
Influenza Virus Vaccine Live Intranasal (Seasonal)

80:12 Vaccines (AHFS primary); im100 (VA primary)

■ Influenza virus vaccine live intranasal stimulates active immunity to influenza virus infection. There are 2 types of influenza virus vaccines commercially available in the US for prevention of seasonal influenza: influenza virus vaccine inactivated and influenza virus vaccine live intranasal. Seasonal influenza virus vaccine inactivated is a trivalent vaccine containing noninfectious, suitably inactivated influenza virus types A and B subunits and is administered parenterally; seasonal influenza virus vaccine live intranasal is a trivalent vaccine containing live, attenuated (cold-adapted) influenza virus types A and B and is administered intranasally. For information on the parenteral inactivated seasonal influenza vaccine, see Influenza Virus Vaccine Inactivated (Seasonal) 80:12.

Uses

■ Prevention of Seasonal Influenza A and B Virus Infections

Seasonal influenza virus vaccine live intranasal is used in children 2 years of age or older, adolescents, and adults 18 through 49 years of age to stimulate active immunity to influenza virus strains contained in the vaccine for the prevention of seasonal influenza.

Seasonal influenza virus vaccine live intranasal 2011–2012 is a trivalent vaccine formulated to contain antigens representative of the strains of influenza A (H1N1), influenza A (H3N2), and influenza B viruses likely to circulate in the US during the 2011–2012 influenza season. Seasonal influenza virus vaccine live intranasal 2011–2012 contains A/California/7/2009 (H1N1), A/Perth/16/2009 (H3N2), and B/Brisbane/60/2008.

Following administration of influenza virus vaccine live intranasal, the vaccine viruses replicate in the nasopharynx epithelial cells to induce protective immunity. Although the vaccine strains contained in the seasonal intranasal influenza vaccine are attenuated live virus reassortants and the strains contained in the seasonal parenteral influenza vaccine are inactivated virus subunits, these vaccines are considered antigenically equivalent.

The US Public Health Service Advisory Committee on Immunization Practices (ACIP) recommends routine influenza vaccination for *all* adults, adolescents, and infants and children 6 months of age or older using an age-appropriate seasonal influenza vaccine, unless contraindicated. However, seasonal influenza vaccination efforts should continue to target individuals at higher risk of influenza or influenza-related complications and those who live with or care for such individuals (e.g., health-care personnel, household or other close contacts). (See Target Groups for Influenza Vaccination under Uses: Prevention of Seasonal Influenza A and B Virus Infections, in Influenza Virus Vaccine Inactivated (Seasonal) 80:12.)

The ACIP, American Academy of Pediatrics (AAP), American Academy of Family Physicians (AAFP), and other experts state that either seasonal influenza virus vaccine live intranasal or age-appropriate seasonal parenteral influenza virus vaccine inactivated can be used for prevention of seasonal influenza in healthy, nonpregnant individuals 2 through 49 years of age who do not have underlying medical conditions that put them at higher risk for influenza complications. This includes health-care personnel, household contacts, and other individuals (e.g., day-care providers) who are in close contact with individuals at high risk of influenza complications or in close contact with certain immunocompromised individuals (e.g., those not requiring a protective environment, those with diabetes or human immunodeficiency virus [HIV] infection, asthma patients taking corticosteroids). Possible advantages of the intranasal live vaccine over the parenteral inactivated influenza vaccine in such individuals include its potential to induce a broad mucosal and systemic immune response, ease of administration, and improved acceptance of intranasal rather than parenteral administration; possible disadvantages include restrictions based on age or medical conditions and the risk that the live vaccine virus could be transmitted from the vaccinee to close contacts who are severely immunocompromised.

Seasonal influenza virus vaccine live intranasal should *not* be used in health-care workers, household members, or other individuals who have close contact with *severely* immunocompromised individuals requiring a protective environment (e.g., hematopoietic stem cell transplant [HSCT] recipients). Age-appropriate parenteral inactivated seasonal influenza vaccine should be used in such individuals.

Safety and efficacy of seasonal influenza virus vaccine live intranasal have *not* been established in children younger than 2 years of age or adults 50 years of age or older; age-appropriate parenteral inactivated seasonal influenza virus vaccine should be used in these age groups.

Safety of seasonal influenza virus vaccine live intranasal has *not* been established in individuals with underlying medical conditions that may predispose them to influenza complications. In addition, only limited data are available regarding safety and efficacy of the intranasal live vaccine in immunocompromised individuals, and live vaccines usually are not recommended in such individuals. (See Individuals with

Altered Immunocompetence and Their Close Contacts under Cautions: Warnings/Precautions.)

During periods when seasonal influenza virus vaccine inactivated vaccine is in short supply, use of seasonal influenza virus vaccine live intranasal is encouraged for eligible individuals. Use of seasonal influenza virus vaccine live intranasal in eligible individuals, including health-care workers, might increase availability of seasonal influenza virus vaccine inactivated for individuals in high-risk groups.

Seasonal influenza vaccines are *not* effective against all strains of influenza, but may be effective against those strains (and closely related strains) represented in the vaccines.

The 2009 pandemic influenza A (H1N1) virus, previously referred to as the novel 2009 influenza A (H1N1) virus or swine-origin influenza A (H1N1) virus, is likely to continue to circulate during the 2011–2012 influenza season. Seasonal influenza vaccines for the 2011–2012 influenza season are expected to provide protection against infection with the 2009 pandemic influenza A (H1N1) virus and influenza A (H3N2) and influenza B strains represented in the vaccines.

Seasonal influenza vaccines are *not* expected to provide protection against infection with avian influenza A viruses, including avian influenza A (H5N1).

For further information on recommendations for use of seasonal influenza vaccines, including information on choice of influenza vaccines, target groups for influenza vaccination, timing of influenza vaccination, antigenic characteristics of influenza viruses, and the choice of antigens for annual formulations of seasonal influenza vaccines, see Influenza Virus Vaccine Inactivated (Seasonal) 80:12.

Information regarding influenza surveillance and updated recommendations for prevention and treatment of seasonal influenza is available from the US Centers for Disease Control and Prevention (CDC) at <http://www.cdc.gov/flu>.

Travelers

Travelers who want to reduce their risk for influenza infection should receive seasonal influenza vaccine at least 2 weeks before departure. The risk for exposure to seasonal influenza during travel depends on the time of year and destination. In tropical and subtropical areas, influenza can occur throughout the year. In temperate regions of the northern hemisphere, influenza activity may begin as early as October and extend until May; in temperate regions of the southern hemisphere, influenza activity generally occurs from April through September. However, travelers may be exposed to influenza at any time of the year if they are traveling on a cruise or as part of a large tourist group that includes individuals from areas of the world where influenza is circulating. The ACIP recommends that travelers (especially those at high risk for influenza complications) be vaccinated against seasonal influenza before travel if they were not vaccinated during the preceding fall or winter, will be traveling to the tropics, traveling with organized tourist groups at any time of year, or traveling to the southern hemisphere between April and September.

Healthy Close Contacts of Individuals with Altered Immunocompetence

Seasonal influenza virus vaccine live intranasal should *not* be used in household members, health-care personnel, or other individuals who have close contact with *severely* immunocompromised individuals requiring a protective environment (e.g., HSCT recipients) because of the theoretical risk that the live vaccine virus could be transmitted to these individuals. Therefore, the ACIP states that close contacts of severely immunosuppressed individuals should receive seasonal influenza virus vaccine inactivated (not influenza virus vaccine live intranasal).

Either seasonal influenza virus vaccine live intranasal or age-appropriate seasonal parenteral influenza virus vaccine inactivated can be used in individuals 2 through 49 years of age (including health-care personnel and employees of long-term care and assisted-living facilities) who have close contact with individuals who are less severely immunocompromised (e.g., those not requiring a protective environment, those with diabetes or HIV infection, asthma patients taking corticosteroids).

Dosage and Administration

■ Administration

Seasonal influenza virus vaccine live intranasal is administered intranasally using the prefilled, single-use sprayer supplied by the manufacturer.

The vaccine should not be administered IM, IV, or intradermally.

Influenza virus vaccine live intranasal is a colorless to pale yellow liquid and may be clear to slightly cloudy. The intranasal vaccine should not be mixed with any other vaccine or solution.

Seasonal influenza virus vaccine live intranasal should be administered every year prior to exposure to seasonal influenza. The optimal time for annual vaccination against seasonal influenza cannot be determined because influenza seasons vary in their timing and duration and more than one outbreak might occur in a single community during a single year. In the US, localized outbreaks indicating start of the annual influenza season can occur as early as October; peak influenza activity often occurs in January or February, but has occurred as late as April or May. Vaccination efforts should begin each year by October (or as soon as the seasonal influenza

vaccine is available) and should be continued throughout the influenza season (even in December or after influenza activity has begun in the community).

Intranasal Administration

The vaccine recipient should be placed in an upright position. Approximately one-half the contents of the prefilled, single-use sprayer should be administered into each nostril. The manufacturer's labeling should be consulted for specific information regarding use of the sprayer.

After the vaccine has been administered, the sprayer should be disposed of carefully (i.e., discarded using standard procedures for medical waste).

If the vaccine recipient sneezes after receiving a dose of the intranasal vaccine, the dose should *not* be repeated.

In patients with nasal congestion that might impede delivery of the vaccine to the nasopharyngeal mucosa, administration of the intranasal vaccine should be deferred until symptoms subside. Alternatively, the inactivated influenza virus vaccine can be administered parenterally.

Influenza virus vaccine live intranasal may be given simultaneously with other age-appropriate vaccines during the same health-care visit. (See Drug Interactions: Vaccines.)

Personnel Who May Administer Influenza Virus Vaccine Live Intranasal.

Seasonal influenza virus vaccine live intranasal must be administered by a health-care provider.

Although individuals at high risk of influenza complications (e.g., those with underlying medical conditions, pregnant women, individuals with asthma, individuals 50 years of age or older) may administer influenza virus vaccine live intranasal, the US Public Health Service (USPHS) Advisory Committee on Immunization Practices (ACIP) recommends that individuals who are *severely* immunosuppressed should not administer the live vaccine. Introduction of very small amounts of vaccine virus into the environment is likely to occur when administering influenza virus vaccine live; the risk of acquiring vaccine virus from the environment is unknown, but presumed to be low.

■ Dosage

The dosing schedule of seasonal influenza virus vaccine live intranasal for prevention of seasonal influenza depends on the individual's age and vaccination status.

A single-dose regimen of seasonal influenza vaccine is used in adults 18 through 49 years of age, adolescents, and children 9 years of age or older.

A 2-dose regimen of seasonal influenza vaccine is necessary in children 2 through 8 years of age who have *not* previously received any doses of seasonal influenza vaccine or have an *uncertain* history regarding influenza vaccination during the prior season. (See Pediatric Dosage under Dosage and Administration: Dosage.)

A single dose consists of the entire contents of the sprayer (0.2 mL).

Adult Dosage

Adults 18 through 49 Years of Age.

For prevention of seasonal influenza in healthy, nonpregnant adults 18 through 49 years of age, a single dose of influenza virus vaccine live intranasal consisting of 0.2 mL (0.1 mL in each nostril) should be administered.

Pediatric Dosage

Children 2 through 8 Years of Age.

For prevention of seasonal influenza in healthy children 2 through 8 years of age who have *not* previously received any dose of any type of seasonal influenza vaccine or have an *uncertain* history regarding influenza vaccination during the previous influenza season, 2 doses of influenza virus vaccine live intranasal should be administered at least 1 month apart. Each dose consists of 0.2 mL (0.1 mL in each nostril).

For prevention of seasonal influenza in healthy children 2 through 8 years of age who received at least 1 dose of any type of seasonal influenza vaccine during the previous influenza season, a single dose of influenza virus vaccine live intranasal should be administered consisting of 0.2 mL (0.1 mL in each nostril).

Children 9 through 17 Years of Age.

For prevention of seasonal influenza in healthy children and adolescents 9 through 17 years of age, a single dose of influenza virus vaccine live intranasal consisting of 0.2 mL (0.1 mL in each nostril) should be administered.

■ Special Populations

Geriatric Patients

Influenza virus vaccine live intranasal is *not* indicated in adults 50 years of age or older, including geriatric adults.

Cautions

■ Contraindications

History of hypersensitivity (especially anaphylactic reactions) to egg or egg proteins, gentamicin, gelatin, or arginine.

Life-threatening reaction to previous dose of influenza vaccine.

Children and adolescents 2–17 years of age receiving aspirin or aspirin-containing therapy, because of an association of Reye's syndrome with aspirin use and wild-type influenza infection. (See Drug Interactions: Aspirin.)

■ Warnings/Precautions

Hypersensitivity Reactions

Hypersensitivity reactions (e.g., anaphylactic reaction, facial edema, urticaria) have been reported after administration of influenza virus vaccine live intranasal.

Appropriate medical treatment and supervision must be available for immediate use in case an anaphylactic reaction occurs.

Additional vaccine doses should not be administered to any individual who had a life-threatening reaction to a previous dose. (See Cautions: Contraindications.)

Egg Allergy.

Seasonal influenza virus vaccine live intranasal is produced using eggs, and can contain residual egg protein (ovalbumin) that may induce immediate hypersensitivity reactions (e.g., anaphylaxis) in individuals with severe egg allergy.

The US Public Health Service Advisory Committee on Immunization Practices (ACIP) states that individuals who are able to eat lightly cooked eggs (e.g., scrambled eggs) without reaction are unlikely to be allergic and may receive influenza vaccination per usual protocols. However, tolerance to egg-containing foods does not exclude the possibility of egg allergy since some egg-allergic individuals may tolerate eggs in baked products (e.g., bread, cake). Egg allergy can be confirmed by a consistent history of adverse reactions to eggs and egg-containing foods in addition to skin and/or blood testing for immunoglobulin E antibodies to egg proteins.

The ACIP and the American Academy of Pediatrics (AAP) state that individuals who have less severe reactions (i.e., hives only) after eating eggs or egg-containing foods may receive influenza vaccine; however, parenteral influenza virus vaccine inactivated is preferred over influenza virus vaccine live intranasal because data are lacking regarding administration of the live intranasal influenza vaccine in individuals with egg allergy. Additionally, in such individuals, influenza vaccine should be administered by a health-care provider familiar with the potential manifestations of egg allergy and recipients should be observed for at least 30 minutes following administration. Other measures, such as skin testing or administration of the vaccine in 2 steps (e.g., 10% of the dose initially, followed by remainder of dose if no reaction occurs during 30 minutes of observation), are not necessary in individuals with a history of less severe reactions (i.e., hives only) to eggs. In children who require a second dose of influenza vaccine, administration of the same product used for the first dose is preferred, although the lot numbers may be different.

Individuals with a history of severe reaction to eggs, including angioedema, respiratory distress (e.g., wheezing, throat swelling), cardiovascular changes (e.g., hypotension), or GI symptoms (e.g., nausea, vomiting), or any previous reaction requiring epinephrine or other emergency intervention (particularly reactions that occurred within minutes to hours following egg exposure), should *not* receive influenza vaccine. The ACIP and AAP recommend that such individuals be referred to a clinician with expertise in the management of allergic conditions for further risk assessment to determine whether the vaccine should be administered.

Infants Younger than 24 Months of Age

Influenza virus vaccine live intranasal should *not* be used in infants younger than 24 months of age. An increased risk of wheezing and hospitalization has been reported when the intranasal live vaccine was used in this age group.

In studies in infants, those 6–23 months of age had an increased incidence of wheezing (5.9%) within 42 days of receiving influenza virus vaccine live intranasal relative to the incidence in infants in this age group who received influenza virus vaccine inactivated (3.8%). In addition, an increase in hospitalizations (4.2%) within 180 days of vaccination with the intranasal vaccine was observed in infants 6–23 months of age relative to infants in this age group given influenza virus vaccine inactivated (3.2%). The incidence of wheezing (2.1%) or hospitalizations (2.1%) in children 24–59 months of age given the intranasal vaccine was similar to the incidence in children in this age group given influenza virus vaccine inactivated (2.5% for wheezing and 2.5% for hospitalization).

Individuals with Asthma or Recurrent Wheezing

Influenza virus vaccine live intranasal should *not* be used in individuals with asthma or in children younger than 5 years of age with recurrent wheezing or a recent wheezing episode (i.e., during the past 12 months), unless possible benefits outweigh potential risks. Such individuals are potentially at increased risk of wheezing after receiving the vaccine. (See Pediatric Use under Warnings/Precautions: Specific Populations, in Cautions.)

Influenza virus vaccine live intranasal should *not* be administered under any circumstances to individuals with *severe* asthma or *active* wheezing because the vaccine has not been evaluated in clinical studies in such individuals.

Guillain-Barré Syndrome

If Guillain-Barré syndrome (GBS) developed within 6 weeks of a previous influenza vaccination, the manufacturer states that the decision to administer influenza virus vaccine live intranasal should be based on careful consideration of the possible benefits and potential risks.

It is unclear whether influenza vaccination increases the risk of recurrence of GBS. The AAP states that influenza vaccines should not be used in children who developed GBS within 6 weeks after a dose of any influenza vaccine. The ACIP states that, as a precaution, individuals who are not at high risk for severe influenza complications and who developed GBS within 6 weeks of a previous dose of influenza vaccine generally should avoid influenza vaccination. Although data are limited, ACIP states that use of influenza vaccine can be considered in individuals with a history of GBS who are at high risk for severe complications from influenza.

Individuals with Altered Immunocompetence and Their Close Contacts

Only limited data are available regarding safety and efficacy of influenza virus vaccine live intranasal in immunocompromised individuals. Possible benefits and potential risks of the vaccine should be carefully considered in such individuals.

Influenza virus vaccine live intranasal has been used in a limited number of HIV-infected adults (asymptomatic or mildly symptomatic) in a clinical study; no serious adverse effects were reported, but efficacy was not evaluated. CDC, National Institutes of Health (NIH), Infectious Diseases Society of America (IDSA), AAP, and other experts state that HIV-infected children, adolescents, and adults should receive annual vaccination against seasonal influenza; however, influenza virus vaccine inactivated (not influenza virus vaccine live intranasal) should be used for prevention of seasonal influenza in HIV-infected individuals.

ACIP states that live viral vaccines (including influenza virus vaccine live intranasal) usually should not be used in immunocompromised individuals, except in certain circumstances. These experts state that use of live virus vaccines can be considered in patients with leukemia, lymphoma, or other malignancies if the disease is in remission and chemotherapy was terminated at least 3 months prior to vaccination. (See Drug Interactions: Immunosuppressive Agents.)

Because of possible transmission of live vaccine viruses, the ACIP states that influenza virus vaccine live intranasal should *not* be administered to close contacts of severely immunocompromised individuals requiring a protective environment (e.g., hematopoietic stem cell transplant [HSCT] recipients); however, ACIP states that the vaccine may be administered to close contacts of less severely immunocompromised individuals (e.g., those not requiring a protective environment).

In addition, because of possible transmission of live vaccine viruses, ACIP states that health-care workers who have received influenza virus vaccine live intranasal should avoid contact with severely immunocompromised patients requiring a protective environment (e.g., HSCT recipients) for 7 days after vaccination. Hospital visitors who have received the vaccine should avoid contact with severely immunosuppressed patients for 7 days after vaccination but may visit patients who are not severely immunosuppressed.

Individuals with Medical Conditions that Increase Risk of Influenza Complications

Safety of influenza virus vaccine live intranasal has *not* been established in individuals with underlying medical conditions known to increase the risk for complications following wild-type influenza infection.

Individuals at increased risk of influenza complications include those with chronic pulmonary (including asthma), cardiovascular (except hypertension), renal, hepatic, neurologic, hematologic, or metabolic (including diabetes mellitus) disorders and those who are immunosuppressed (including immunosuppression caused by drug therapy or HIV infection). (See Individuals with Altered Immunocompetence and Their Close Contacts under Cautions: Warnings/Precautions.) Influenza virus vaccine live intranasal should *not* be administered to these individuals unless the possible benefits outweigh the risks.

Transmission of Vaccine Virus

Intranasal influenza vaccine contains live, attenuated virus. Vaccine virus capable of infection and replication is present in nasal secretions of vaccine recipients, and viral shedding occurs in adults and children who have received the intranasal live vaccine.

The relationship between vaccine virus replication in vaccine recipients and transmission of vaccine virus to other individuals has not been established. However, transmission of vaccine virus has occurred rarely between recipients of influenza virus vaccine live intranasal and their contacts.

The duration of vaccine virus replication and shedding in vaccine recipients has not been established.

Limitations of Vaccine Effectiveness

Up to 2 weeks may be required for protection to develop following seasonal influenza vaccination.

Vaccination with seasonal influenza virus vaccine live intranasal may not protect all vaccine recipients from influenza.

Seasonal influenza vaccine is formulated annually to contain influenza A and B antigens predicted to represent strains of influenza virus likely to circulate in the US during the upcoming influenza season. Efficacy of the seasonal vaccine during any given year depends on how closely viral strains represented in the vaccine match viral strains circulating during the season.

Influenza virus vaccine live intranasal for the 2011–2012 influenza season is expected to provide protection against the 2009 pandemic influenza A (H1N1) virus and influenza A (H3N2) and influenza B strains represented in the vaccines.

Seasonal influenza vaccines are *not* expected to provide protection against infection with avian influenza A viruses, including avian influenza A (H5N1).

Duration of Immunity

Immunity declines during the year after seasonal influenza vaccination. In addition, circulating strains of seasonal influenza virus change from year to year. Therefore, annual vaccination is needed for prevention of seasonal influenza.

Influenza vaccine from a previous influenza season should *not* be administered during a subsequent influenza season in an attempt to provide protection.

Concomitant Illness

ACIP states that minor acute illness, such as mild diarrhea or mild upper respiratory tract infection (with or without fever), generally does not preclude vaccination. If nasal congestion will impede delivery of the vaccine to the nasopharyngeal mucosa, influenza virus vaccine live intranasal administration should be deferred until the illness resolves.

Administration Precautions

Health-care personnel who are severely immunosuppressed should *not* administer intranasal live influenza vaccine to patients. Small amounts of vaccine virus probably are introduced into the environment; the risk of acquiring vaccine virus from the environment is unknown, but presumed to be limited.

Improper Storage and Handling

Seasonal influenza virus vaccine live intranasal should be stored at 2–8°C and should not be frozen. The vaccine does not contain thimerosal or any other preservatives. Improper storage or handling of vaccines may result in loss of vaccine potency and reduced immune response in vaccinees.

All vaccines should be inspected upon delivery and monitored during storage to ensure that the appropriate temperature is maintained.

Influenza virus vaccine live intranasal that has been mishandled or has not been stored at the recommended temperature should not be administered. If there are concerns about mishandling, the manufacturer or state or local health departments should be contacted for guidance on whether the vaccine is usable.

Specific Populations

Pregnancy.

Category C. (See Users Guide.)

Manufacturer states that the vaccine should be used in pregnant women only when clearly needed.

ACIP, American Congress of Obstetricians and Gynecologists (ACOG), American College of Physicians (ACP), NIH, IDSA, and other experts state that seasonal parenteral inactivated influenza vaccine (*not* intranasal live influenza vaccine) should be used for prevention of seasonal influenza in pregnant women.

Lactation.

It is not known whether influenza virus vaccine live intranasal is distributed into milk. Caution is advised if the vaccine is administered in nursing women.

ACIP states that either seasonal influenza virus vaccine live intranasal or seasonal parenteral inactivated influenza vaccine may be used for prevention of seasonal influenza in nursing women, unless contraindicated.

Pediatric Use.

Safety and efficacy of influenza virus vaccine live intranasal have been established only in children 2 years of age or older.

Influenza virus vaccine live intranasal should *not* be administered to infants younger than 24 months of age. An increased incidence of wheezing and hospitalization has been reported in a clinical trial in infants 6–23 months of age† who received intranasal live influenza vaccine compared with those who received parenteral inactivated influenza vaccine. (See Infants Younger than 24 Months of Age under Cautions: Warnings/Precautions.)

Influenza virus vaccine live intranasal should *not* be administered to children with asthma or to children younger than 5 years of age with a history of recurrent wheezing or a recent wheezing episode (i.e., during the past 12 months).

When considering use in children 2 through 4 years of age, ACIP and AAP recommend that clinicians screen for possible reactive airways diseases by consulting the child's medical record and asking the child's parent or guardian if wheezing or asthma episodes were identified by a health-care provider within the past 12 months. Age-appropriate seasonal parenteral inactivated influenza vaccine should be used instead of the intranasal live vaccine for prevention of seasonal influenza in such children.

Protection of young infants against seasonal influenza virus depends on immunization of their close contacts. All household contacts, health-care and day-care providers, and other close contacts of young infants should receive seasonal influenza vaccination appropriate for their age and target group.

Adults 50–64 Years of Age.

Influenza virus vaccine live intranasal is *not* indicated for use in adults 50–64 years of age. In a multicenter, placebo-controlled study, the vaccine was not effective in this age group. Age-appropriate parenteral inactivated seasonal influenza vaccine (not

intranasal live influenza vaccine) is indicated for prevention of seasonal influenza in this age group.

Geriatric Use.

Influenza virus vaccine live intranasal is *not* indicated for use in geriatric individuals 65 years of age or older. Age-appropriate parenteral inactivated seasonal influenza vaccine (not intranasal live influenza vaccine) is indicated for prevention of seasonal influenza in geriatric adults.

Common Adverse Effects

Adverse effects reported more frequently in adults 18–49 years of age receiving seasonal influenza virus vaccine live intranasal than in those receiving placebo include runny nose (44%), headache (40%), sore throat (28%), tiredness/weakness (26%), muscle aches (17%), cough (14%), chills (9%), nasal congestion (9%), and sinusitis (4%).

Adverse effects reported more frequently in children 2–6 years of age receiving seasonal influenza virus vaccine live intranasal than in those receiving placebo include runny nose/nasal congestion (58%), decreased appetite (21%), irritability (21%), lethargy (14%), sore throat (11%), fever (9%), headache (9%), muscle aches (6%), and chills (4%). Similar adverse effects were reported in older children and adolescents up to 17 years of age; in addition, abdominal pain was reported in 12% and decreased activity reported in 6% of vaccine recipients.

Drug Interactions

Antiviral Agents

Safety and efficacy of concomitant use of seasonal influenza virus vaccine live intranasal with antiviral agents used for treatment or prevention of influenza (e.g., amantadine, rimantadine, oseltamivir, zanamivir) have not been evaluated. Because influenza antiviral agents reduce replication of influenza viruses, these drugs potentially could decrease the immune response to influenza virus vaccine live intranasal.

Influenza virus vaccine live intranasal should not be administered until at least 48 hours after influenza antiviral agent therapy is discontinued and influenza antiviral agents should not be administered until at least 2 weeks after administration of the live vaccine.

If an influenza antiviral agent and influenza virus vaccine live intranasal are administered concomitantly, revaccination should be considered if appropriate. The US Public Health Service Advisory Committee on Immunization Practices (ACIP) recommends revaccination if an influenza antiviral agent was given 2 days before to 14 days after vaccination with influenza virus vaccine live intranasal.

Aspirin

Influenza virus vaccine live intranasal is contraindicated in children and adolescents 2–17 years of age receiving aspirin or aspirin-containing therapy because of association of Reye's syndrome with aspirin use and wild-type influenza infection. When influenza virus vaccine live intranasal is used in children and adolescents 2–17 years of age, aspirin and aspirin-containing products should be avoided for 4 weeks following vaccination, unless medically indicated.

Blood Products

ACIP states that influenza virus vaccine live intranasal can be administered simultaneously with or at any interval before or after whole blood, packed red blood cells, plasma, and platelet products.

Immune Globulins

ACIP states that influenza virus vaccine live intranasal may be given simultaneously with or at any interval before or after immune globulin (immune globulin IM [IGIM], immune globulin IV [IGIV]) or specific hyperimmune globulin (hepatitis B immune globulin [HBIG], rabies immune globulin [RIG], tetanus immune globulin [TIG], varicella zoster immune globulin [VZIG]).

Immunosuppressive Agents

Immunosuppressive agents (e.g., alkylating agents, antimetabolites, corticosteroids, radiation) may decrease the antibody response to influenza virus vaccine live intranasal and may increase the risk of adverse effects. Like other live viral vaccines, influenza virus vaccine live intranasal should not be used in individuals receiving immunosuppressive therapy.

The optimum interval between discontinuance of immunosuppressive therapy and subsequent administration of a live viral vaccine has not been determined.

Live viral vaccines generally are contraindicated in patients receiving high dosages of systemic corticosteroids or when systemic immunosuppression occurs with prolonged topical corticosteroid therapy. Corticosteroid therapy (prednisone or equivalent) in a dosage at least 2 mg/kg daily or at least 20 mg daily given for 2 weeks or longer is considered immunosuppressive, and administration of live viral vaccines should be delayed for at least 1 month after such therapy is discontinued. Short-term (less than 2 weeks), low- to moderate-dose systemic corticosteroid therapy (less than 20 mg of prednisone or equivalent daily); long-term, alternate-day systemic corticosteroid therapy using short-acting drugs; maintenance physiologic doses (replacement therapy); topical corticosteroid therapy (e.g., cutaneous, ophthalmic);

corticosteroids given by inhalation; or intra-articular, bursal, or tendon injections of corticosteroids do not contraindicate administration of live viral vaccines.

ACIP recommends that live viral vaccines generally be deferred for at least 3 months after immunosuppressive therapy is discontinued, including chemotherapy or radiation for leukemia, other hematopoietic malignancies, or solid tumors, or after solid organ transplant.

Intranasal Preparations

There are no data regarding concomitant administration of influenza virus vaccine live intranasal with other preparations that are administered intranasally (e.g., intranasal corticosteroids).

Vaccines

Inactivated Vaccines and Toxoids

Safety and immunogenicity of influenza virus vaccine live intranasal administered concomitantly with inactivated vaccines have not been specifically determined. The manufacturer states that risks versus benefits of concomitant administration of the live influenza vaccine and inactivated vaccines should be considered.

ACIP states that, in the absence of specific data indicating interference, inactivated vaccines or toxoids can be administered simultaneously with or at any interval before or after seasonal influenza virus vaccine live intranasal.

Live Vaccines

Intranasal influenza vaccine is a live, attenuated virus vaccine. ACIP states that influenza virus vaccine live intranasal and other live vaccines generally may be administered simultaneously on the same day.

ACIP states that some oral live vaccines (e.g., typhoid vaccine live oral) can be administered concomitantly with or at any interval before or after the intranasal live influenza vaccine. However, because of theoretical concerns that the immune response to other live virus vaccines might be impaired if given within 30 days of another live virus vaccine, the ACIP states that if influenza virus vaccine live intranasal and other live vaccines are not administered on the same day, they should be administered at least 4 weeks apart.

Concomitant administration of influenza virus vaccine live intranasal with measles, mumps, and rubella virus vaccines live (MMR) and monovalent varicella virus vaccine live has been studied in infants 12–15 months of age†. There was no evidence of interference with the immune response to the measles, mumps, rubella, varicella, or influenza antigens, and adverse effects were similar to those reported in other clinical studies evaluating influenza virus vaccine live intranasal. Safety and immunogenicity of concomitant administration of these vaccines have not been evaluated in infants older than 15 months of age.

Concomitant administration of oral rotavirus vaccine live and influenza virus vaccine live intranasal has not been studied; however, rotavirus vaccine is not indicated in children 2 years of age or older (the age group that can receive the intranasal live influenza vaccine).

Description

Influenza virus vaccine live intranasal used for prevention of seasonal influenza is a trivalent vaccine containing live, attenuated (cold-adapted) influenza virus types A and B that stimulates active immunity to influenza virus infection. The seasonal vaccine is prepared by culturing live attenuated influenza virus reassortants in specific pathogen-free eggs. Following administration of influenza virus vaccine intranasal, vaccine virus replicates in cells lining the nasopharynx. The protective mechanism is not completely understood, but may involve both serum and mucosal antibodies.

Seasonal influenza virus vaccine live intranasal 2011–2012 was formulated based on specifications of the US Food and Drug Administration (FDA) Vaccines and Related Biological Products Advisory Committee (VRBPAC) to contain antigens representative of the strains of influenza A and influenza B viruses likely to circulate in the US during the 2011–2012 influenza season. For the 2011–2012 season, the antigenic components recommended by the FDA for the US formulation are the same as those recommended by the World Health Organization (WHO) for the northern hemisphere. Seasonal influenza virus vaccine live intranasal is considered antigenically equivalent to seasonal parenteral influenza virus vaccine inactivated.

Each 0.2 mL of seasonal influenza virus vaccine live intranasal 2011–2012 contains 10^{6.5–7.5} FFU (fluorescent focus units) each of the following live, attenuated influenza virus reassortants: A/California/7/2009 (H1N1), A/Perth/16/2009 (H3N2), and B/Brisbane/60/2008. All 3 antigens contained in the 2011–2012 seasonal influenza vaccine are the same as those contained in the seasonal influenza vaccine used during the previous influenza season (2010–2011).

Advice to Patients

Prior to administration of seasonal influenza virus vaccine live intranasal, provide a copy of the appropriate US Centers for Disease Control and Prevention (CDC) Vaccine Information Statement (VIS) to the patient or patient's legal representative (VISs are available at <http://www.cdc.gov/vaccines/pubs/vis/default.htm>).

Advise patient and/or patient's parent or guardian of the risks and benefits of vaccine administration.

Advise patient and/or patient's parent or guardian that annual vaccination against seasonal influenza is necessary.

Importance of receiving the 2011–2012 seasonal influenza vaccine, even if the individual received the 2010–2011 seasonal influenza vaccine. Although the 2011–2012 seasonal vaccine contains the same antigens contained in the 2010–2011 seasonal influenza vaccine, the duration of protection is unknown and likely declines over time.

Advise patient and/or patient's parent or guardian that a single dose of seasonal influenza vaccine is necessary each year in adults, adolescents, and children 9 years of age or older, but that 2 doses of seasonal influenza vaccine may be necessary in some children 2 through 8 years of age. (See Pediatric Dosage under Dosage and Administration: Dosage.)

Ask patient and/or patient's parent or guardian if vaccinee has a history of asthma or recurrent wheezing or has had a recent wheezing episode (within the past 12 months). Advise patient's parent or guardian that a history of recurrent wheezing may be an asthma equivalent in children younger than 5 years of age. (See Pediatric Use under Warnings/Precautions: Specific Populations, in Cautions.)

Importance of informing clinicians of any severe or life-threatening allergies, including severe allergy to eggs, or any history of severe reaction after prior influenza vaccination.

Advise patient and/or patient's parent or guardian that seasonal intranasal influenza vaccine is a live, attenuated virus vaccine and that vaccine virus can be transmitted to close contacts. Necessity of vaccine recipient avoiding close contact with severely immunocompromised individuals for 7 days following vaccination. (See Individuals with Altered Immunocompetence and Their Close Contacts under Cautions: Warnings/Precautions.)

Importance of informing clinicians of adverse effects. Clinicians or individuals can report any adverse reactions that occur following vaccination to the manufacturer at 877-633-4411 or Vaccine Adverse Event Reporting System (VAERS) at 800-822-7967 or <http://www.vaers.hhs.gov>.

Importance of informing clinician of existing or contemplated concomitant therapy, including prescription and OTC drugs, as well as concomitant medical problems (i.e., asthma, recurrent wheezing, Guillain-Barré syndrome).

Importance of women informing clinician if they are or plan to become pregnant or plan to breast-feed.

Importance of informing patients of other precautionary information. (See Cautions.)

Overview[®] (see Users Guide). For additional information on this drug until a more detailed monograph is developed and published, the manufacturer's labeling should be consulted. It is essential that the manufacturer's labeling be consulted for more detailed information on usual cautions, precautions, contraindications, potential drug interactions, laboratory test interferences, and acute toxicity.

Preparations

Excipients in commercially available drug preparations may have clinically important effects in some individuals; consult specific product labeling for details.

Influenza Virus Vaccine Live Intranasal Trivalent Types A and B (2011–2012)

Nasal Suspension

$10^{6.5-7.5}$ FFU (fluorescent focus units) each of A/California/7/2009 (H1N1), A/Perth/16/2009 (H3N2), and B/Brisbane/60/2008 per 0.2 mL

FluMist[®] (preservative-free; available in 0.2-mL prefilled single-use sprayers), MedImmune