College of Pharmacy and Nutrition
University of Saskatchewan
Saskatoon, SK S7N 5C9
www.medsask.usask.ca

# Update on 2014-2015 Influenza Vaccines

There are currently eight trivalent influenza vaccines and two quadrivalent influenza vaccines authorized for use in Canada. The trivalent vaccines contain three influenza strains as recommended by the World Health Organization for the northern hemisphere: an A(H1N1) virus; an A(H3N2) virus; and a B/Massachusetts/2/2012-like virus (Yamagata lineage). The quadrivalent vaccines contain the above plus a B/Brisbane/60/2008-like virus (Victoria lineage). The vaccines are available as inactivated vaccine (TIV or QIV) with or without adjuvant for intramuscular or intradermal administration or live attenuated influenza vaccine (LAIV) for intranasal administration.(1)

The National Advisory Committee on Immunization (NACI) has posted the following recommendations for dosage and route of administration of the influenza vaccines available in Canada.(1)

| Age group | TIV without adjuvant * or QIV IM | MF59—adjuvanted TIV (Fluad®) IM | TIV for intradermal use (Intanza®) ID | LAIV (FluMist®)** IN | Number of doses required |
|---|---|---|---|---|---|
| **6–23 months** | 0.5 ml | --- | --- | --- | 1 or 2** |
| **2–8 years** | 0.5 ml | --- | --- | 0.2 ml (0.1 mL per nostril) | 1 or 2** |
| **9–17 years** | 0.5 ml | --- | --- | 0.2 ml (0.1 mL per nostril) | 1 |
| **18–59 years** | 0.5 ml | --- | 0.1 mL (9µg/strain) | 0.2 ml (0.1 mL per nostril) | 1 |
| **60–64 years** | 0.5 ml | --- | 0.1 mL (15µg/strain) | --- | 1 |
| **≥65 years** | 0.5 ml | 0.5 ml | 0.1 mL (15µg/strain) | --- | 1 |

TIV=Trivalent inactivated vaccine; QIV=Quadrivalent inactivated vaccine; LAIV = Live attenuated influenza vaccine; IM = Intramuscular; ID = Intradermal; IN = Intranasal

* Influvac® ≥ 18 years, Fluviral® ≥ 6 months, Agriflu® ≥ 6 months, Vaxigrip® ≥ 6 months, Fluzone® ≥ 6 months

** Children 6 months to less than 9 years of age who have never received the seasonal influenza vaccine require two doses of influenza vaccine, with a minimum interval of four weeks between doses. Eligible children <9 years of age who have properly received one or more doses of seasonal influenza vaccine in the past should receive one dose per influenza vaccination season thereafter.

**In Saskatchewan, the following brands of influenza vaccines are publically funded**(2):
Agriflu®, Vaxigrip®, Fluviral®, FluMist®

University of Saskatchewan

Telephone: 1-800-667-3425 (SK); 966-6340 (Saskatoon)
Fax: (306) 966-2286 Text: (306) 260-3554

College of Pharmacy and Nutrition
University of Saskatchewan
Saskatoon, SK S7N 5C9
www.medsask.usask.ca

**Novel delivery systems:**
Intradermal and intranasal delivery systems are now available as options to the usual intramuscular administration of influenza vaccine:

- **Intanza® – Intradermal**
  Intanza® is the first influenza vaccine that is administered intradermally by micro-injection. It is very convenient and easy-to-use, and the ID delivery system is more comfortable for most patients. Intanza® is available in both a 9 mcg and a 15 mcg/dose strength. The 9 mcg vaccine, for adults 18-59 years of age, has been shown to elicit an immune response that is comparable to IM TIV, with or without adjuvant. The 15 mcg vaccine, for ages 60 and over, has been proven to elicit an immune response that is superior to that induced by an IM reference seasonal influenza vaccine, for all 3 strains, in a Phase III randomized controlled clinical trial.(4)

  The skin is a potent immune organ and contains a larger number of antigen-presenting dendritic cells than muscle. Influenza antigen administered by the intradermal route has a high likelihood of being processed by local dendritic cells. Thus, the vaccine is thought to stimulate both cell-mediated immunity and antibody production. This may account for the higher immune response with Intanza® 15µg vaccine. (1)

  The natural weakening of the immune system associated with aging causes more susceptibility to infections and to complications from influenza. It also reduces the immune response to the influenza vaccines compared with younger patients. (4)

  Intanza® produces more frequent and more extensive erythema, swelling, induration and pruritis than the IM vaccine. These reactions are generally mild and resolve spontaneously in a few days. Systemic reactions are similar to IM except that myalgia is less frequent with Intanza®. (1)

- **FluMist®-Intranasal**
  This product contains the live attenuated influenza vaccine which has shown higher efficacy in children than the trivalent inactivated vaccine. Each dose of 0.2ml contains 10 fluorescent focus units (FFU) of virus propagated in pathogen-free eggs (so can't be used in an egg allergy). The flu strains are cold-adapted and temperature sensitive so they replicate in the nasal mucosa rather than the lower respiratory tract. Since they are attenuated they do not produce classic influenza-like illness.(5)

  The intranasal administration is thought to result in an immune response that mimics that induced by atural infection with the development of both mucosal and systemic immunity. Local mucosal antibodies protect the upper respiratory tract and may be more important than serum antibodies. The most common side effects are nasal congestion and runny nose.(5)

University of Saskatchewan
Telephone: 1-800-667-3425 (SK); 966-6340 (Saskatoon)
Fax: (306) 966-2286 Text: (306) 260-3554

College of Pharmacy and Nutrition
University of Saskatchewan
Saskatoon, SK S7N 5C9
www.medsask.usask.ca

**Quadrivalent Influenza Vaccine**

This is the first season that quadrivalent influenza vaccines have been authorized for use in Canada.(1) For years only the trivalent vaccines, containing two influenza A strains and one influenza B strain, have been used.

Influenza B infection usually follows influenza A – typically peaking in spring- but it is unpredictable. In 7 out of the last 12 seasons, the B strain recommended for inclusion in the influenza vaccines turned out to be different than the one that actually circulated. Quadrivalent vaccines contain a second B strain of the influenza virus, thus providing a better chance of protection against the seasonal strain.(3)

From 2001/02 to 2012/13, influenza B accounted for 17% of all lab-confirmed cases of influenza. The impact of circulating B strains seems greater in children and young adults.(6) Individuals infected were more likely to be < 20 years of age: 19.5% were 0-4 years olds; 31.4% were 5-19 year olds.(1) Since, on average, 34% of influenza-related deaths in children up to 18 years of age were due to influenza B (7), it appears that the quadrivalent formulations would provide greatest benefit to pediatric populations.(6)

**Why choose one vaccine over another?**

- **TIV without adjuvant**: widely available and funded by SaskHealth. Agriflu® comes packaged as a single dose therefore does NOT contain thimerosal. The others are multi-dose and do contain thimerosal as a preservative.(1) (Influvac® is also available in a thimerosol-free formulation but this is not publicly funded).
- **Quadrivalent vaccines:** contain a second influenza B strain. Pediatrics may benefit the most from the extra coverage. The quadrivalent vaccines available in Saskatchewan this season are: FluMist Quadrivalent® (LAIV) and Fluzone Quadrivalent® (QIV). (2) The FluMist Quadrivalent® is publicly funded where available; Fluzone Quadrivalent® is not publicly funded.
- **TIV with adjuvant - Fluad®:** the adjuvant improves the immune response to the vaccine therefore recommended for those greater than 65 years of age in a long term care facility or those with underlying health problems. It is thimerosal free.(1) It is not covered by SaskHealth.
- **Intanza®:** Intradermal administration is less painful than IM and the delivery system is easier for the health care worker. It is not covered by SaskHealth. The 15 µg formulation might improve response in adults with immune compromising conditions and in individuals of 60 years of age and over, especially in those who run an increased risk of associated complications.(4,5)
- **FluMist®:** NACI recommends its use for healthy children and adolescents 2 to 17 years of age without contraindications. There is evidence for the preferential use of LAIV in young children (younger than 6 years of age) based on superior efficacy of LAIV compared to TIV (Grade A), with weaker evidence of superior efficacy in older children (Grade I). It is anticipated that the superior efficacy for LAIV over TIV extends beyond age 6 years, but the evidence does not indicate at which specific age the efficacies of LAIV and TIV become equivalent. If LAIV is not available for those for whom it is considered superior, TIV should be used.(1)

  FluMist® has an intranasal delivery system which is patient-friendly , especially for children. It is not suitable for children under 2 years of age because of risk of wheezing. Because it contains a live virus, it

University of Saskatchewan
Telephone: 1-800-667-3425 (SK); 966-6340 (Saskatoon)
Fax: (306) 966-2286 Text: (306) 260-3554

College of Pharmacy and Nutrition
University of Saskatchewan
Saskatoon, SK S7N 5C9
www.medsask.usask.ca

should not be used in pregnant women or in the immunocompromised. Children and adolescents (2-17 years of age) currently receiving acetylsalicylic acid or acetylsalicylic acid -containing therapy should not use FluMist® because of the association of Reye's syndrome with acetylsalicylic acid and wild-type influenza infection. It is recommended that acetylsalicylic acid -containing products in children <18 years of age be delayed for four weeks after receipt of FluMist®.(1) It is covered by SaskHealth.

**Prepared by Dorothy Sanderson BSP; reviewed by Karen Jensen MSc, BSP.**
**October, 2014**

**References:**

1) An Advisory Committee Statement (ACS) -National Advisory Committee on Immunization (NACI): Statement on Seasonal Influenza Vaccine for 2014-2015. Public Health Agency of Canada. Available at http://www.phac-aspc.gc.ca/naci-ccni/flu-grippe-eng.php#iv. Accessed October 2014.
2) Influenza Information and Fact Sheets.Government of Saskatchewan website. Available at http://www.health.gov.sk.ca/influenza. Accessed October 2014.
3) Saskatoon Health Region Influenza Program. Available at https://www.saskatoonhealthregion.ca/locations_services/Services/Influenza-Program . Accessed October 2014.
4) Intanza®-Drug Product Monograph. Available at http://webprod5.hc-sc.gc.ca/dpd-bdpp/info.do?code=83409&lang=eng. Accessed October, 2014.
5) CPhA Influenza Immunization Guide for Pharmacists 2014. Available at http://www.pharmacists.ca/cpha-ca/assets/File/education-practice-resources/Flu2014-Guide_EN.pdf. Accessed October 2014
6) Barr I, Jelley L. The coming era of quadrivalent human influenza vaccines ...Drugs 2012;72:2177- 85. Fluzone influenza virus vaccine. Available at www.Fluzone.com. Accessed October 2014