

Saskatchewan Ministry of Health Funded Vaccines Other Than Routine Childhood Immunizations (Table 9-2)
Eligibility Criteria for Those at Increased Risk [Excerpted from Saskatchewan Immunization Manual (Section: 9-20; Revised June 2008)]

Criteria	H. influenzae b (Hib)	Hepatitis A (HA)	Hepatitis B (HB)	Influenza (Inf)	Meningococcal Conjugate (Men-C) &/or Polysaccharide (Men-P)	MMR	Pneumococcal conjugate (Pneu-C-7) &/or polysaccharide (Pneu-P-23)	Tetanus Diphtheria (Td)	Rabies (Rab)	Vari-cella (Var)
Age ≥65 years				X			X ¹			
All adults – every 10 years								X		
Alcoholism				X			X ¹			
Anemia				X						
Animal bites								X ¹⁰	X ¹⁰	
Children 6-23 months of age				X						
Children 12 months to 18 years on chronic ASA therapy										X ⁴
Children 6 months to 18 years on chronic ASA therapy				X						
Children under 7 years of age whose families have immigrated to Canada from regions of high Hepatitis B prevalence			X							
Children aged 1-15 years living in Northern Health Regions or on reserve in Saskatchewan		X ²								
Chronic Cerebrospinal fluid leak							X			
Chronic cardiorespiratory disease (including bronchopulmonary dysplasia, and asthma) requiring regular medical follow-up or hospital care				X						
Chronic cardiorespiratory disease, especially cyanotic congenital HD, cardiac failure, bronchopulmonary dysplasia, excluding asthma unless on oral corticosteroid therapy							X			
Chronic liver disease, regardless of cause, including cirrhosis		X	X	X			X ¹			
Chronic metabolic disease				X						
Chronic renal failure from nephrotic syndrome			X	X			X			X ⁴
Cochlear implant recipients	X				X		X			
Complement, properidin and factor D deficiency					X					
Cystic Fibrosis				X			X			X ⁴
Diabetes				X			X			
Predialysis, peritoneal, and hemodialysis			X	X			X			X ⁴
Hemoglobinopathy				X			X			
Hemophilia		X	X							
Hepatitis A household and intimate social contacts <small>as recommended by MHO</small>		X								
Hepatitis B household contacts, who are non immune, including child care settings			X							
Hepatitis C, if hepatitis A and/or B non-immune		X	X							
HIV infection	X	X ⁷	X ⁷	X		X ⁴	X			X ⁴
Humoral Immune System Deficiencies: - disorders of antibody production or function - lymphoreticular malignancies - hematopoetic malignancies - antibody dyscrasias - protein wasting syndromes	X			X			X			

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Immunosuppression for therapy or underlying disease (e.g. cancer, Hodgkin's disease, leukaemia, lymphoma, myelodysplasias, congenital immune deficiency)	X			X			X			
Infants of HBsAg+ mothers			X ¹¹							
Infants born to women at increased risk for hepatitis B infection (i.e. injection drug users) whose infectious status is unknown or negative at time of delivery			X ¹²							
Injection drug users (street drugs) and their sexual partners/household contacts			X					X		
Meningococcal disease - household and intimate social contacts to a case, as recommended by MHO					X					
Percutaneous (needle stick) or high risk mucosal exposure			X					X		
Pregnancy				X						
Rubella non-immune women, unless previously received at least 2 doses (see Section 3-75)						X				
Residents of institutions for the developmentally challenged			X ¹³							
Residents of special care homes and other chronic care facilities				X			X ¹			
Sexual assault victims			X							
Sexual partners of HBsAg positive persons			X							
Sexual partners-multiple			X							
Spleen: - Asplenia, functional or anatomic, or - Hyposplenia due to (sickle cell anemia, thalassemia major, essential thrombocytopenia, celiac disease and inflammatory bowel disease)	X ⁵			X	X ⁶		X			
Transplant recipients – bone marrow, solid organs, stem cell transplants ³ (see section 3-85 & 3-90)	X ⁴	X ⁸	X ⁸	X	X ⁸	X ⁴	X	X ⁸		X ⁴
Wound management								X ⁹		

Footnotes

- ¹ Applies only to pneumococcal polysaccharide vaccine (23 valent).
- ² Recommended for children living in the northern health regions or on reserve in Saskatchewan (Creighton, Air Ronge, La Ronge excluded from the program). The first dose is given at 1 year of age with a second dose at 18 months. It is also acceptable to provide the first dose at 18 months with the second dose at 2 years of age. Children who received an initial dose as part of this program should receive their 2nd dose regardless of their place of residence. Children who were eligible for immunization when this program started in 1997 are eligible until they turn 15 years of age.
- ³ Transplant recipients also may receive a repeat series of routine childhood vaccines, as recommended by the medical centre where they received the transplant and following consultation with an MHO.
- ⁴ Only given following consultation with MHO. (Medical Health Officer)
- ⁵ Vaccination with the age-appropriate primary series should be completed (if not already completed) for all children < 5 years with asplenia. One dose of Hib vaccine is recommended for all asplenic individuals ≥ 5 years of age regardless of previous Hib immunization
- ⁶ Eligible for both conjugate vaccine products: Men – C and Men – P.
- ⁷ Only men who have sex with men and IDU (Intravenous drug user)
- ⁸ Use if indicated based on recommendation from Transplant Physician/Team and MHO (Medical Health Officer)
- ⁹ Refer to Section 8-30
- ¹⁰ Refer to Section 8-35
- ¹¹ Initiate at birth with HBIG
- ¹² Initiate at 2 months of age
- ¹³ Routine blood work prior to immunization of residents is not indicated

General Statements

♦Physicians are **strongly advised** to check with **local public health** departments for current guidelines, advice & patient's immunization **record** (if available)!!! This document intended to highlight vaccine awareness. **Provincial policy & cost/coverage issues will impact use!!!**

Links: Canadian: Public Health Agency of Canada Immunizations & Vaccine Info: <http://www.phac-aspc.gc.ca/im/index-eng.php>
 Provincial-Links: <http://www.phac-aspc.gc.ca/im/ptimprog-progimpt/table-1-eng.php>; BC: <http://www.bccdc.org>
 American: Adult Immunization Schedule 2010 Recommendations: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5901a5.htm?s_cid=mm5901a5_x
 SK: <http://www.health.gov.sk.ca/immunization-schedule>; <http://www.health.gov.sk.ca/immunization-manual>
NACI:CIG Online Canadian Guidelines: www.naci.gc.ca (BOOK); **Other:** <http://immunize.cpha.ca/en/default.aspx>; <http://www.cdc.gov/vaccines/>

Common Myths / Misunderstandings

♦**Vaccines & autism.** Best available evidence suggests that vaccines, including MMR & those containing thimerosal are **not** linked to the development of autism.^{4,5,6} (Impossible to rule out risk completely. Thimerosal present in very few Canadian vaccinations.)
 ♦**Hepatitis B & Multiple Sclerosis:** Current evidence suggests no link between HB vaccination & MS.⁷

Reactions: http://www.phac-aspc.gc.ca/im/aefi-form_e.html
Precautions & Contraindications (Consult specific product monographs & guidelines!)
 ♦**Immunodeficiency:** Avoid live vaccines (yellow fever, oral typhoid, rotavirus, varicella, MMR, FluMist, BCG, zoster).
 ♦**Pregnancy:** Avoid use of live vaccines. Assess benefit/risk. (Those contraindicated in pregnancy may be given post.)
 ♦**Hypersensitivity:** inquire regarding any previous reactions: thimerosal, egg, latex, preservatives

Storage & the "Cold Chain": Cold storage & transport of vaccines is critical!!!! (Direct, door-to-door from pharmacy to physician office for same day appointment; transport in cool container 2-8°C). See Q&A pg 2.

Practice Pearls & Common Q&As {for more detail, see next Extras page (available online)}

♦**Considerations for Immigrants:** Useful Links: <http://www.immunize.org/practices/p5120.pdf>; <http://www.immunize.org/practices/p5121.pdf>
 - Immigration medical examinations (IME's) do not routinely cover immunization status, tuberculosis or HB testing.
 - Compare: age of immunization, number of doses & intervals between doses; may need additional vaccinations
 - Other country vaccination schedule information: <http://www.who.int/vaccines/GlobalSummary/Immunization/ScheduleSelect.cfm>
 {Note: Developing countries: measles vaccine often given alone, without mumps & rubella. Vaccines in limited use include Haemophilus influenzae type b conjugate, hepatitis B, varicella, pneumococcal conjugate, meningococcal C conjugate.}
 - When immune status uncertain, usually safe to give routine vaccinations (even if repeat) if no adverse reaction history & HIV -ve
 - In temperate climates a higher proportion of varicella infections occur in adults. As such adolescents and adults from such countries may be susceptible to varicella, and require vaccination.
 - Foreign born individuals from endemic areas may be more likely to be carriers of hepatitis B.
 - HA immunity may be more prevalent in individuals from endemic countries. May test prior to vaccination.

♦**Considerations for Travel:** Links: <http://www.travelhealth.gc.ca> (Travel Medicine Program PHAC; travel clinic list); www.cdc.gov/travel/; www.who.int/inf
 - Clients should consult/obtain current info from travel health clinics or public health agencies. (2-3months prior!)
 - Ensure routine immunizations are up to date (poliomyelitis, HB, measles, rubella, Td, pertussis).
 - May require: Meningococcal (MCV4), Yellow Fever, HA, Influenza, Japanese encephalitis, Typhoid, Cholera, TBE
 - Accelerated Hepatitis Vaccine Schedule ^{age >18}: **Twinrix** (HA+HB): Reg Schedule: 0,1 & 6 months. Rapid schedule at 0,7,21 days, with 4th dose at 1yr. **Engerix-B** (HB): Reg Schedule: 0, 1, 6months or 0, 1, 2, 12months. Rapid schedule 0, 7, 21days, with 4th dose at 1 yr.
 - Accelerated schedules: immunity starts to build after 1st dose, so useful even if completion is after return.

Route	Generic/TRADE (\$=Approximate cost in SK if not covered; may vary! {Note: recommended does not mean cost is covered!} See color coding description below for tan & pink boxes.*	Age Considerations for Adult Vaccination					Immuno-compromised (not HIV)	HIV** CD4 (cells/mm3) <200 >200	Diabetes/CHD/lung/chronic/alcoholism	Asplenia (splenectomy & terminal complement component deficiency)	Chronic Liver Diseases	Kidney failure, ESRD, hemodialysis	Health care personnel	Pregnancy If contraindicated, may give post-partum.			
		18-26yr	27-49yr	50-59yr	60-64yr	>65yr											
IM	Tetanus, diphtheria +/- pertussis ADACEL, BOOSTRIX: Tdap \$80 with pertussis Td Adsorbed: Td \$35/dose (3 doses required if 1 st series)	Vaccinate for pertussis once in adulthood; e.g. substitute 1 time dose of Tdap for Td booster or Td in 1 st series; boost with Td q10yr (If wound/skin trauma, ↑ tetanus risk; may give Td booster if > 5yr, in addition certain patient groups may require tetanus immune globulin)					Td boost q10yr	Substitute 1 time adult dose of Tdap for Td booster, then boost with Td q10yr. (If uncertain history of 1 ^o vaccination, will require 3 doses.)							Td: if indicated; (may wait till 2 nd or 3 rd trimester.)		
IM	HPV GARDASIL: HPV types 6,11,16,18 0,2 & 6month schedule (\$555 per series)	3 doses for ♀ age 9-26 Genital warts ^{CDN + FDA Oct09 approval} age 9-26; ACIP → ok, not routine.						3 doses for Females age 9-26yrs, preferably prior to potential exposure through sexual activity. (Use in ♂: lacks data; not indicated in Canada.)							Not recommended		
SC	Varicella Var e.g. chicken pox [Deltoid best] VARILRIX, VARIVAX III (\$200 per 2 doses)	2 doses 4-8 weeks apart, if no evidence of immunity (e.g. not had vaccine or the dx)						Contraindicated							2 doses; if no evidence of immunity (e.g. not had vaccine or the dx)	Contraindicated	
SC	Zoster ZOSTAVAX ⁹ {New in Canada 2009} Same varicella vaccine strain but ≥14x more potent. (\$160/dose)	Freezer storage! For Shingles! 1 dose (if no contraindications)					1 dose	Contraindicated							1 dose	Contraindicated	
SC	Measles, Mumps, Rubella MMR (\$75/dose) M-M-R-II, PRIORIX (rubella=German measles)	1 or 2 doses ~4 wk apart, if indicated; 1 dose if indicated; 2 nd dose @4wks if indicated						Contraindicated							1 or 2 doses; if indicated (e.g. ... for adults who have not had the vaccine ~ born after 1970 or the disease.)	Contraindicated	
IM	Influenza Inf modified yearly; cover 2 strains Type A, 1 Type B FLUVIRAL, VAXIGRIp age ≥6mo (\$25) Seasonal INFLUVAC official indication age 18+; thimerosal free	1 dose annually; recommended, although not always covered for all ages in all provinces. Low cost. (Covered age ≥65 in SK)					1 dose annually	1 dose annually. (High risk groups often eligible for coverage.) Canadian products: 1) Vaxigrip: thimerosal free in single dose; 2) Fluviral; 3) Influvac: thimerosal free; official indication: age 18+ only; 4) H1N1 ^{adjuvanted & non.}									
IM/SC	Pneumococcal Pneu-P-23 (\$65) PNEUMOVAX-23; PNEUMO-23: age ≥ 2yrs {Pnevarn conjugate (7 types: 4,6B,9V,14,18C,19F,23F) age 6wks-9yrs}						1 dose	1 dose (option of 1 time revaccination after 5+ years (not covered; questionable efficacy). (New in USA: smoker, asthma)) More than 1 revaccination may be counterproductive due to polysaccharide nature of vaccine. <small>Efficacy limited by serotypes covered (6C now more common, not covered by vaccines & growing resistance to penicillin eq. 19A, 35B). New Pnevarn 13 approved ^{Age 6wks-5yrs} Types: 1, 3, 4, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F & 23F.</small>							Can be given		
IM	Hepatitis A HA (\$140/2 doses) AVAXIM, HAVRIX, VAQTA (SC if bleeding disorder)	2 doses 6-12 months apart; lasts 20+ yrs?; (esp. if medical, occupational, sanitation / lifestyle risk; see CIG for recommendations (Recommend for those adopting/in close contact with kids from high risk countries))						2 doses							2 doses	2 doses	
IM	Hepatitis B HB ♦vaccines interchangeable if reg schedule ENGERIX-B, RECOMBIVAX-HB, (\$210-280) RECOMBIVAX Preservative Free (SC if bleeding disorder)	{TWINRIX: covers both HA & HB – 3 doses (\$225)}						3 doses							3 doses	3 doses	
IM	Meningococcal Men (Age ≤54) (\$125-175/dose) -conjugate: MENINGITEC C, NeisVac-C C, MENJUGATE C; MENACTRA MCV4 -polysaccharide (SC): MENOMUNE Discontinued 2008	1 or more doses (mostly for age ≤25 yrs)						3 doses (especially those with medical, occupational, travelling or lifestyle risks; see CIG for recommendations)							3 doses	3 doses	
		♦ May be indicated for 1 st year students living in dormitories, occupational exposure risk, military recruits & travelers to high risk countries (MCV4 required for Hajj pilgrims – Saudi Arabia). ♦ MCV4 covers C & 3 serotypes A, W-135, & Y, others just Men-C (most important in youth & Canada). May avoid MCV4 if neurological history (~1million association with Guillain-Barré). {Conjugate confers longer term protection, herd immunity, less hypo-responsiveness & ↑ booster effect upon reimmunization; more fever ≥38.5; not for >5yrs.}						[C Sequential; then MCV4] usually							1 or more doses	1 or more doses	1 or more doses

CHD=coronary heart disease **CI**=contraindication **DI**=drug interaction **ESDR**=end stage renal disease **SE**=side effect **TBE**=tick-bourne encephalitis
 * Recommended for all persons meeting age requirements & lacking evidence of immunity eg. Lack proof of vaccination or have no evidence of prior infection. Cost not always covered! Recommended if also some other risk factor is present eg. medical, occupational, lifestyle or other indication. Contraindicated
 ** HIV Considerations: 1) Before immunizing an HIV positive person, consult an ID specialist or Medical Health Officer. 2) HB may not be necessary in all HIV patients, although may be given routinely due to rapid progression if exposed.
OTHER: YF-VAX: Yellow Fever \$140; IMOVAX-Rabies, RabAvert: Rabies \$700/3 doses; Rabies Immune Globulin (acute exposure; give within 24hrs or up to 7 days after 1st dose of rabies vaccine); TYPHIM-VI, TYPHERIX:Typhoid IM \$70; VIVOTIF: Typhoid oral; VIVAXIM: HA & Typhoid HA-Typhid-; JE-VAX{Inflaro: Japanese Encephalitis \$615/series; DUKORAL: oral for select cholera strains \$130-195/series; Polio\$80; Haemophilus influenzae type b Hib; not generally for age >5yr, may consider in sickle cell dx, leukemia, HIV, splenectomy pt. [Canada Feb10, FDA Oct09; CERVARIX^{AS04}: HPV types 16, 18, ♀ age 10-25.]
Passive Agents: Antitoxin: botulinism & diphtheria; Immuqglobulin: human, HB, rabies, RSV, tetanus & varicella; Antivenom: snake & spider. **Some Peds Products:** INFANRIX HEXA: 6wk – 2yrs diphtheria, tetanus, pertussis, HB, polio, Hib; RotaTeq: for infants rotavirus 5 types
VACCINES ROUTINELY GIVEN to MOST KIDS in Canada: between age 0month – 18year: tetanus, diphtheria, pertussis, polio, measles, mumps, rubella, HPV, varicella, pneumococcal PCV7, influenza, hepatitis B, meningococcal, & Hib.

1) **Breaking the “cold chain”**

Canadian Guidelines: Refrigerated vaccines should be stored between +2°C and +8°C. Frozen vaccines should be stored at -15°C or colder. Store light sensitive vaccines away from light. Follow manufacturer recommendations for storage & transport. Administration requires someone trained to give im/sc injections.

Fridges:

- Fridge used should be dedicated to the storage of vaccines only.
- **Use of bar fridges for vaccine storage is the leading cause of cold chain breaks in Canada. Bar fridges are not recommended for the purpose of storing vaccines.
- Keeping temperature of fridge stable (2-8° C): Avoid opening refrigerator door unnecessarily, store containers of water in refrigerators, or ice packs in the freezer
- NEVER store vaccines in the vegetable bin section of the refrigerator. Ideal storage location for vaccine: In the middle compartment, away from floor, coils, walls, and venting for the freezer or cold air.
- Temperature of the compartments of the refrigerator where the vaccine is stored should be checked and logged at least twice a day. Fridge temperatures outside of the 2 to 8 degree C range must be reported immediately to obtain recommendation on the stability of the affected product.
- Fridge temperature recording logs should be retained for 2 years.
- Min-Max thermometer batteries should be routinely changed twice a year: December 1 and June 1 and the date of changing noted on the device.

Transporting Refrigerated Vaccines: Avoid breaking the cold chain

- 1) Transport vaccines in insulated containers at all times. Hard sided plastic insulated containers, or Styrofoam containers with walls at least 2 inch thick walls should be used. Icepacks should be placed inside the transport container to maintain the cold chain. To prevent freezing the vaccine should never be placed directly onto an ice pack. Instead an insulating barrier (i.e. bubble wrap, Styrofoam peanuts) should be placed between vaccine and ice pack.
- 2) Make sure vaccine is never placed in trunk of vehicle, or in direct contact with sunlight. Also the vaccine should not be placed in line with the air from the vehicles heater or air conditioner. Vaccine should never be left in a vehicle unattended.
- 3) If a break in the cold chain identified prior to administration of the vaccine, contact your local public health authority about the appropriate course of action. While waiting for a decision, ensure that the vaccine is stored in appropriate cold chain conditions. The vaccine should not be administered until a decision has been reached.
- 4) If a break in the cold chain is identified after administration of the vaccine, contact your local public health authority. The type of vaccine, duration and temperature of the exposure will be taken into account in order to determine the course of action. Serological testing or revaccination may be suggested.

Further information: available from the Public Health Agency of Canada's Website.

- References:
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2) **Anaphylaxis Management with vaccine administration:**

- 1) Patients should be kept under supervision for 15 minutes (JE-VAX: 30 minutes) following administration.
- 2) In order to treat anaphylaxis perform the following steps (note steps a-d should be performed rapidly or simultaneously, however the priority is to complete step a):
 - a) Promptly administer 0.01 mL/kg (maximum 0.5 mL) of aqueous epinephrine 1:1000 by intramuscular (or subcutaneous) injection in the opposite limb to that in which the vaccination was given (or the vastus lateralis). Prompt administration is essential.
 - b) Call for an ambulance
 - c) Place the patient in a recumbent position, and elevate their feet.
 - d) If necessary, establish an oral airway.
 - e) Patients with severe reactions such as cyanosis, dyspnea, should be given oxygen if it is available. Pulse oximetry can be used to monitor if available.
 - f) If the vaccine was administered subcutaneously, an additional dose of 0.005 mL/kg (maximum 0.3 mL) of aqueous epinephrine 1:1000, can be injected into the vaccination site to slow down absorption. This should be done shortly after administration of the first dose of epinephrine in moderate to severe cases, and generally should not be repeated. Local injection of epinephrine into an intramuscular vaccination site is contraindicated, as it speeds up absorption of the vaccine.
 - g) A dose of diphenhydramine hydrochloride (Benadryl®) can be given as an adjunct to epinephrine. The oral route of diphenhydramine is preferred for conscious patients who are not seriously ill (as the intramuscular injection is painful). Oral dose: 1-2 mg/kg to a maximum single dose of 50 mg.
 - h) An inhaled β-agonist should be considered if there is a bronchospasm resistant to an adequate dose of epinephrine (e.g., nebulized salbutamol 2.5-5.0 mg in 3 mL of saline or 1 puff per 3 kg to a maximum of 10 puffs by metered dose inhalers).
 - i) Vital signs should be monitored continuously.
 - j) Patient should be transported to emergency department for long term monitoring.

•Epinephrine dosing can be repeated twice at 5-minute intervals if necessary, for a total of three doses. The limb in which the vaccination was given should be avoided. A different limb is preferred for each dose to maximize drug absorption.

- 3) **Breastfeeding and Vaccinations:** Immunizations for actively breastfeeding women are considered safe, with the exception of smallpox vaccine and yellow fever, by both the CDC and the American academy of pediatrics. Breastfeeding does not appear to influence the maternal immune response. Vaccines do not appear to affect the safety of breast milk for infants.^{10,11}

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References

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¹ Therapeutic Choices 5th Edition
² Micromedex 2010
³ Advisory Committee on Immunization Practices (ACIP). Recommended adult immunization schedule: USA, 2009¹. Ann Intern Med. 2009 Jan 6;150(1):40-4. Also accessible via : <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5753a6.htm> (InfoPOEMs: There are 2 minor changes to the recommendations for adult immunizations: (1) The new guidelines recommend 2 doses of varicella vaccine for adults born after 1980 who have not had documented varicella infection or herpes zoster; and (2) smokers and adults with asthma have been added to the list of people younger than 65 years who should receive the pneumococcal vaccine. (LOE = 5))
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⁴ Public Health Agency of Canada. http://www.phac.aspc.gc.ca/mtq_a_thimerosal-eng.pdf
⁵ Canadian Coalition for Immunization Awareness and Promotion. <http://www.immunize.cpha.ca/en/publications-resources/questions/auism.aspx>
⁶ Lancet retracts Wakefield paper linking MMR vaccine to autism (19Feb, 2010). [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(10\)60175-7/fulltext](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(10)60175-7/fulltext)
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Immunocompromised patients should continue to receive all five vaccine shots, with the fifth on Day 28. Vaccine shots may be delivered to the outer aspect of the thigh in younger children and to the deltoid in older children and adults. The gluteal region should never be used. The authors note that their recommendations will differ from vaccine label instructions into the foreseeable future. *MMWR Recommendations and Reports*: <http://dx.doi.gov/10.1093/mmwr/mm11r5902a1.htm>

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