The background of the slide features a gradient sky transitioning from a deep blue at the top to a warm orange at the bottom, suggesting a sunset. In the foreground, the dark silhouettes of several trees are visible against the bright orange horizon.

Adult Vaccine Update

NB Internal Medicine Update, April 22nd,
2016

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Summary points:

- Canadian adults > 18 should be regularly assessed to ensure recommended vaccinations are up to date.
- There are six vaccines that should be regularly assessed for all healthy adults and 4 vaccines that need to be considered for those with specific risk factors.
- Other vaccinations can be considered in specific circumstances, primarily related to travel or occupational exposures.

Routine vaccinations summary:

- TDaP:
 - Single dose recommended for all adults > 18.
 - Pertussis booster should also be given to pregnant women in 3T of pregnancy (but usually only funded if outbreak).
 - Tetanus and diphtheria should be updated every ten years.
- MMR:
 - Immunization is recommended for all adults born after 1970 who do not have documentation of having received two previous doses.
 - Single dose is adequate unless the patient is a high risk person (HCW, traveller, student in post secondary education, or military personnel).
 - Live vaccine therefore not to be given to those with immunocompromise without expert consultation.
 - Publically funded in NB.

Routine vaccinations summary:

- **Influenza:**
 - Recommended annually for all adults without contraindications.
 - While efficacy is suboptimal, the vaccine attenuates influenza associated disease and reduces risk of hospitalization or death.
 - In NB, publically funded for adults > 65, pregnant women, indigenous persons, morbid obesity, nursing home residents, and persons with high risk medical conditions or close contacts.
- **Pneumococcus:**
 - Best vaccine for prevention is PCV-13 (US recommendation for all adults > 65, with booster dose of Pneumovax given one year later).
 - In NB, Pneumovax-23 covered for adults > 65, or those with conditions that place them at risk for IPD.
 - In NB, Prevnar-13 is currently covered for those with splenectomy, functional asplenia, HIV, HSCT or other immunosuppressive conditions. Boosting with Pneumovax 8 weeks following Prevnar-13 is recommended.

Routine vaccinations summary:

- **HPV:**

- 9-valent vaccines prevents against 90% of oncogenic HPV subtypes and those causing genital warts.
- HPV vaccination is currently recommended in Canada for the prevention of cervical cancer and its precursors in males and females aged 9-26, including those with previous PAP testing abnormalities, cervical cancer or genital warts.
- Should be given to persons >27 with ongoing risk factors.
- Gardasil 4 is currently publically funded in New Brunswick for grade 7 females.

- **HPV (zoster) vaccine:**

- Recommended for all adults > 60 without contraindications and can be considered in those > 50.
- Live vaccine, use with caution in immunocompromised persons.
- Delay by at least one year following episode of clinical Zoster.
- Not publically funded in NB.

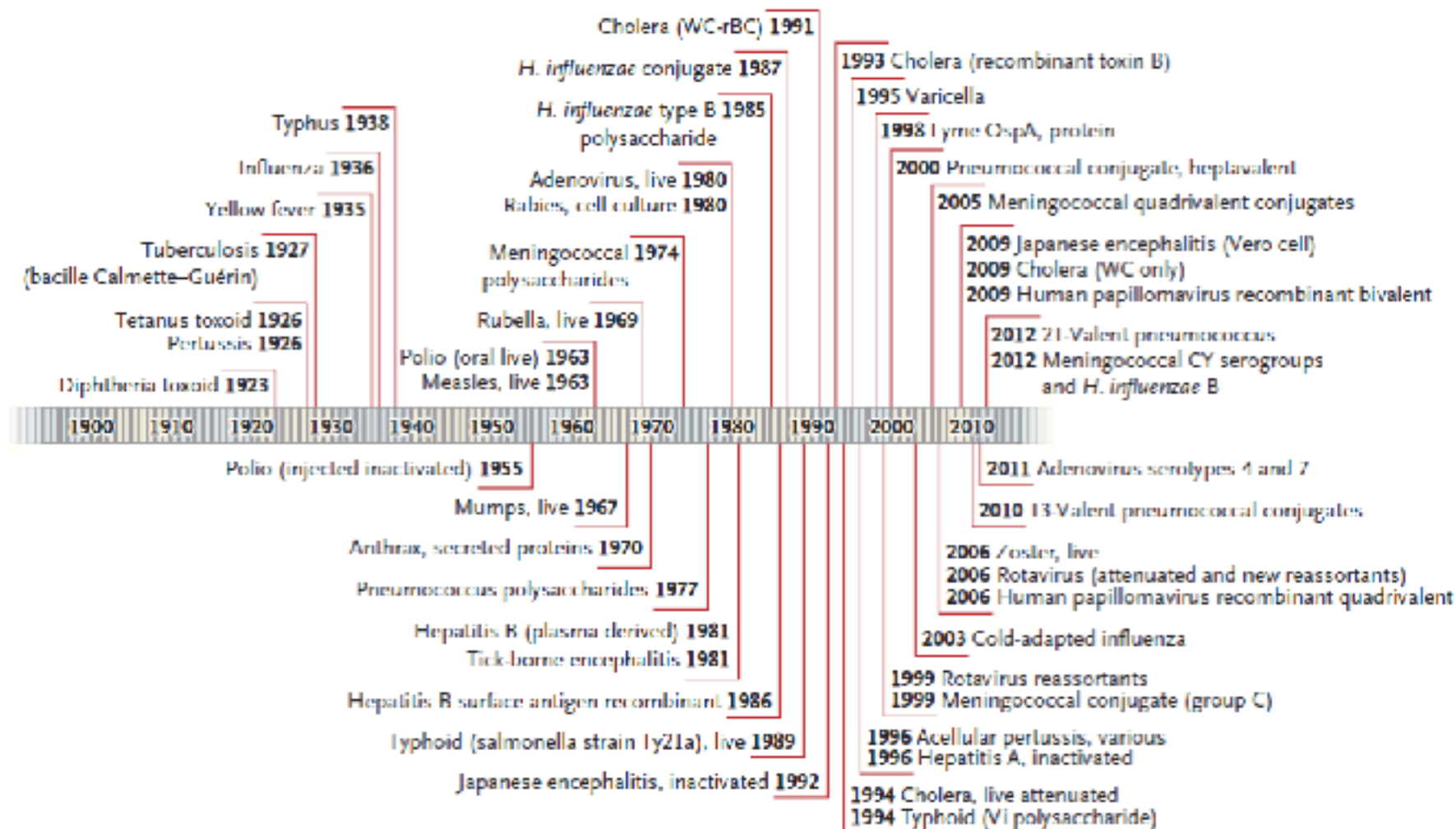
With specific risk factors:

- Hepatitis A Vaccine:
 - Recommended for those at risk of HAV exposure.
 - Publically funded in NB for persons with CLD, alcoholism, and IVDU on MMT.
- Hepatitis B Vaccine:
 - Recommended for those at risk of exposure.
 - Publically funded in NB for: CLD, those on HD, persons getting regular blood products, IVDU on MMT, MSM, institutions for developmentally challenged persons.
- Quadrivalent Meningococcal vaccine:
 - Recommended for young adults (12-24) and high risk groups with underlying medical conditions (asplenia, complement deficiency, travel to endemic areas).
 - Publically funded in NB for those with splenic disorders.
 - Serogroup B is now the most common cause of IMD in Canada, vaccines now available.
- Haemophilus influenza Type B:
 - Recommended for adults with increased risk of invasive disease.
 - Includes congenital immunodeficiency, heme malignancy, HIV, asplenia, HSCT, cochlear implants.
 - Publically funded in NB for persons with splenic disorders, malignant neoplasms including leukemia/lymphoma, cochlear implants.

Vaccines:

- Arguably one of the most effective interventions of modern medicine.
- Edward Jenner: first use of small pox vaccine in 1796.
 - 20th Century: estimated 375 million deaths from Small pox.
 - Since 1978: total cases and total deaths: 0
- Today > 70 vaccines against about 30 microbes.





Routine vaccinations in adults:



Tdap highlights in adults:

- Administer one dose of Tdap vaccine to pregnant women during each pregnancy (ideally at 27-36 weeks gestation) regardless of interval since past Td or Tdap vaccination.
- Adults with an unknown or incomplete history of completing a primary 3 vaccine series with Td containing vaccines should begin or complete a primary vaccination series including a Tdap dose.
 - For unvaccinated adults administer the first 2 doses at least 4 weeks apart and the third dose at 6-12m.
- With puncture would revaccinate if > 5 years since most recent booster.

MMR highlights in adults:

- Adults born before 1970 are considered immune to measles. All born after 1970 should have **at least one dose** of vaccine or lab evidence of immunity.
- Measles:
 - Second dose of vaccine at least 28 days after recommended for higher risk persons including students, HCW's, and international travellers.
- Mumps:
 - Second dose of vaccine at least 28 days after recommended for higher risk persons including student, HCW's, and international travellers
 - Persons vaccinated before 1979 with killed mumps vaccine or vaccines of unknown type should be considered for two dose MMR revaccination.
- Rubella:
 - For women of childbearing age, regardless of year of birth, rubella immunity should be determined. If no immunity, women who are not pregnant should be vaccinated.
 - Pregnant women without evidence of immunity should be vaccinated following completion of pregnancy.

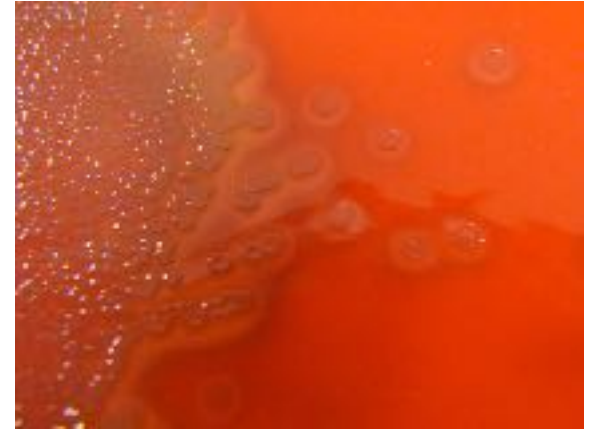
Influenza:

- Influenza: orthomyxoviridae, segmented RNA genome which undergoes antigenic shift and drift, therefore need annual vaccine.
- Types of vaccines: generally inactivated vaccines but can now use live attenuated influenza vaccine (LAIV, Flumist) for healthy non pregnant adults aged 2-49.
- While efficacy is suboptimal, the vaccine attenuates influenza associated disease and reduces risk of hospitalization or death (NEJM, 2007; 357: 1373-1381).
- Indications:
 - High risk of influenza complication or hospitalization (chronic medical problems, immunocompromised, long term care residents, age > 65, children > 6 months, pregnant women).
 - People capable of transmitting to those at high risk (i.e. especially health care workers).



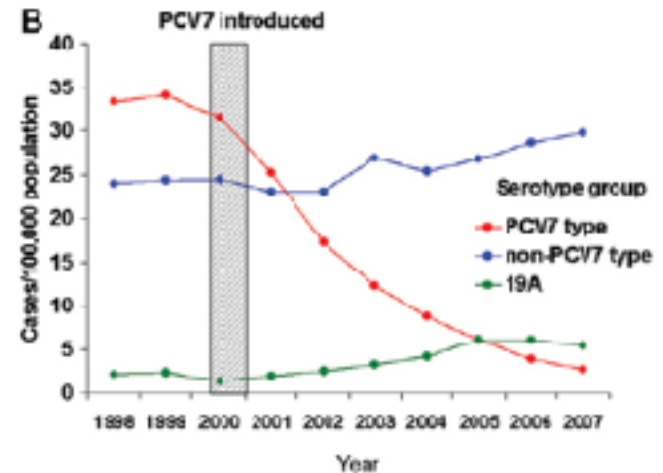
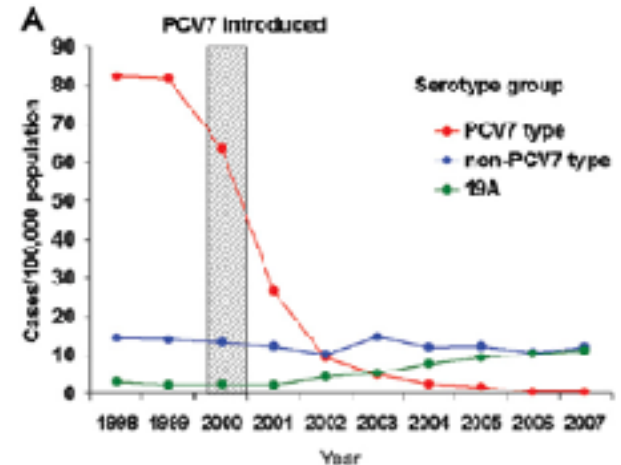
Pneumococcus:

- Streptococcus pneumoniae.
- Colonizes nasopharynx of 5-10% of adults and 20-40% of kids (even more in daycare!).
- Virulence: **CAPSULE**: at least 91 different serotypes.
- Clinical:
 - **Community acquired pneumonia:**
 - 30-50% of CAP (other bugs include S. aureus, H. influenzae, respiratory viruses, gram negatives).
 - **Meningitis:**
 - Most common bug in adults and kids > 6m immunized for H. influenzae.
 - Other: sinusitis, bacteremia/sepsis, etc.



Pneumococcus:

- Vaccine recommended if ≥ 65 or ≤ 65 and immunocompromised.
- Polysaccharide vaccination (PPSV23 AKA Pneumovax):
 - Capsular material from 23 serotypes that historically cause 75-85% of disease.
 - Immune response: T cell independent with poor immunologic memory.
 - Infants and toddlers do not respond well.
- Protein conjugated vaccination (AKA Prevnar):
 - Capsular polysaccharide covalently linked to diphtheria toxin like protein.
 - Immune response: T cell dependent with good immunologic memory.
 - Stimulates good antibody response in infants and toddlers, also improved mucosal immunity.
 - PCV7 (2000); PCV13 (2011)



IPD In children (A) and adults (B) following introduction of PCV7, Black, Pediatr Infect Dis J, 2000

Current recommendations (CDC):

- Adults > 65 immunocompetent:
 - **No past vaccine: PCV13 then PPSV23 at 1y.**
 - PPSV23 after age 65: give PCV13, at least 1 year later than PPSV23.
 - One or more doses of PPSV23 < 65: give PCV13 at least one year after last PPSV23 dose. PPSV23 at least one year after PSV13 and 5 years after most recent PPSV23.
 - PSV13 before age 65: give PPSV23, at least 1 year after.
 - Both PSV13 and PPSV23 before age 65: give PPSV23 at least one year after PSV13 and 5 years after most recent PPSV23.
- Adults > 19 immunocompromised or functional/anatomic asplenia:
 - **No past vaccines: PCV13 then PPSV23 at least 8 weeks after, and then again after at least 5 years.**
 - Past PPSV23: PCV13 at least one year later, then PPSV23 at least 8 weeks after, and then again after at least 5 years.
 - Past PPSV23 2 doses: give PSV13 at least one year after most recent PSV13 dose.
 - Past PSV13: give PPSV23 at least 8 weeks after, and then again after at least 5 years.
- **Aged 19-64 with chronic medical conditions (CHF, asthma/COPD, CLD, alcoholism, DM, smokers): PPSV23.**
 - At age ≥ 65 , give PCV13 (at least one year after PPSV23), then PPSV23 at least one year after PCV13 and at least five years after PPSV23.
- Give vaccines at least two weeks prior to planned splenectomy and as soon as possible in adults with newly diagnosed symptomatic or asymptomatic HIV infection.

Annual Impact of HPV Infection in Canada

- HPV associated with cervical , vulvar, and vaginal cancer in females, penile cancer in males, and anal/oropharyngeal cancer in both males and females.
- Burden of HPV infection also includes cervical pre-cancers, including CIN 2/3 and adenocarcinoma in situ. Majority of HPV associated cancers are caused by HPV 16 or 18, all targeted in 2vHPV, 4vHPV, and 9vHPV.
- In USA< about 64% of invasive HPV associated cancers are associated with 16 and 18. (about 21,300 annual cases), 10% associated with the five additional subtypes in 9vHPV (31, 33, 45, 52, and 58).
- HPV 6 and 11 cause most cases (>90%) of anogenital warts and recurrent respiratory papillomatosis.

HPV vaccination:

- For males and females, use of 4vHPV, or 9vHPV recommended in 3 dose primary series routinely at age 11-12 and for those aged 13-26.
- Recommended for MSM and immunocompromised.
- Primary series consists of three doses with second dose minimum 4 weeks after first, minimum interval 12 weeks to third dose.

VZV:

- Clinical: primary varicella infection (C. pox), re-activation (zoster), reactivation complications (PHN - higher incidence and severity in elderly)
- Primary vaccination:
 - Adults without evidence of immunity to Varicella (clinical or lab confirmed disease) should receive a two dose primary vaccination series.
 - Emphasis on those close to high risk persons or those at high risk of exposure (HCW, teachers, etc.).
 - Assess for immune status in pregnancy and vaccinate post partum if not immune.
- For Herpes Zoster:
 - Single dose recommended for adults > 60, regardless of past reports of clinical zoster.
 - Can consider in adults > 50 yo.
 - Efficacy of vaccine for preventing zoster 70% age 50-59, 64% 60-69, and 38% > age 70 (but efficacy for PHN 66% age 60-69 and 67% > age 70).
- Live vaccines, CI in pregnancy, HIV @ CD4 < 200, and immunocompromising conditions.



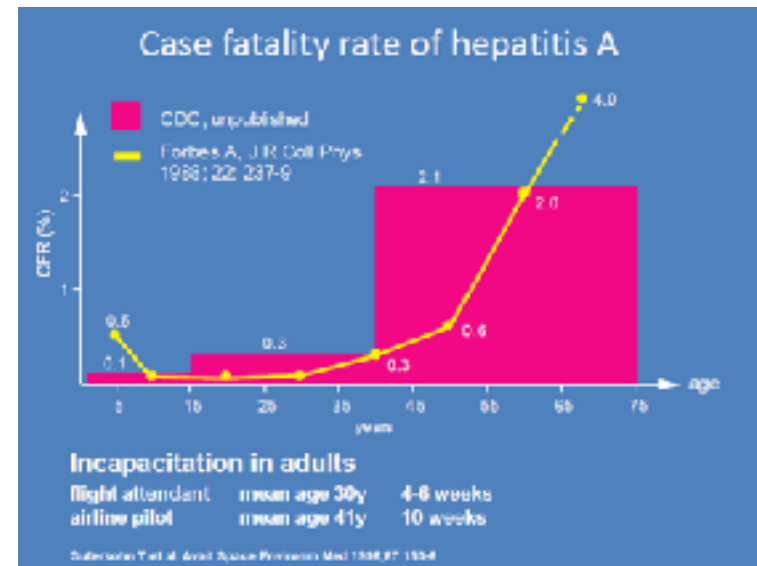
Herpes Zoster

Vaccines for persons with specific risk factors:



Hepatitis A Virus:

- Human reservoir with shellfish rarely implicated, fecal oral transmission.
- Mean incubation 28 days, ILI and hepatitis which can be fulminant (and higher likelihood of severe hepatitis with higher age).
- No antiviral treatment.
- Vaccinate any person at risk including the following high risk groups (for acquisition or complication of infection):
 - MSM
 - IVDU
 - Working with HAV infected primate or in HAV lab.
 - CLD
 - Travellers to endemic areas.
- Single dose formulation (Havrix) can be given in two dose schedule at 0 and 6-12 months. With co-formulated HAV/HBV (Twinrix) usually at 0, 1, and 6 months.



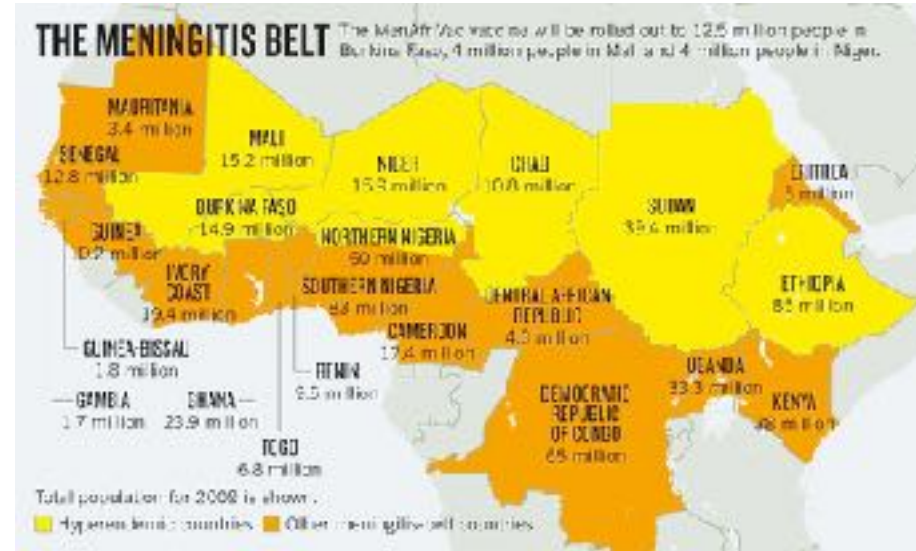
Hepatitis B Virus:

- Blood borne virus, chronic infection in minority of infected adults. Leading cause of HCC worldwide.
- Vaccinate persons with the following risk factors:
 - Sexually active persons not in monogamous relationship, persons with concurrent STI, IVDU and MSM.
 - HCW and public safety workers.
 - Patients at higher risk of exposure or complication: DM, HD, HIV, CLD
 - Household contacts of Sag+ patients
 - Travellers to endemic areas.
 - Institutions.
- Administer doses to complete 3 dose series in those not vaccinated or incompletely vaccinated. Second dose at least 1 month following first, and third at least 4 months following the first.



Meningococcus:

- Serogroup A, C, W and Y vaccine available as conjugate (MenACWY, Menactra, Menveo) or a polysaccharide (MPSV4, Menomune) vaccine.
- Target vaccination in functional and anatomic asplenia, complement deficiency, or high risk for exposure.
- MenACWY vaccine preferred for adults <55 with vaccine indication, and for those ≥ 55 previously vaccinated with MenACWY who need booster.
 - Generally two doses separated by four months.
- Can use MPSV4 in adults ≥ 56 who are not previously vaccinated and need protection in context of outbreak.
- Revaccination every 5 years with MenACWY recommended for those at high risk (complement deficiency, functional or anatomic asplenia).
- Use MenACWY in travellers to high risk areas, military recruits, and first year university students.
- Men B:
 - Serogroup B vaccine now available as 2 dose Men-B-4C vaccine (Bexsero) given at least one month apart.
 - Vaccination recommended for persons ≥ 10 who are at risk for Serogroup B meningococcal disease.
 - May be given concurrently with MenACWY



Haemophilus influenzae type B (Hib):

- One dose of vaccine should be given to all person with functional or anatomic asplenia or SCD, or who are undergoing splenectomy and have not previously been given Hib vaccine.
- Suggest vaccination 14 or more days prior to splenectomy.
- Patients given HSCT should be vaccinated with 3 dose regimen 6-12 months after successful transplant, regardless of vaccination history.

Special circumstances:

- Travel, may also wish to consider vaccinating for:
 - Yellow fever virus
 - Japanese encephalitis virus
 - Typhoid oral or injectable, Cholera
- Occupational, may also wish to consider vaccinating for:
 - Rabies

Adult Splenectomy Vaccines

Documentation for Primary Care Provider and Public Health

Please complete and forward to patient's primary care provider and local public health office on discharge.

From: _____	
Phone: _____	Fax: _____
To: Dr. _____	To: Local Public Health Office
Fax#: _____	Fax #: _____
Re: Patient Name: _____	
HCN: _____	
D.O.B.: _____	

Asplenic patients are known to be at risk of infection, and are particularly susceptible to encapsulated organisms. Vaccinations are recommended to reduce the risk of infection in this patient population.

Your patient received the following vaccinations while in hospital after splenectomy. Please update your records and note the patient's need for future vaccinations.

Meningococcal ACWY-135 conjugate vaccine (MENACTRA + MENVEO)

G: 40mg, 2 vaccines split

Date 1st dose given: _____

Lot# _____

Dose _____

Administration Site: _____

Date 2nd dose given: _____

Lot# _____

Dose _____

Administration Site: _____

A booster is recommended every 5 years.

Hemophilus influenzae type b conjugate vaccine (ACT-HIB)

Dose given: _____

Lot# _____

Dose _____

Administration Site: _____

Pneumococcal 13-valent conjugate vaccine (PREVNAR 13)

Dose given: _____

Lot# _____

Dose _____

Administration Site: _____

Pneumococcal polysaccharide vaccine (PNEUMOVAX 23) due 8 weeks after pneumococcal 13-valent conjugate vaccine (PREVNAR 13)

Dose given: _____

Lot# _____

Dose _____

Administration Site: _____

A single booster dose of pneumococcal polysaccharide vaccine is recommended after 5 years.

- Yearly influenza vaccine recommended

If you have any questions regarding these vaccinations please call the numbers above, or contact the Department of Public Health for further information.

Thank you

This message is CONFIDENTIAL. If you received this letter by mistake, please notify us immediately.

Wallet card for Asplenic Patients

Please complete card and give to patient on hospital discharge.

Medical Alert Asplenic Patient
Patient Name: _____ Physician Name: _____ Physician Phone: _____
Patient is at risk of potentially fatal, overwhelming infections. Medical attention required for: <ul style="list-style-type: none"> • Signs of infection- fever > 38°C, sore throat, chills, unexplained cough. • Tick and animal bites/scratches.
Vaccination Record
Patient has received the following vaccinations: <ul style="list-style-type: none"> <input type="checkbox"/> Meningococcal ACWY-135 conjugate vaccine (MENACTRA + MENVEO) 2 doses 8 weeks apart Date 1st dose given: _____ Date 2nd dose given: _____ <input type="checkbox"/> Meningococcal ACWY-135 conjugate vaccine booster (MENACTRA + MENVEO) Dose due every 5 years Date given: _____ <input type="checkbox"/> Pneumococcal 13-valent conjugate vaccine (PREVNAR 13) Date given: _____ <input type="checkbox"/> Pneumococcal polysaccharide vaccine (PNEUMOVAX 23) Date due: 8 weeks after pneumococcal 13-valent conjugate vaccine (PREVNAR 13) Date given: _____ <input type="checkbox"/> Pneumococcal polysaccharide booster (PNEUMOVAX 23) Date due: single dose 5 years after initial vaccine Date given: _____ <input type="checkbox"/> Hemophilus influenzae type b conjugate vaccine (ACT-HIB) Date given: _____



Recommended Adult Immunization Schedule—United States—2016

Note: These recommendations must be read with the footnotes that follow containing numbers of doses, intervals between doses, and other important information.

Figure 1. Recommended immunization schedule for adults aged 19 years or older, by vaccine and age group¹

Vaccine ²	MMWR ³	19–24 years	25–64 years	65–74 years	75–79 years	80–89 years	≥90 years	
Influenza ⁴		1 dose annually						
Tetanus, diphtheria, pertussis (Td/Tdap) ⁵		Substitute Tdap for Td once, then Td booster every 10 yrs						
Varicella ⁶		2 doses						
Human papillomavirus (HPV) female ⁷		3 doses						
Human papillomavirus (HPV) male ⁸		3 doses						
Zoster ⁹						1 dose		
Meningococcal conjugate (MenACWY) ¹⁰		1 or 2 doses depending on indication						
Polysaccharide pneumococcal (PPV23) ¹¹		1 dose						
Polysaccharide tetanus toxoid (PPV21) ¹²		1 or 2 doses depending on indication						
Hepatitis A ¹³		2 or 3 doses depending on vaccine						
Hepatitis B ¹⁴		3 doses						
Meningococcal outer capsule (MenB) ¹⁵ or polysaccharide (PPV21) ¹⁶		1 or more doses depending on indication						
Meningococcal (MenT) ¹⁷		2 or 3 doses depending on vaccine						
Acyclovir influenza type B (IAZI) ¹⁸		1 or 3 doses depending on indication						

¹ Based on the Advisory Committee on Immunization Practices

Yellow: Recommended for all persons who meet the age requirement for immunization or vaccination or lack evidence of past infection; more details recommended regardless of previous exposure
Purple: Recommended for persons with risk factors (medical, occupational, lifestyle, or other indications)
White: No recommendation

² Report all clinically significant post-vaccination reactions to the Vaccine Adverse Event Reporting System (VAERS). Reporting forms and instructions are available at <http://www.cdc.gov/vaers> or by telephone, 800-338-2300. Toll-free information how to file a vaccine injury compensation claim is available at www.hhs.gov/vaccine-compensation or by telephone, 800-338-2300. Toll-free information on the U.S. Court of Federal Claims (USCF) is available at www.uscf.gov.
³ Additional information about the various tables is available. Contact information for assistance is available at www.cdc.gov/vaccines or from the CDC WAC Contact Center (CDC WAC CC) at 1-800-458-5231, 900 L St., Silver Spring, MD 20910.
⁴ Use of these services is a commercial service for providers; only vaccines not easily administered by the U.S. Department of Health and Human Services.
⁵ The recommendations in this schedule were approved by the Centers for Disease Control and Prevention (CDC) Advisory Committee on Immunization Practices (ACIP), the American Academy of Family Physicians (AAFP), the American College of Physicians (ACP), the American College of Obstetrics and Gynecology (ACOG), and the American College of Nurse-Midwives (ACNM).

Figure 2. Vaccines that might be indicated for adults aged 19 years or older based on medical and other indications¹

Vaccine ²	MMWR ³	Indication	HPV infection (male) ⁴	HPV infection (female) ⁵	Other risk factors (MIR) ⁶	Being followed, not on treatment or hospitalized ⁷	Recent travel, including alcohol consumption ⁸	Exposure and persistent contact with individuals ⁹	Classic West Nile virus ¹⁰	Diabetes ¹¹	Healthcare personnel ¹²
Influenza ¹³			<200	>200							
Tetanus, diphtheria, pertussis (Td/Tdap) ¹⁴											
Varicella ¹⁵		Contraindicated									
Human papillomavirus (HPV) female ¹⁶											
Human papillomavirus (HPV) male ¹⁷											
Zoster ¹⁸		Contraindicated									
Meningococcal conjugate (MenACWY) ¹⁹		Contraindicated									
Polysaccharide pneumococcal (PPV23) ²⁰											
Hepatitis A ²¹											
Hepatitis B ²²											
Meningococcal outer capsule (MenB) ²³ or polysaccharide (PPV21) ²⁴											
Meningococcal (MenT) ²⁵											
Acyclovir influenza type B (IAZI) ²⁶											

Yellow: Recommended for all persons (except for age requirement, lack documentation of vaccination, or lack evidence of past infection); more details in vaccine information statement (VIS) or package insert
Purple: Recommended for persons with risk factors (medical, occupational, lifestyle, or other indications)
White: No recommendation
Red: Contraindicated

¹ These vaccines and/or their recommended age groups are not medical interventions which administration of vaccines to immunocompetent individuals is primarily recommended for adults aged 19 years or older. For all vaccines being recommended in the Adult Immunization Schedule, immunocompetent adults are not to be vaccinated regardless of the time that has elapsed since the last dose of the vaccine. Contraindications include severe allergic reactions to any component of the combination or individual ingredients of the vaccine other than those listed in the package insert. For all combination and individual vaccines included in the Adult Immunization Schedule, the Advisory Committee on Immunization Practices (ACIP) has determined that the vaccine is safe and effective. Use of trade names and commercial names is for identification only and does not imply endorsement by the U.S. Department of Health and Human Services.

Summary:

- Canadian adults > 18 should be regularly assessed to ensure recommended vaccinations are up to date.
- There are six vaccines that should be regularly assessed for all healthy adults and 4 vaccines that need to be considered for those with specific risk factors.
- Other vaccinations can be considered in specific circumstances, primarily related to travel or occupational exposures.

**Get
Vaccinated**



Questions and discussion:

