Pharmacists and vaccination in pregnancy

Christine Hughes, BScPharm, PharmD, FCSHP

Introduction

Across Canada, pharmacists are increasingly involved in providing vaccinations.¹ The accessibility of pharmacists provides opportunity to improve adult vaccination rates for influenza and other routinely recommended vaccines. Since pregnant women are an important segment of the population that may require vaccines, pharmacists should be aware of vaccine recommendations as well as contraindications in pregnancy. Physiologic changes that occur during pregnancy, such as alterations in the balance of type 1 and 2 T-helper cells, increase the susceptibility of pregnant women to illness.^{2,3} Vaccination in pregnancy provides protection not only for the woman but also for the fetus and infant in the first few vulnerable months of life (i.e., before infant vaccines can be given) and thus addresses a previous gap in vaccination coverage.^{4,5} However, misperceptions around the safety of vaccines have been shown to influence patient decisions to refuse vaccinations during pregnancy.⁶ Other commonly reported patient barriers include not receiving a provider recommendation for the vaccine and pregnant women perceiving they are not at risk for contracting the disease.⁶ This article highlights vaccines that are recommended in all pregnant women, as well as vaccines that should be avoided. The significant role and responsibility of pharmacists in proactively promoting maternal vaccination are also underscored (summarized in Box 1).

General principles regarding vaccination in pregnancy and breastfeeding

In general, inactivated viral vaccines, bacterial vaccines and toxoids are considered safe in pregnancy, based on lack of data suggesting that such vaccines are teratogenic or embryotoxic or adversely affect pregnancy outcomes.^{7,8} While thimerosal has been removed from most adult vaccines in Canada, the National Advisory Committee on Immunization (NACI) has concluded that vaccines containing thimerosal (i.e., multi-dose vial influenza and hepatitis B) are safe in pregnancy and should be used where indicated.⁷ Although some inactivated

BOX 1 Summary of pharmacists' responsibilities in promotion of maternal vaccination

- Proactively review vaccination status of pregnant women.
- Provide education on recommended vaccines in pregnancy, including indications, contraindications and safety data.
- Administer recommended vaccines (where possible) or refer pregnant women to other maternity care providers.
- Promote administration of routine vaccines, including measles, mumps and rubella, as part of preconception planning.

vaccines are recommended to be administered to all pregnant women, in most cases, the decision to vaccinate during pregnancy requires weighing risks and benefits, depending on individual medical and vaccination status. In some cases, pregnant women should be offered hepatitis B, hepatitis A, meningococcal and/or pneumococcal vaccines for the well-being of the mother, if they have specific risk factors or exposures.^{4,7}

In contrast to inactivated vaccines, live-attenuated vaccines—including varicella, yellow fever, oral typhoid and measles, mumps and rubella (MMR) vaccines—are typically contraindicated in pregnancy due to the mainly theoretical risk to the infant.^{4,7} However, if a pregnant woman inadvertently received a live-attenuated vaccine, the Society of Obstetricians and Gynaecologists of Canada (SOGC) recommends that pregnant women should not be counselled to terminate the pregnancy.⁴ For women who are breastfeeding, it is generally considered safe to administer routinely recommended inactivated vaccines, as well as most live-attenuated vaccines (with the exception of yellow fever).^{4,7}

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Recommended vaccinations in pregnancy

Influenza vaccine

It is well documented that pregnant women have higher rates of hospitalization, cardiopulmonary complications and death as a result of influenza as compared to the general public.^{2,3} In addition, pregnant women who become infected with influenza are at greater risk of premature labour and delivery, which can increase risk of infant morbidity and mortality.² Influenza vaccination during pregnancy provides protection for the mother, fetus and newborn, via the transfer of maternal antibodies through the placenta.⁵ This protection is important since influenza vaccine is not licensed for use in infants under 6 months of age. Data also demonstrate that influenza vaccination is associated with lower hospitalization rates in pregnancy, and infants born to mothers who received influenza vaccine during pregnancy are less likely to be premature or small for gestational age.^{2,4,9} Passive surveillance over decades has not demonstrated any safety concerns with inactivated influenza vaccine, including when administered in the first trimester.^{4,7}

Since 2007, NACI has recommended that all pregnant women (at any stage of pregnancy) receive inactivated influenza vaccine.^{7,10} Despite this recommendation and even with wide access to publicly funded influenza vaccines at physicians' offices, public health clinics and pharmacies in most jurisdictions, vaccine coverage in pregnant Canadian women remains well below the recommended target of 80%.¹¹ In 1 study conducted in Nova Scotia, only 16% of women received influenza vaccine during pregnancy in the 2 years following H1N1.¹² Reported influenza vaccination rates in pregnancy vary in other countries, ranging from <25% in Europe to approximately 50% in the United Kingdom and United States.²

Regarding clinicians' recommendations, in a 2017 survey of over 1000 Canadian maternity care providers (including pharmacists), 72% reported recommending influenza vaccine to all pregnant patients.¹¹ Approximately 65% strongly agreed that pregnant women are at an increased risk of complications from influenza, and nearly 70% strongly agreed that the vaccine is safe.

Tetanus diphtheria acellular pertussis (Tdap) vaccine

Severe disease associated with *Bordetella pertussis* is most commonly seen in very young infants (<2 months of age) who are not old enough to be vaccinated.⁴ A rising incidence of pertussis (whooping cough) was seen in certain parts of Canada, the United States and the United Kingdom between 2010 and 2014, which precipitated evaluation of a maternal vaccination program.^{4,13} Research has shown that maternal immunoglobulin G (IgG) antibodies for pertussis are actively transferred through the placenta to provide passive immunity to newborns in the first few months.^{4,5} Transplacental passage of pertussis antibodies is minimal until 13 to 16 weeks' gestation, continuously increases in the second trimester and is highest in the third trimester.^{4,5} Studies from countries with universal pertussis vaccination programs

in pregnant women between 27 and 36 weeks' gestation noted 85% vaccine effectiveness in preventing pertussis in infants less than 8 weeks old.⁴ In addition, tetanus diphtheria acellular pertussis (Tdap) appears to be safe in pregnancy, even when tetanus vaccine was last administered in the previous 2 years.^{4,7}

As of March 2018, NACI and the SOGC recommend Tdap for women in every pregnancy, regardless of the mother's previous vaccination history.^{4,7} Although the vaccine should ideally be administered between 27 and 32 weeks' gestation to maximize passive antibody transfer,⁷ SOGC encourages vaccination as early as 21 weeks to avoid missed opportunities.⁴ Also, vaccination of the mother after 32 weeks' gestation or postpartum provides some protection to the infant and therefore should be recommended in women who did not receive Tdap earlier in the pregnancy.⁴

All provinces and territories currently fund Tdap vaccine (e.g., Boostrix; Adacel) in each pregnancy, with the exception of Ontario, which funds 1 adult (booster) dose of Tdap, and British Columbia (BC), where the vaccine can be purchased privately at pharmacies.^{14,15} Notably, Alberta is the first jurisdiction to announce that, as of January 1, 2019, publicly funded Tdap vaccine for pregnant women would be available through pharmacies, in a joint effort with Alberta Health Services to increase Tdap vaccine access.¹⁶ In the United States, Tdap has been recommended since 2013. While current data are limited, 1 study found that 54.4% of pregnant women with a recent live birth reported receiving Tdap vaccination (2017-18).¹⁷

Pharmacists' role in championing maternal vaccination

Pharmacists should play a significant role in advocating for maternal vaccination with influenza and Tdap vaccines, which are safe and effective in protecting mothers, fetuses and newborns from serious infectious diseases. This is especially important given the lack of streamlined delivery systems across maternity care providers, including general practitioners, obstetricians-gynecologists, midwives, pharmacists and nurses, which may lead to missed opportunities for vaccination.^{8,11} In this context, pharmacists' roles may encompass proactive review of vaccination status, providing education on recommended vaccines and dispelling vaccine myths, as well as administering recommended vaccines. In particular, in cases where pharmacists are unable to provide influenza and/or Tdap vaccines, they should refer pregnant women to other maternity care providers. Referrals of pregnant individuals, in addition to provider recommendations and offers of vaccination, remain among the most important factors in increasing uptake rates for both influenza and Tdap vaccines.^{17,18} Pharmacists should also play a role in promoting routine vaccinations, including MMR, to women of childbearing potential who are planning on becoming pregnant. Useful resources regarding maternal vaccination are outlined in Appendix 1, available online at www.cpjjournal.ca. ■

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