Dispelling myths held by parents about the influenza vaccine

N Le Saux; Canadian Paediatric Society, Infectious Diseases and Immunization Committee

Français en page 620

1. *The influenza vaccine will give me the flu.*

- The virus in the Canadian vaccine is killed and cannot cause influenza.
- The killed vaccine is in pieces and cannot recombine into a live virus.
- The antigens (mainly hemaglutinin and neuraminidase) present in the vaccine induce immunity.
- Other viruses that are circulating at the same time as the vaccine is given can cause colds and diarrhea (eg, rhinovirus, adenovirus and metapneumovirus), and these symptoms may be wrongly attributed to the vaccine.

2. *The influenza vaccine does not work.*

- The vaccine does work. In healthy children and adults, 70% to 90% efficacy (protection) is achieved when there is a good match to the seasonal strain (1).
- Immunization of health care workers decreases upper respiratory tract infections, physician visits and work absenteeism by 25% to 44% during seasonal influenza.

3. *I don't need to be immunized – I'm healthy!*

- Healthy adults accounted for most of the deaths in previous pandemics and represent a significant portion of deaths from pandemic H1N1.
- Otherwise healthy children younger than five years of age (notably those younger than two years of age) and adults older than 65 years of age are at significantly increased risk of hospitalization and complications from seasonal influenza.
- Prevention of influenza will reduce risk of bacterial pneumonia.
  - 29% of 77 pandemic H1N1 deaths in the United States had bacterial coinfections (mainly pneumococcus, *Staphylococcus aureus* and group A streptococcus).
- Health care workers can transmit viruses to susceptible patients and their own families.
  - Studies have documented decreased transmission and decreased risk of death due to influenza in long-term care facilities where staff have been immunized against influenza (2).

4. *Healthy children don't need to be immunized – they're healthy!*

- Healthy children are the epicentre of every yearly influenza epidemic.
- Data show that school immunization programs prevent adult deaths.
- 15% to 42% of healthy preschool and school-age children are infected annually with influenza (see provincial ages of hospitalization graphs).
- Healthy children younger than five years of age are hospitalized as often as patients 50 to 64 years of age.
- Infants younger than six months of age have the highest hospitalization rates.
- Canadian paediatric surveillance indicated that of childhood admissions to hospital for seasonal influenza, more than one-half were younger than two years of age.
- Most children and youth admitted to hospital for influenza are healthy, but the risk of hospitalization and severe disease is increased in children with (3-9):
  - neurodevelopmental delay or neurological disease,
  - cardiac or pulmonary disease,
  - cystic fibrosis,
  - diabetes and obesity, or
  - defects of the immune system.

  The risk of hospitalization and severe disease is also increased in pregnant women.

5. *I might get those awful neurological side effects.*

- The influenza infection itself can cause many neurological effects including encephalitis, meningitis, acute disseminated encephalomyelitis, Reye's syndrome, rhabdomyolysis, transverse myelitis, movement disorders, Guillain-Barré syndrome (GBS) and postinfectious movement disorders.
- GBS is rare and occurs a few days or weeks after a person has a respiratory or gastrointestinal infection, including influenza. A variety of infectious agents, including *Campylobacter jejuni*, cytomegalovirus, Epstein-Barr virus and *Mycoplasma pneumoniae*, have been associated with GBS.
- When the swine influenza vaccine was administered in 1976, there was an increase of one extra case of GBS per 100,000 people vaccinated. When this increase was recognized, the 1976 vaccine was withdrawn and has never been used again. While some scientists believe the GBS was caused by the vaccine antigen, others believe *Campylobacter* or another infection might have caused the increase. Because *Campylobacter* was not

Correspondence: Canadian Paediatric Society, 2305 St Laurent Boulevard, Ottawa, Ontario K1G 4J8. Telephone 613-526-9397, fax 613-526-3332, Web sites www.cps.ca, www.caringforkids.cps.ca

known to be a cause of GBS in 1976, patients were not tested. It is now known to be a common cause of GBS.
- The 2009 H1N1 vaccine is very different from the 1976 swine influenza vaccine.
- A retrospective review of the 1992 to 1993 and 1993 to 1994 United States influenza vaccine campaigns found an adjusted RR of 1.7 (95% CI 1.0 to 2.8; P=0.04) for GBS associated with influenza vaccination (10). This is similar to a Canadian study involving a self-matched case series from Ontario for the years 1992 to 2004. This study found the estimated RR for GBS in the period two to seven weeks after influenza vaccination, compared with the period 20 to 43 weeks after influenza vaccination, to be 1.45 (95% CI 1.05 to 1.99; P=0.02) (11). These studies suggest that the absolute risk of GBS in the period following vaccination is approximately one extra case per million vaccines above background. The potential benefits of influenza vaccine must be weighed against this very low risk. It is not known whether other influenza virus vaccines are associated with GBS.
- The number of GBS cases will be monitored closely over the next year. Canada has an excellent adverse events surveillance program for children, and a similar surveillance program for adults has been developed. If there is any increase in GBS following H1N1 vaccination, we should be able to detect it quickly and respond accordingly.

6. *Thimerosal is bad and the mercury compound may cause autism.*
- Thimerosal in vaccines is a preservative and is metabolized to ethyl mercury, not methyl mercury (methyl is the very toxic form of mercury). Thimerosal is regarded as safe.
- Thimerosal is present in trace amounts in the multidose vials of the vaccine. No thimerosal is present in single-dose flu vaccine preparations; however, single-dose vials may not be available in all jurisdictions.
- It is used to prevent bacterial contamination of vaccines.
- No evidence was found in numerous epidemiological studies that the trace amount of thimerosal in the vaccine is associated with autism or immune deficiency (12).
- A report by the Institute of Medicine in 2004 rejected any causal association between the measles, mumps and rubella vaccine or thimerosal, and autism.

7. *No one with egg 'allergy' should receive the influenza vaccine.*
- The virus is grown in eggs and the vaccine may contain minute amounts of egg protein (13). Children who can tolerate a small amount of cooked egg or eggs in baked goods can safely receive the vaccine in the physician's office.
- The risk of a serious reaction to the vaccine is considered extremely low compared with the risk of infection with either pandemic H1N1 or seasonal influenza in other years.
- The Canadian Society of Allergy and Clinical Immunology has subdivided the patients with egg allergy into low-risk (mild gastrointestinal or mild local skin reaction, tolerating the ingestion of small amounts of egg, or positive skin/specific immunoglobulin E test to egg without knowingly exposed to egg) and high-risk (previous respiratory or cardiovascular reaction, generalized hives or those with poorly controlled asthma) categories (14).
- Persons in the low-risk category should be vaccinated, but the patient should be observed for 60 min after vaccine administration.
- Persons in the high-risk category should have special precautions taken as recommended by the Canadian Society of Allergy and Clinical Immunology if the vaccine is administered.

8. *I can't be immunized because I'm pregnant (or breastfeeding).*
- The Canadian Paediatric Society, the Society of Obstetricians and Gynecologists of Canada and other bodies recommend that pregnant women should be immunized.
- The virus in the vaccine is dead, split and in pieces so it cannot infect the woman or the fetus and is safe.
- Antibodies from the mother are passed transplacentally to the fetus and provide some protection to infants younger than six months of age – those who are at greatest risk of very serious illness with influenza.
- Pregnancy increases the risk of hospitalization, severe disease and death from influenza (15,16).

For the latest information on the Canadian response to H1N1, please visit www.FightFlu.ca.

REFERENCES

1. Nichol KL. Efficacy and effectiveness of influenza vaccination. Vaccine 2008;26(Suppl 4):D17-22.
2. Carman WF, Elder AG, Wallace LA, et al. Effects of influenza vaccination of health-care workers on mortality of elderly people in long-term care: A randomized controlled trial. Lancet 2000;355:93-7.
3. Moore DL, Vaudry W, Scheifele DW, et al. Surveillance for influenza admissions among children hospitalized in Canadian Immunization Monitoring Program Active Centers. Pediatrics 2006;118:e610-9.
4. O'Brien MA, Uyeki TM, Shay DK, et al. Incidence of outpatient visits and hospitalizations related to influenza in infants and young children. Pediatrics 2004;113:585-93.
5. Izurieta HS, Thompson WW, Kramarz P, et al. Influenza and the rates of hospitalization for respiratory disease among infants and young children. N Engl J Med 2000;342:232-9.
6. Reichert TA, Sugaya N, Fedson DS, Glezen WP, Simonsen L, Tashiro M. The Japanese experience with vaccinating schoolchildren against influenza. N Engl J Med 2000;344:889-96.
7. Neuzil KM, Zhu Y, Griffin MR, et al. Burden of interpandemic influenza in children younger than 5 years: A 25-year prospective study. J Infect Dis 2002;185:147-52.

8. Bhat N, Wright JG, Broder KR, et al. Influenza-associated deaths among children in the United States, 2003-2004. N Engl J Med 2005;353:2559-67.
9. Centers for Disease Control and Prevention. Influenza-associated pediatric mortality. <http://www.cdc.gov/flu/weekly/index.htm≠MS> (Version current at October 15, 2009).
10. Lasky T, Terracciano GJ, Magder L, et al. The Guillain-Barré syndrome and the 1992-1993 and 1993-1994 influenza vaccines. N Engl J Med 1998;339:1797-802.
11. Juurlink DN, Stukel TA, Kwong J, et al. Guillain-Barré syndrome after influenza vaccination in adults: A population-based study. Arch Intern Med 2006;166:2217-21.
12. Hviid A, Stellfeld M, Wohlfahrt J, Melbye M. Association between thimerosal-containing vaccine and autism. JAMA 2003;290:1763-6.
13. Public Health Agency of Canada. Canadian Immunizaton Guide, Seventh Edition. Influenza Vaccine. Ottawa: Public Health Agency of Canada, 2006:206-20.
14. The Canadian Society of Allergy and Clinical Immunology. Statement: Administration of H1N1 and seasonal influenza vaccine to egg allergic individuals. < http://www.csaci.ca/include/files/CSACI_H1N1_Statement.pdf> (Version current at October 15, 2009).
15. ECDC Technical Emergency Team. Initial epidemiological findings in the European Union following the declaration of pandemic alert level 5 due to influenza A (H1N1). Euro Surveill 2009;14:pii-19204.
16. Rasmussen SA, Jamieson DJ, Bresee JS. Pandemic influenza and pregnant women. Emerg Infect Dis 2008;14:95-100.