduced dose volume for children in this age group (half that recommended for persons aged ≥3 years) was based on increased reactogenicity noted among children (particularly younger children) following receipt of influenza vaccines in trials conducted during the 1970s. This increased reactogenicity was primarily observed with whole-virus inactivated vaccines. Studies with vaccines more similar to currently available split-virus inactivated products demonstrated **less reactogenicity**. In a randomized trial comparing immunogenicity and safety of 0.5 mL FluLaval Quadrivalent with 0.25 mL Fluzone Quadrivalent, **safety and reactogenicity were similar** between the two vaccines.

See the box below for guidance on the schedule and dosing for influenza vaccines in children.

Take Care to Use Correct Volume for Dose in Children

- For any dose needed, children aged 6 through 35 months may receive either:
  - 0.5 mL FluLaval Quadrivalent (IIV4) IM, or
  - 0.25 mL Fluzone Quadrivalent (IIV4) IM.
  - Note that dose volume differs for these two brands. Care should be taken to administer the correct volume for each dose of either product.
- Children aged 3 through 17 years may receive 0.5 mL intramuscularly of an age-appropriate IIV formulation.

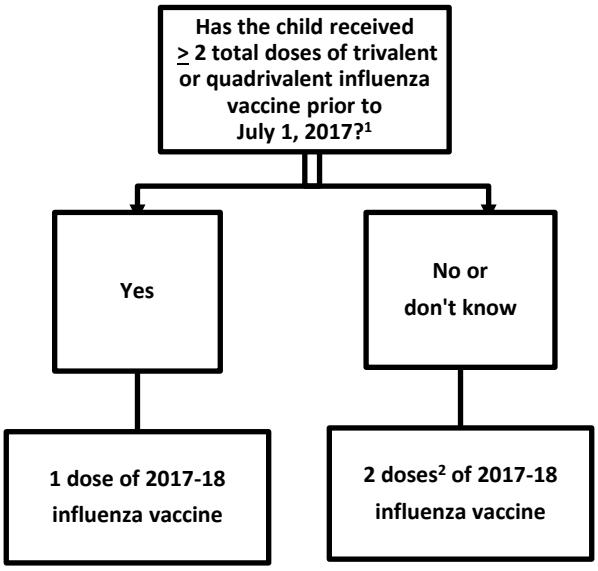
Please note: Children 6 months through 8 years who are receiving influenza vaccine for the 1st time or who have had a total of only 1 dose of influenza vaccine in any previous seasons will need 2 doses separated by ≥4 weeks. For those children who need 2 doses this season, the 2 doses do not need to be the same product.

The algorithm for determining the appropriate number of doses for children aged 6 months through 8 years has not changed for 2017-2018.

- Children 6 months through 8 years who have previously received 2 or more total doses of trivalent or quadrivalent influenza vaccine as of July 1, 2017 need only 1 dose for the 2017-18 season. The 2 previous doses do not need to have been given during the same season or consecutive seasons.
- Children 6 months through 8 years who have previously received only 1 dose or no doses of influenza vaccine need 2 doses (of the appropriate dose volume for age and formulation, as described above) of vaccine to be fully protected for the 2017-2018 season.

(See the algorithm on the next page.)

Figure 1: Flu vaccine dosing algorithm for children 6 months through 8 years of age, 2017-2018



Note: Children 6 months through 8 years of age who have not received a total of 2 or more doses in previous seasons as described above require 2 doses in 2017-18.

[1]The 2 doses need not have been received during the same season or consecutive seasons.

[2]Doses should be administered ≥ 4 weeks apart.

For additional information about FluLaval and guidance about influenza vaccination of young children, see pages 3, 7-9, 14-16 in the ACIP Recommendations and page 35 in the Background document.

Information for Travelers:
The Southern Hemisphere experiences its flu season from April through September, and flu activity can occur year-round in the tropics. People traveling to parts of the world where flu activity is ongoing, and who have not received flu vaccine for the current season, should get vaccinated. This is particularly important for people at risk for flu-related complications. This also applies to people who are traveling in the temperate regions of the Northern Hemisphere as part of tourist groups (e.g., on cruise ships) that may include people from other parts of the world where flu activity is ongoing.

Influenza vaccine formulated for the Southern Hemisphere might differ in viral composition from the Northern Hemisphere vaccine. Southern Hemisphere formulation seasonal influenza vaccines are generally not commercially available in the U.S. For more information, go to: www.cdc.gov/flu/travelers/travelersfacts.htm And page 12 in the ACIP Recommendations.

Influenza, Neurologic and Neuromuscular Conditions, and Congregate Housing:
Children and adults with neurological and neuromuscular conditions (including disorders of the brain, spinal cord, peripheral nerve, and muscle such as cerebral palsy, epilepsy [seizure disorders], stroke, intellectual disability [mental retardation], moderate to severe developmental delay, muscular dystrophy, or spinal cord injury) are at increased risk of complications from influenza. These conditions can compromise respiratory function, handling of secretions and increase the risk of aspiration. Like everyone else six months of age and older, they should receive influenza vaccine every year. A CDC study found that in 2011-2012, only about half of children and young adults within this high risk group received influenza vaccine.

People with neurological and neuromuscular conditions who live in congregate housing (e.g., group homes) and/or attend day programs may be exposed to influenza throughout the season. They should receive flu vaccine as soon as it is available. Staff at these facilities should be vaccinated as well. In addition, when outbreaks of influenza-like illness (fever with cough and/or sore throat) occur in a group home or day program serving vulnerable populations, healthcare providers should be immediately notified and should consider rapid antiviral treatment of ill individuals as well as antiviral prophylaxis of individuals who were exposed.

Outbreaks across the age spectrum in these settings have occurred annually in Massachusetts and have resulted in serious illness and even death. Therefore MDPH recommends annual vaccination of residents and staff; rapid outbreak response; proactive development of an influenza outbreak response protocol within agencies serving vulnerable populations, to facilitate a rapid response when an outbreak occurs; and immediate notification of MDPH and other appropriate agencies (see below). For more information see http://www.cdc.gov/ncbddd/developmentaldisabilities/features/keyfinding-flu-vaccine-neurologic.html.

Influenza Surveillance, Reporting and Control

Influenza Surveillance:
Throughout the year, and especially during flu season, conduct surveillance for respiratory illness with fever and use influenza testing to identify outbreaks so infection control measures can be promptly initiated in all settings, including inpatient and outpatient settings.

Influenza Reporting:
All positive laboratory findings indicative of influenza virus infection (except teleform reporting of rapid influenza tests) are reportable directly to MDPH, in accordance with 105 CMR 300.000 (Reportable Diseases, Surveillance and Isolation and Quarantine Requirements).

1) Immediately report the following influenza-related cases by phone to the Division of Epidemiology and Immunization at 617-983-6800 and to your local board of health. Providers in the city of Boston should report these cases directly to the Boston Public Health Commission at 617-534- 5611. This applies to all strains of influenza:

- ☎ Suspected and confirmed deaths related to influenza in children under 18 and in pregnant women
- ☎ Unusual or unusually severe cases of influenza or ILI (e.g., with encephalopathy, myocarditis, or pericarditis)
- ☎ Case(s) or clusters of ILI in long-term care facilities, group homes, shelters, prisons or other high risk settings
- ☎ Unusual clusters of ILI in daycare and elementary schools
- ☎ Cases of suspected or proven antiviral treatment or prophylaxis failure
- ☎ Suspect novel or variant influenza, e.g., travel-associated, animal-associated, avian influenza A H5N1 or H7N9, influenza A H3N2v, or other avian influenza
- ☎ ILI in employees of swine or poultry farms

Clusters in hospitals and long-term care: Report clusters of influenza-like illness to MDPH via faxed teleform. Teleforms are available by calling 617-983-6801. Please provide as much detail on these forms as possible. Upon receipt of the teleform, an epidemiologist will contact you to provide guidance concerning testing, prophylaxis and infection control. Clusters in hospitals, long term care facilities and other entities licensed by the Division of Healthcare Quality (DHCQ) should also be reported to DHCQ at 800-462-5540 or 617-753-8150. Group homes, prisons or other settings should also contact the appropriate oversight agency for your facility. The teleform is also available at http://www.mass.gov/eohhs/docs/dph/cdc/reporting/case-report-forms/resp-cluster-reporting-form.pdf.

Do **not** report rapid flu test results by teleform, as it was discontinued in 2016-2017. For any questions, please call 617-983-6801.

2) More about reporting: For specific information about reporting, see the MDPH 105 CMR 300.000: Reportable Diseases, Surveillance and Isolation and Quarantine Requirements at www.mass.gov/eohhs/docs/dph/cdc/reporting/rdiq-reg-summary.rtf. Please note that additional jurisdiction-specific reporting requirements may also apply. For example, healthcare providers and laboratories within the city of Boston must also report all cases of influenza and all laboratory tests positive for influenza directly to the Boston Public Health Commission (see www.bphc.org/ or contact BPHC at 617-534-5611).

Influenza testing and infection control (including antiviral treatment), below: Providers should routinely check for updates at www.mass.gov/flu and www.cdc.gov/flu/professionals/.

Influenza Testing:
Diagnostic testing for influenza can aid clinical judgment and guide treatment decisions and control measures. Clinical testing services performed on specimens submitted to a state public health laboratory provide important diagnostic information to the clinician and also contribute to public health respiratory surveillance response and control measures. As a specific example, an influenza B strain submitted to the Massachusetts State Public Health Laboratory (MA SPHL) in March 2012 was the first identified isolate that later began to circulate widely and was then incorporated into the 2013-14 and 2014-15 influenza vaccines. Specific testing services provided by the MA SPHL may assist the clinician as follows:

- **Define the start of the influenza season:** Rapid antigen testing for detecting influenza A and B virus infections is widely available. Rapid influenza diagnostic tests vary in performance characteristics. False negative and false positive results can occur when flu prevalence is low in the community. For this reason, MA SPHL requests that clinical laboratories consider submitting their first influenza rapid positive original samples of the season (beginning in October) to MA SPHL for confirmation. For more information: www.cdc.gov/flu/professionals/diagnosis/clinician_guidance_ridt.htm.

- **Diagnose influenza or other respiratory infections:** Diagnostic tests for influenza performed at the MA SPHL include a "respiratory panel" to identify seasonal and novel influenza types/subtypes followed by testing of influenza negative samples for the presence of adenovirus, respiratory syncytial virus (A/B), parainfluenza virus (1-4), coronavirus (HKU1, OC43, NL63, 229E), human metapneumovirus and rhinovirus/enterovirus using polymerase chain reaction (PCR). There is no charge for these tests. The turnaround time for results is usually a few days, but varies depending on the test performed. Results are returned electronically or by fax and mail to the submitting provider.

- **Monitor trends in influenza antiviral resistance:** MA SPHL performs surveillance testing for influenza antiviral resistance and provides this information in its weekly influenza report. Diagnostic antiviral resistance testing is currently coordinated with CDC and is offered on a case-by-case basis. Providers are encouraged to submit samples from influenza cases with suspect antiviral drug resistance.

- **Rapid identification of new or novel influenza or other viral infections:** MA SPHL is able to rapidly determine the presence of a novel or variant influenza strain using the CDC diagnostic panel. Rapid antigen testing and commercially-available RT-PCR tests may not detect novel or variant strains of influenza and most are unable to differentiate between seasonal, novel or variant influenza strains. Therefore, respiratory specimens should be collected from any patient suspected of having atypical or novel infections with H3N2v or avian influenza H7N9, for example. These suspicions may be based on travel history or animal exposure.

Specimen Collection and Shipping to MA SPHL:
Flu specimens should be collected as soon as possible after onset of illness, preferably within three days (72 hours). Specimens collected after 72 hours are usually unsuitable for testing. Specimens should be submitted immediately after collection to MA SPHL in order to be tested within three days of collection. If samples will be shipped to MA SPHL ≥3 days from collection or on a Friday but are collected within 72 hrs, they should be frozen at <-20ºC and shipped with ice packs on Monday. This variation must be noted on the specimen submission form to avoid an "unsatisfactory for testing" designation.

- For information on influenza specimen collection and transportation, or to speak with an immunization epidemiologist, call MDPH at 617-983-6800.

- Information on specimen collection and submission, including the respiratory surveillance specimen submission form, may be found at: www.mass.gov/eohhs/docs/dph/laboratory-sciences/flu-virus-collection.pdf and www.mass.gov/eohhs/docs/dph/laboratory-sciences/flu-specimen-submission-form.pdf.

Infection Control: To prevent the transmission of **all** respiratory infections, including influenza, in healthcare settings, implement the following infection control measures at the first point of contact with a potentially infected person. These should be incorporated into infection control practices as one component of standard precautions. Tools to help promote and implement these recommendations are available at www.cdc.gov/flu/professionals/infectioncontrol.

1) Assess the influenza and pneumococcal vaccination status of all patients and the flu vaccination status of all staff. Vaccinate all susceptible patients and staff.

2) Use standard precautions (www.cdc.gov/hicpac/2007IP/2007ip_part3.html#a) with all patients. Use

droplet precautions (www.cdc.gov/hicpac/2007IP/2007ip_part3.html#b) when caring for patients with suspected or confirmed seasonal influenza.

3) Active surveillance and testing for new illness and cases: Educate staff about the signs and symptoms of influenza-like illness.

4) Respiratory hygiene/cough etiquette: Post visual alerts (in appropriate languages) at the entrance to outpatient facilities (e.g., emergency departments, physician offices, outpatient clinics) instructing patients and persons who accompany them (e.g., family, friends) to inform healthcare personnel of symptoms of a respiratory infection when they first register for care and to practice respiratory hygiene/cough etiquette. Posters, brochures and fact sheets promoting **cough etiquette** and **handwashing** in multiple languages are available from the Massachusetts Health Promotion Clearinghouse at https://massclearinghouse.ehs.state.ma.us/.

5) Novel strains of influenza: If you suspect any novel strain of influenza, please contact your local board of health and MDPH immediately at 617-983-6800. Highly-pathogenic avian influenza (HPAI) A H5 viruses were identified in birds in the United States in December 2014 and the first half of 2015. The majority of these infections occurred in poultry, including backyard and commercial flocks. These HPAI A H5 viruses are not known to have caused disease in humans. There have been no cases identified in Massachusetts birds to date. Providers should check for updates at http://www.cdc.gov/flu/avianflu/index.htm and http://www.cdc.gov/flu/swineflu/prevention-strategies.htm.

6) Antiviral drugs are an adjunct to, not a substitute for, vaccination for preventing and controlling influenza. The neuraminidase inhibitors oseltamivir (Tamiflu®), zanamivir (Relenza®), and peramivir (Rapivab®) are currently recommended for use against circulating influenza viruses. The adamantanes (amantadine and rimantadine) are **not** recommended because of high levels of resistance to these drugs among recently circulating influenza A (H3) and 2009 H1N1 influenza viruses.

> **Prompt empiric antiviral treatment:** Clinical judgment is an important factor in treatment decisions for patients presenting with influenza-like illness. Prompt empiric antiviral treatment with influenza antiviral medications is recommended while results of definitive diagnostic tests are pending, or if diagnostic testing is not possible, for patients with clinically suspected influenza illness who have:
>
> - Illness requiring hospitalization,
> - Progressive, severe, or complicated illness, regardless of previous health status, and/or
> - Increased risk for severe disease.

Antiviral treatment, when clinically indicated, should **not be delayed pending definitive laboratory confirmation of influenza.** Influenza antiviral medications are most effective when initiated within the first 2 days of illness, but these medications may also provide benefits for severely ill patients when initiated even after 2 days**.** Guidance on use of antivirals may change depending upon resistance data. Consult CDC's latest recommendations on antiviral use at www.cdc.gov/flu/professionals/antivirals/. Clinicians should be alert to changes in antiviral recommendations that might occur as additional antiviral resistance data becomes available during the 2017-2018 season.

7) Rapid testing reminder: Point of care rapid tests capable of detecting influenza A and B virus infections are available, **but healthcare providers and public health personnel should be aware that rapid influenza diagnostic tests have limited sensitivity and false negative results are common**. Thus, negative results from rapid influenza diagnostic test should not be used to guide decisions regarding treating patients with influenza antiviral medications. In addition, false positive tests can occur and are more likely when influenza is rare in the community. When laboratory confirmation is desired, use RT-PCR and/or viral culture.

Vaccine Ordering and Locating Clinics:

Providers Wishing to Order Flu Vaccine for Private Purchase: The national Influenza Vaccine Availability Tracking System (IVATS) assists providers wishing to privately purchase flu vaccine. IVATS identifies available doses of influenza vaccine by formulation and distributor/vendor throughout the season.

Location of Flu and Adult Vaccination Services:
Flu vaccination clinics are listed on the mylocalclinic.com website sponsored by the Massachusetts Health Officers Association (MHOA). MDPH urges agencies to post their clinics on this website. Many boards of health (BOHs) may have clinics that make flu and other vaccines available to both adults and children. BOHs can be contacted individually for questions about possible flu vaccination clinics in Massachusetts municipalities, including the age groups served.

HealthMap Vaccine Finder assists the public with locating influenza and adult vaccination services within their communities. It is a free, online service where users can search for locations that offer immunizations. Its staff works with partners such as clinics, pharmacies, and health departments to provide accurate and up-to-date information about vaccination services. MDPH urges providers and other agencies to register their locations on the HealthMap Vaccine Finder site too.

Guidance and Resources for Large Scale Immunization Clinics:

- **MDPH Guidelines for Immunization Clinics**. These guidelines were developed to assist in the planning and operation of vaccination clinics, including annual flu clinics, school-based clinics, and vaccination clinic in response to small-scale emergencies. This document summarizes key points in running a successful clinic, and provides links to many other useful resources.
- **Guidelines for Large-Scale Influenza Vaccination Clinic Planning.** This webpage provides guidelines and recommendations to assist with planning influenza vaccination clinics. Topics include clinic logistics as well as vaccine storage, handling, and administration.
- **Tools to Assist Satellite, Temporary, and Off-Site Vaccination Clinics**. Outlines CDC's Best Practices that are essential for patient safety and vaccine effectiveness in these settings.
- **CDC At-A-Glance Resource Guide - Vaccine Administration and Storage and Handling.** This is a quick guide to key web resources on immunization, vaccine administration, and vaccine storage and handling. The guide includes CDC guidelines, an immunization checklist, educational webinars, and standing orders.
- **CDC Vaccine Administration Site.** This is CDC's main vaccine administration web page with resources for providers about screening for contraindications, vaccine administration, job aids, videos, e-learning and self-study on-line materials.
- **General Best Practice Guidelines for Immunization. Best Practices Guidance of the Advisory Committee on Immunization Practices (ACIP).** This comprehensive website and report provides evidence-based guidance for healthcare providers related to a broad range of immunization practices and vaccine administration.
- **MDPH Influenza Vaccine Guidelines and Tools.** This webpage contains information about influenza vaccine and links to guidance about planning flu and other mass immunization campaigns, standing orders, screening forms, consent forms, and MDPH-specific vaccine management guidance.
- **One & Only Campaign.** The One & Only Campaign is a public health campaign, led by the Centers for Disease Control and Prevention (CDC) and the Safe Injection Practices Coalition (SIPC), to raise awareness among patients and healthcare providers about safe injection practices.
    - **Frequently Asked Questions** Regarding Safe Practices for Medical Injections
    - **Pocket Card** on Injection Safety Guidelines from CDC
    - **Infographic** describes the impact of unsafe medical injection practices

Pneumococcal Vaccine Recommendations

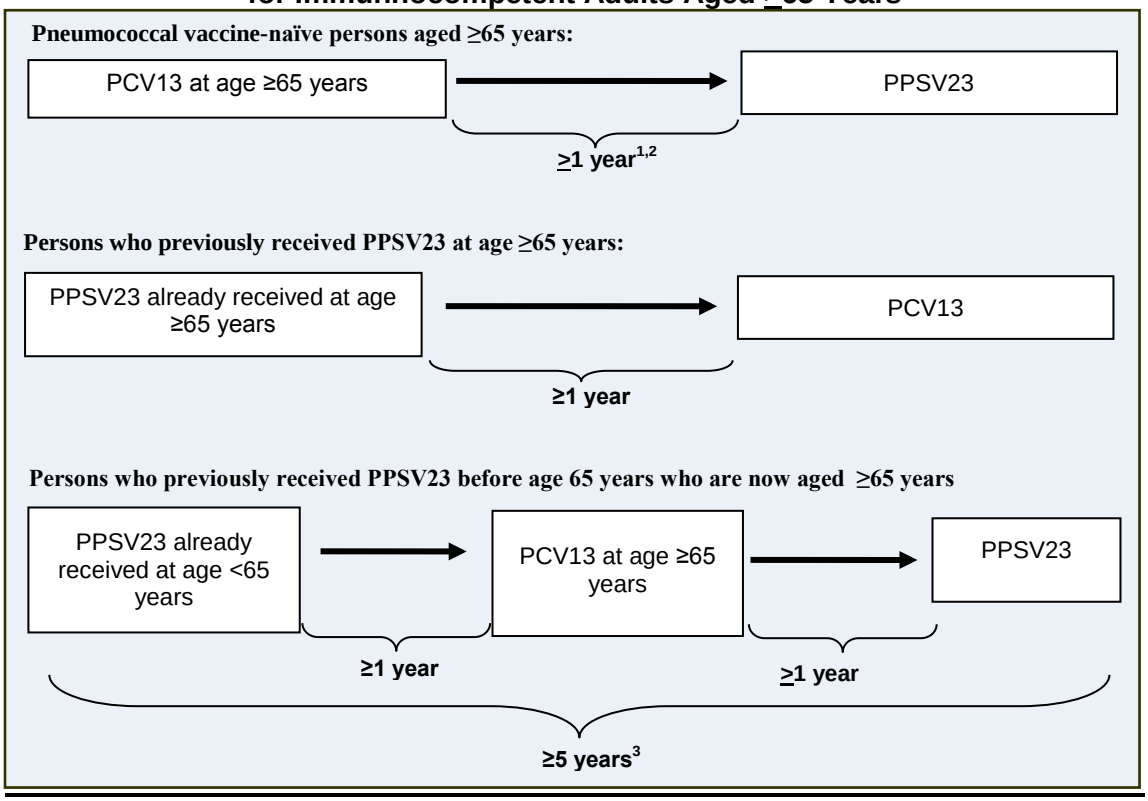
Since 2014, the ACIP recommends that PCV13 and PPSV23 should be administered routinely **in a series** to all immunocompetent adults aged ≥65 years. **PCV13** should be administered **only once** for all adults. The recommended intervals between PCV13 and PPSV23 vaccines were updated in 2015 and published in the MMWR.

Specific recommendations are based on a person's previous pneumococcal vaccine history.

- **Persons who are pneumococcal vaccine-naïve.** Adults aged ≥65 years who have not previously received pneumococcal vaccine or whose previous vaccination history is unknown should receive a single dose of PCV13 first, followed by a dose of PPSV23. The dose of PPSV23 should be given **≥1 year** after a dose of PCV13.
- **Persons previously vaccinated with PPSV23.** Adults aged ≥65 years who have previously received ≥1 doses of PPSV23 also should receive a single dose of PCV13 if they have not yet received it. A dose of PCV13 should be given **≥1 year** after receipt of the most recent PPSV23 dose. For those for whom an additional dose of PPSV23 is indicated, this subsequent PPSV23 dose should be given **≥1 year** after PCV13 and ≥5 years after the most recent dose of PPSV23.
- The two vaccines should not be co-administered. If doses of PPSV23 and PCV13 are inadvertently given on the same day or earlier than the recommended interval, those doses do not need to be repeated.
- Adults 19 years and older at increased risk for pneumococcal disease who have already received a dose of PCV13 at 64 years or younger should **no**t receive another dose of PCV13 at 65 years or older.
- For adults ≥65 years with immunocompromising conditions, functional or anatomic asplenia, CSF fluid leaks or cochlear implants, the recommended interval between a dose of PCV13 and PPSV23 remains at ≥8 weeks. This interval minimized the risk window for invasive pneumococcal disease caused by serotypes unique to PPSV23 in these highly vulnerable groups.

For more details about the sequential schedule and intervals, please see the algorithm below.

Sequential Administration and Recommended Intervals for PCV13 and PPSV23 for Immunnocompetent Adults Aged ≥65 Years



[1] If doses of PPSV23 and PCV13 are inadvertently given on the same day or earlier than the recommended interval, those doses do not need to be repeated.
[2] For adults in this age group with immunocompromising conditions, functional or anatomic asplenia, CSF fluid leaks or cochlear implants, the recommended interval is ≥8 weeks.
[3] For those who previously received PPSV23 when aged <65 years and for whom an additional dose of PPSV23 is indicated when aged ≥65 years, this subsequent PPSV23 dose should be given ≥1 year after PCV13 and ≥5 years after the most recent dose of PPSV23.

The above figure only outlines pneumococcal vaccine recommendations for those ≥65 years of age. The CDC job aid Pneumococcal Vaccine Timing for Adults contains a number of algorithms and a summary table. It was developed to help providers understand the complex pneumococcal recommendation across both age and risk groups -- and is an outstanding resource.
https://www.cdc.gov/vaccines/hcp/adults/downloads/fs-pneumo-hcp.pdf

The recommendations for routine PCV13 use among adults aged ≥65 years will be reevaluated and revised as needed. CDC's Pneumococcal Frequently Asked Questions was developed to help healthcare professionals address common questions patients ask regarding pneumococcal vaccination. Information and other resources can be found on CDC's Pneumococcal Disease and Pneumococcal Vaccination web pages. MDPH's Control of Influenza and Pneumococcal Disease in Long-Term Care Facilities contains additional guidance and will be posted at www.mass.gov/flu.

Insurance Coverage and Pneumococcal Vaccines

Most private health insurance covers pneumococcal vaccines. Check with the insurance provider for details on whether there is any cost to your patient and for a list of in-network vaccine providers. Medicare Part B covers the cost of two recommended doses of pneumococcal vaccine when administered 1 year apart. (i.e., 11 full months have passed following the month in which the previous pneumococcal vaccine was administered). As with other preventive care and vaccines, Medicare beneficiaries may not need to pay for the immunization if the doctor or other qualified healthcare provider accepts assignment (Medicare payment) for giving the vaccine. However, patients should check with their provider and plan to review the details of their coverage. Guidance for providers about Medicare Part B billing for pneumococcal vaccines can be found at:
https://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNMattersArticles/Downloads/MM9051.pdf

Table 1. Approved Inactivated Influenza Vaccines for Different Ages 2017-2018[1,2]

Vaccine	Trade Name	Manufacturer	Presentation	Mercury Content from Thimerosal	Age Indication	Dose	Route
IIV4 Standard Dose	Fluzone Quadrivalent	Sanofi Pasteur	0.25 mL PFS	0.0	6 - 35 mos	0.25 mL	IM
			0.5 mL PFS	0.0	≥3 years	0.5 mL	IM
			0.5 mL SDV	0.0	≥3 years	0.5 mL	IM
			5.0 mL MDV	25 (µg Hg/0.5 mL)	6 - 35 mos	0.25 mL	IM
					≥3 yrs	0.5 mL	
	FluLaval Quadrivalent	ID Biomedical (distributed by GSK)	0.5 mL PFS	0	≥6 mos[3] ***NEW***	0.5 mL	IM
			5.0 mL MDV	< 25.0 (µg Hg/0.5 mL)			
	Fluarix Quadrivalent	GSK	0.5 mL PFS	0.0	≥3 yrs	0.5 mL	IM
	Afluria Quadrivalent	Seqirus	0.5 mL PFS	0.0	≥5 yrs via needle[4] ***NEW***	0.5 mL	IM
			5.0 mL MDV ***NEW***	24.5 (µg Hg/0.5 mL)	≥5 yrs via needle[4] ***NEW*** 18 - 64 yrs via jet injector[4]	0.5 mL	IM
	Fluzone Intradermal[5]	Sanofi Pasteur	0.1 mL prefilled microinjection	0.0	18 - 64 yrs	0.1 mL	ID
IIV4 Cell Culture Based (ccIIV4) Standard Dose	Flucelvax[6] Quadrivalent	Seqirus	0.5 mL PFS	0.0	≥4 yrs	0.5 mL	IM
			5.0 mL MDV ***NEW***	25 (µg Hg/0.5 mL)	≥4 yrs	0.5 mL	IM
IIV3 Standard Dose	Fluvirin	Seqirus	0.5 mL PFS (Syringe tip cap may contain natural rubber latex)	≤1 (µg Hg/0.5 mL)	≥4 yrs	0.5 mL	IM
			5.0 mL MDV	25 (µg Hg/0.5 mL)			
	Afluria	Seqirus	0.5 mL PFS	0.0	≥5 yrs via needle[4] ***NEW***	0.5 mL	IM
			5.0 mL MDV	24.5 (µg Hg/0.5 mL)	≥5 yrs via needle[4] ***NEW*** 18 - 64 yrs via jet injector[4]	0.5 mL	
Adjuvanted Trivalent Standard Dose (aIIV3)	Fluad[7]	Seqirus	0.5 mL PFS (Syringe tip cap contains natural rubber latex)	0.0	≥65 yrs	0.5 mL	IM
IIV3 High Dose	Fluzone High Dose[8]	Sanofi Pasteur	0.5 mL PFS	0.0	≥65 yrs	0.5 mL	IM
Recombinant Quadrivalent (RIV4) ***New***	Flublok[9] (Does NOT contain any ovalbumin)	Protein Sciences	0.5 mL PFS	0.0	≥18 yrs	0.5 mL	IM
Recombinant Trivalent (RIV3)	Flublok[9] (Does NOT contain any ovalbumin)	Protein Sciences	0.5 mL SDV	0.0	≥18 yrs	0.5 mL	IM

Abbreviations: IM= intramuscular; ID=intradermal; MDV = multi-dose vial; PFS = single-dose prefilled syringe; SDV = single-dose vial

(See footnotes next page.)

Footnotes:

[1.] Check Food and Drug Administration for approved prescribing information for 2017-18 influenza vaccines for the most updated information, including (but not limited to) indications, contraindications, and precautions. Package inserts are available at http://www.fda.gov/BiologicsBloodVaccines/Vaccines/ApprovedProducts/ucm093833.htm

[2] The column for ovalbumin concentration has been removed. Studies that have examined the use of both IIV and LAIV in egg-allergic and non-egg allergic patients indicate that severe allergic reactions in people with egg allergy are unlikely.

Although history of severe allergic reaction to egg is a labeled contraindication to IIV and LAIV, the ACIP currently recommends that **any** licensed age-appropriate and recommended IIV or RIV may be administered to persons with egg allergy of **any** severity. See "Egg Allergies" on page 4 for additional information.

Please note: **Flublok** does **NOT** contain any egg protein (see footnote 9) and Flucelvax contains a theoretical maximum of $5x10^{-8}$µg per 0.5 mL dose of total egg protein (see footnote 5).

[3] In November 2016, the FDA **lowered** the minimum age for use of FluLaval from 3 years old to 6 months old. FluLaval is approved as a **0.5 mL dose, including in this younger age group.**

[4] Afluria (IIV3) and Afluria Quadrivalent (IIV4) can both now be given in persons ≥5 years via needle. Afluria (IIV3) was previously only recommended for persons ≥9 years. ACIP reviewed data from studies performed by the manufacturer concerning the cause of an increase in the rate of febrile seizures which occurred in association with the 2010 Southern Hemisphere formulation of this product, and resulting changes in the vaccine manufacturing process. These changes resulted in an acceptable safety profile. The ACIP recommendation for Afluria is now consistent with the approved FDA labelling for that product. In addition, Afluria Quadrivalent (IIV4), which had only been approved for use in those ≥18 years and older, is also now approved for persons ≥5 years.

[5] Quadrivalent inactivated vaccine, intradermal: A 0.1 mL dose contains 9 µg of each vaccine antigen (36 µg total).

[6] For Flucelvax, information about egg protein is not included in the package insert. For this cell culture vaccine, Flucelvax, viruses are propagated in mammalian cells rather than eggs, so it has a much smaller amount of egg protein. However, some of the viruses provided by the manufacturer are egg-derived, and therefore egg protein may potentially be introduced at the start of the manufacturing process. Once these viruses are received by the manufacturer, no eggs are used and dilutions at various steps during the manufacturing process result in a theoretical maximum of $5x10^{-8}$µg per 0.5 mL dose of total egg protein. (ACIP statement.)

[7] Fluad is standard dose of IIV3 and contains MF-59 as an adjuvant.

[8] Fluzone High-Dose (IIV3) contains 60 µg of each vaccine antigen (180 µg total) per 0.5 mL dose.

[9] Flublok (RIV) is a recombinant vaccine that does **NOT** contain **ANY** ovalbumin. It contains 45 µg of each HA antigen (135µg total for trivalent, and 180 µg total for quadrivalent).

Resources and Questions:

For complete guidance, see ACIP's 2017-2018 Recommendations for Prevention and Control of Influenza with Vaccines at http://www.cdc.gov/mmwr/volumes/65/rr/pdfs/rr6505.pdf. CDC will be updating its flu website to reflect the new recommendations, including those about LAIV for both providers and patients. So please check their website: www.cdc.gov/flu. The MDPH Flu website at www.mass.gov/flu has information for providers and the general public. Click on 'Information for Healthcare Professionals' for provider resources such as clinical advisories and control guidance, model standing orders, screening forms and planning clinics and campaigns.

For questions about influenza and technical consultation, please call the Massachusetts Department of Public Health Immunization Program at 617-983-6800 or your local board of health. For questions about state-supplied influenza vaccine, please call the Vaccine Unit at 617-983-6828.

References:

CDC. Prevention and Control of Influenza with Vaccines: Recommendations of the Advisory Committee on Immunization Practices (ACIP) - United States, 2017-18 Season. MMWR 2017 66(RR-2):1-20. https://www.cdc.gov/mmwr/volumes/66/rr/pdfs/rr6602.pdf

CDC. Prevention and Control of Influenza with Vaccines: Recommendations of the Advisory Committee on Immunization (ACIP) – United States, 2017-2018, Summary of Recommendations. Available at: https://www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/downloads/ACIP-recs-2017-18-summary.pdf

Background Document for "Prevention and Control of Seasonal Influenza with Vaccines: Recommendations of the Advisory Committee on Immunization Practices—United States, 2017-18 Influenza Season." Available at https://www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/downloads/ACIP-recs-2017-18-bkgd.pdf

CDC. Intervals between PCV13 and PPSV23 Vaccine Recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR 2015;64;944-947. http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6434a4.htm?s_cid=mm6434a4_e

CDC. Antiviral Drugs: Information for Healthcare Professionals. https://www.cdc.gov/flu/professionals/antivirals/index.htm

CDC. Interim Guidance for Infection Control Within Healthcare Settings When Caring for Patients with Confirmed, Probable, or Cases Under Investigation of Novel Influenza A Associated with Severe Disease, January 2014. http://www.cdc.gov/flu/avianflu/h7n9-infection-control.htm

CDC. Influenza Vaccination Practices of Physicians and Caregivers of Children with Neurologic and Neurodevelopmental Conditions – United States, 2011 – 12 Influenza Season. MMWR 2013;62:744-746. http://www.cdc.gov/mmwr/pdf/wk/mm6236.pdf

Prevention Strategies for Seasonal and Influenza A (H3N2)v in Health Care Settings. Web page last reviewed 8/30/2014. http://www.cdc.gov/flu/swineflu/prevention-strategies.htm

CDC. Immunization of Health-Care Personnel: Recommendations of the ACIP. MMWR November 25, 2011, 2011:1-45. http://www.cdc.gov/mmwr/PDF/rr/rr6007.pdf

Vaccine Information Statements (VISs) for all vaccines in many languages: www.immunize.org/vis.

Standing orders for IIV, pneumococcal vaccine, Tdap and other vaccines are available at www.immunize.org or www.mass.gov/dph/imm

References for Immunization Rates:

2015-2016 Influenza Season Vaccination Coverage Reports https://www.cdc.gov/flu/fluvaxview/reportshtml/reporti1516/reporti/index.html

CDC. Influenza Vaccination Coverage Among Health Care Personnel — United States, 2015–16 Influenza Season. https://www.cdc.gov/mmwr/volumes/65/wr/pdfs/mm6538a2.pdf

CDC. Influenza Vaccination Coverage Among Pregnant Women – United States: https://www.cdc.gov/flu/fluvaxview/pregnant-coverage_1516estimates.htm

MDPH. Massachusetts Behavioral Risk Factor Surveillance System: http://www.mass.gov/eohhs/gov/departments/dph/programs/admin/dmoa/health-survey/brfss/statewide-reports-and-presentations.html

MDPH: MA Pregnancy Risk Assessment Monitoring System (PRAMS). http://www.mass.gov/eohhs/gov/departments/dph/programs/family-health/pregnancy-risk-assessment-monitoring-system.html

MDPH. Influenza Vaccination of Health Care Personnel in Massachusetts Clinics, Nursing Homes, Rest Homes, and Adult Day Health Centers 2015-2016 Influenza Season, and Healthcare Associated Infection Data Summaries – Acute Care Hospitals. Accessed July 28, 2017. http://www.mass.gov/eohhs/gov/departments/dph/programs/hcq/healthcare-quality/health-care-facilities/flu-vac-hc-personnel/flu-vaccination-reports.html