



Health and Wellness

# Influenza Illness and Immunization

Learning Module  
2016 - Part I

Immunization & Vaccine Preventable Disease  
Coordinator

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# Objective

1. Review influenza disease
2. Review influenza vaccines
3. Promote immunization (to prevent influenza illness)

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# What is Influenza Illness?

- Respiratory infection
- Caused primarily by Influenza A and B viruses
- Late fall and winter months



# Symptoms (Primary Illness)

## Sudden onset of:

- ▶ high fever
- ▶ muscle aches
- ▶ cough
- ▶ chills
- ▶ throat irritation

## • Other symptoms:

- ▶ headache
- ▶ fatigue
- ▶ loss of appetite
- ▶ watery eyes/runny nose  
/sneezing



# Complications (secondary illness)

- ear infection
- viral pneumonia
- secondary bacterial pneumonia
- worsening of underlying conditions
- death



# How Common is Influenza Illness?

- 10-20% of population infected annually
  - Highest rates in children aged 5-9 years
  - 20-30% of all children
- Rates of serious illness and death highest
  - 65 year of age and older
  - Those with chronic illness
  - Children under 2 years



# PEI 2015-16 Season Summary

- Lab confirmed 71 (A- 94%) (B- 6%)
- Hospitalizations 39 (with 2 in ICU and 1 death)
  - ▶ Average LOS- 5.6 days
- Outbreaks- 7
  - ▶ Influenza A- 3
  - ▶ Influenza B- 0
  - ▶ ILI- 2
  - ▶ Other Respiratory- 2



# Types of Influenza Virus

- Influenza A
  - ▶ most common
  - ▶ more widespread
- Influenza B
  - ▶ tends to be more localized





# Influenza A

- Subtypes based on surface proteins:
  - ▶ Haemagglutinin: **enter** & **destroy** cell
  - ▶ H<sub>1</sub>, H<sub>2</sub>, H<sub>3</sub>,... H<sub>18</sub>
  - ▶ Neuraminidase: **exit** & **spread** among other cells
  - ▶ N<sub>1</sub>, N<sub>2</sub>,... N<sub>11</sub>

## 2016-2017 Influenza Strains

- A/California/7/2009 (H1N1)pdm09-like strain
- A/Hong Kong/4801/2014 X-263B (H3N2)- like strain



# Influenza B

- Less frequent change on surface proteins

## 2016-2017 Influenza Strains

- B/Brisbane/60/2008-like strain
- B/Phuket/3073/2013-like strain

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# What Vaccine does:

## Immunity to these HA and NA proteins

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# What the vaccine does:

## Immunity to the HA and NA Proteins

- reduces likelihood of infection
- lessens severity of disease if infection occurs

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# How is Influenza Spread?

1. Droplets spread by coughing and sneezing OR direct contact with secretions
2. Enters nose and throat (replicates here)
3. Infects cells of upper respiratory system (causing swelling and inflammation)
4. Proceeds to trachea and lungs
5. Enters bloodstream (first symptoms begin to show)



# When is Influenza Virus Communicable?

- Incubation usually 2 days but ranges 1-4
- **Adult** spread 1 day before symptoms to 5 days after
- **Children and those with weakened immune** systems infectious for longer
- Children often mild symptoms but highly contagious



# Burden of Influenza Disease on Canadian Society per year

- Over 12,000 hospitalizations
- 3,500 deaths due to pneumonia related to influenza
- 1.5 million work days lost

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# How can Influenza be Prevented?

- Annual influenza immunization
- Hand hygiene
- Covering coughs and sneezes
- Stay home when ill

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# Influenza Vaccine

- Safe and well tolerated
- Remember...

Immunity to these HA and NA surface proteins:

Infection



Severity



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# Influenza Vaccine

- Currently many approved in Canada and on market
  - Some products developed for specific populations (eg. LAIV for ages 2-59 years, available for ages 2 and up to age 17 years)
  - Both B strains recommended for children due to burden in this age group
  - A-TIV only for aged 65 and older (PEI uses in LTC and CCF)



## 2016-2017 on PEI

Three Vaccines being purchased

1. Fluzone and FluLaval- Quadrivalent (QIV)
2. Fluvad- Trivalent with Adjuvant (A-TIV)
3. Flumist- Live Attenuated Influenza Vaccine (LAIV) (QIV)

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1.

a) Fluzone – QIV

- Inactivated vaccine
- All persons aged 6 months and older can receive
- Prefilled syringe (single dose)
- Children dose: 0.5
  - ▶ Receive 2 doses if age < 9 yrs and first time receiving
  - ▶ Doses one month apart
  - ▶ Egg allergy NO Longer Contraindicated

b) FluLaval Tetra – QIV

- Multi-dose vial

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## 2) Flud - A-TIV

- Inactivated Vaccine
- Available for:
  - residents of LTC and CCF aged 65 and over
  - awaiting placement in LTC (but still in acute)
  - 2000 doses ordered
  - prefilled syringe
- More immunogenic for elderly (higher antibody response)



## 2) Flud - A-TIV

Different adjuvant than in many vaccines

1. Local immune stimulatory effect at injection site
2. ↑ influx of macrophages and monocytes and attracts more innate immune cells
3. ↑ transport of antigen to lymph nodes
4. Improved T-cell priming to develop immunity



### 3) FluMist – QIV

- Live vaccine
- Approved for ages 2-59 years but...
  - ▶ available in PEI for ages 2-17 years
  - ▶ Contraindicated for those with severe asthma (on oral or high dose glucocorticosteroids or active wheezing), or those with medically-attended wheezing in the past 7 days.
- If less than 9 years need two doses if first time being immunized
- Recommended but not preferred



### 3) FluMist - LAIV

- Many contraindications and precautions
  - For both patient and immunizer
  - Review Product Monograph and [NACI statements \(National Advisory Committee on Immunization\) for LAIV](#)

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### 3) FluMist - LAIV

- Intranasal in divided doses (half in each nostril)
  - Syringe lock mechanism divides doses
- Not for:
  - ▶ Less than 24 months of age
  - ▶ Severely asthmatic
  - ▶ Wheezing in past 7 days
  - ▶ ~~Egg allergic~~—no longer a contraindication ([NACI Statement](#))
  - ▶ Immune compromised



### 3) FluMist - LAIV

- Not for
  - Those who work with immune compromised, patients in hospital or others requiring care
  - Household contacts of immune compromised



### 3) FluMist - LAIV

- Immune response involves both mucosal (UR tract) and systemic immunity (local stimulatory effect)
- Influenza strains in LAIV are cold adapted and temperature sensitive to replicate in nasal area
- Strain attenuated so does not cause illness



# Priority Groups

- High risk of influenza related complications or hospitalization
- Capable of transmitting influenza to those at high risk
- Other (essential community workers, poultry workers)

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# Antibody Protection

- Antibody levels showing protection:
  - By 2 weeks after I/M administration

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# Health Care Workers

- Immunization benefits **both** HCW and patient
- Protects patient (especially the vulnerable)
- Transmission results in significant *morbidity* and *mortality*
- Patient vulnerable and often their response to immunization not as robust
- Reduces illness in the community



# Health Care Worker

- Responsibility to be immunized
- An essential component of *standard of care*
- Less time lost from work

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Health and Wellness

# Influenza Illness and Immunization

Learning Module for Immunizers  
2016 - Part II

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# Objectives of the Module:

- Review protocols for administration of vaccines
- Enable nurses to respond to common questions about influenza illness and immunization
- Identify reliable resources for health professionals and the public to review

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# Protocols for Administration

- Protocols when administering vaccine relate to:
  - ▶ Vaccine storage and handling
  - ▶ Readiness for emergency (anaphylaxis)
  - ▶ Hand hygiene and safety
  - ▶ The vaccine: Product Monograph/[National Advisory Committee on Immunization\(NACI\) stmt](#)
  - ▶ Contraindications of vaccines



# Protocols for Administration

- ▶ Informed consent, fact sheet
- ▶ Patient assessment/checklist
- ▶ Administration of vaccine (site, route)
- ▶ Observation after immunization
- ▶ Reporting of adverse events, follow-up
- ▶ Documentation and Reporting



# Vaccine Storage and Handling

- Store between 2°C and 8°C – biological product
- Place in middle of refrigerator, not door
- NEVER use bar fridge
- Monitor fridge temperature (graph, digital, maximum/minimum thermometer, alarm system)
- Record temperature 2x/day
- Report break in cold chain to CPHO (form)
- Exposure to heat or light are cumulative



# Vaccine Storage and Handling

- Never use a vaccine that has been frozen
- Transport in insulated bag with freeze pack, thermometer
- Protect vaccine with bubble wrap, newspaper, etc.
- In clinic, may use towels or linens
- Do not leave out of fridge or insulated bag on clinic day



# Readiness for an Emergency

- Fainting, breath-holding, anxiety  
versus
- Anaphylaxis
  - ▶ Risk rare (0.4 to 1.8 cases per million doses given)
  - ▶ Life threatening but manageable
  - ▶ Epinephrine kit available

Chart- symptoms and response

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# Hand Hygiene

- Before, After
- Whenever soiled
- Alcohol based sanitizer (70%)
- Safety – biohazard container

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# Checking the Vaccine

- Single dose/Multidose
- Expiry date
- If previously opened (multidose)
- Visual inspection, vaccine color, particles
- Product monograph





# Contraindications of Any Vaccine

- True anaphylactic reaction to previous dose or any vaccine component
- Previous Guillain-Barré Syndrome (GBS) within 6 weeks of any immunization
- People who have experienced oculo-respiratory syndrome (ORS) with lower RT symptoms should have an expert review
- Current febrile illness – return later
- < 6 months of age



# LAIV Contraindications and Precautions

- Children < 24 months
- Individuals with severe asthma on oral or high dose inhaled glucocorticosteroids or active wheezing or those who have been medically attended for wheezing in the past 7 days.
- Children 2 to 17 years receiving aspirin or aspirin-containing therapy
- Pregnant women
- Persons with an immune compromising condition



# Informed Consent

- Verbal or written, voluntary, capacity
- Written information, understandable language
- Must know:
  - ▶ What product is
  - ▶ Benefits and risks
  - ▶ Common side effects
  - ▶ Risk if do not receive



# Patient Assessment

- Well today
- Previous reaction to this vaccine?
- Previous GBS within 6 week of immunization?

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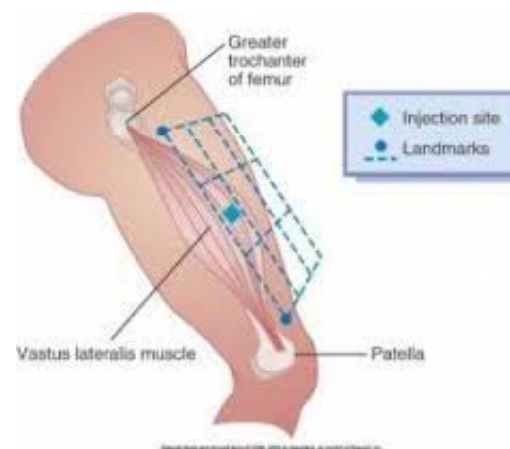
# Patient Assessment

- Assess health conditions with LAIV:
  - ▶ Children < 24 months of age
  - ▶ Pregnant, breastfeeding
  - ▶ Immune compromised
  - ▶ Severe asthmatic
  - ▶ Wheezing in past week



# Administration of Vaccine

- QIV and TIV
  - ▶ I/M
    - vastus lateralis < 1yr
    - deltoid  $\geq$  1 yr,
    - NEVER in buttock
  - ▶ 90° angle
  - ▶ Landmarking (never too high)
  - ▶ Positioning, holding



# Administration of Vaccine

- QIV and A-TIV
- Prefilled but need to add needle
  - ▶ Needle gauge & size
    - IM- 7/8" for infants & small children  
1"-1 1/2" others (depends on size of arm)
    - 25 gauge
  - ▶ Observe 15 (to 30) min after vaccine given



# Common Adverse Events

- Local soreness at site up to 2 days
- Fever, malaise within 6-12 hours, lasting 1-2 days
- Comfort measures  
(may include anti-inflammatory, antipyretic but not ASA in children)





# Serious Adverse Events

- Coincidental or causal
- Report Adverse Event Following Immunization (AEFI) form to CPHO
- Within 24 hours
- Investigate and reply
- Follow-up with patient
- PHAC oversees reporting  
Part of post marketing safety surveillance



# Serious Adverse Events

- Guillain-Barré Syndrome
  - ▶ neurological symptoms with paralysis
  - ▶ Rate estimated at 1 per 1 million immunizations




# Documentation

- What?
  - ▶ Vaccine name, lot #, manufacturer
  - ▶ Date given, site, dose, route of administration
  - ▶ Immunizers signature & designation
  - ▶ Adverse event if occurred
- Where?
  - ▶ Organizations record, chart, or registry
  - ▶ Persons record (date, vaccine given) if asked



# Reporting Requirements

- To CPHO (PH Act and Regulations)
- Electronic or paper

	A	B	C	D
1	 CANADA		DHW Immunization Form 2016-01 Sep 2016	
2			Please return this form by email to:	
3			Chief Public Health Office	
4			Email: <a href="mailto:epidem@ihis.org">epidem@ihis.org</a>	
5				
6	<b>Age (yrs)</b>	<b>Age (mo if under 2 yrs)</b>	<b>Sex</b>	<b>Postal Code</b>
7				
8				
9				
10				
11				
12				
13				

- Instructions of reporting requirements sent to all workplaces
- Any episode of adverse event.



# How would you respond to..?

- Myth #1
- “The vaccine gave me Influenza.”
  - ▶ Not a live virus- it is inactivated
  - ▶ One may be incubating an illness at the time of immunization
  - ▶ Compare symptoms of cold vs. influenza



# How would you respond to..?

- Myth #2
- “I don’t need another flu shot, I got it last year.”
  - ▶ Different strains circulate each year
  - ▶ Immunity wanes over a few months



# How would you respond to..?

- Myth #3
- “I didn’t get influenza vaccine last year and I didn’t get sick.”
  - ▶ Seasonal population epidemiology differs
  - ▶ Last year not a predictor of what may happen this year

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# How would you respond to...?

- Myth #4
- “I’m young and healthy and don’t need it.”
  - ▶ Even healthy people can become ill
  - ▶ Healthy people can spread it
  - ▶ Reduce your chances of infecting someone more vulnerable

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# How would you respond to..?

- Myth #5
- “Influenza is just a bad cold.”
  - ▶ Caused by a different virus
  - ▶ Influenza symptoms are much worse than a cold
  - ▶ Complications from influenza much more severe



# Resources for Health Professionals

- Canadian Pediatric Society - [www.cps.ca](http://www.cps.ca)
- Public Health Agency of Canada- [www.phac-aspc.gc.ca](http://www.phac-aspc.gc.ca)
- Canadian Immunization Coalition- [www.immunize.ca](http://www.immunize.ca)
- IMPACT- Immunization Monitoring Program
  - ▶ <http://www.cps.ca/impact>
- Canadian Immunization Guide (PHAC) <http://www.phac-aspc.gc.ca/publicat/cig-gci/index-eng.php>
- Product Monograph for vaccine
- American Academy of Pediatrics (Red Book), CDC, NIH



# Resources for Parents/Public

- Canadian Pediatric Society (CPS)
- Caring For Kids website
- Your Child's Best Shot
- Parents of Kids with Infectious Diseases- [www.pkids.org](http://www.pkids.org)
- Institute for Vaccine Safety- [www.vaccinesafety.edu](http://www.vaccinesafety.edu)
- Author Paul A. Offit- an American pediatrician specializing in infectious diseases and an expert on vaccines, immunology, and virology

