Reportable Communicable Diseases and the Role of the Laboratory

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BCSLS Congress 2017
Kamloops BC
Outline

- Objectives
- Definitions
- History of Public Health
- Public Health administration; Provincial and Federal
- Role of the laboratory
- Organism specific discussions
- Process improvement in the NHA
Objectives

- Who am I?
- Why is this a topic of interest?
- My experience from QA perspective
  - Risks
  - Gaps
  - Improvements
Case: Family with 6 young children living in a rural community; Youngest child admitted with meningitis.....CSF sent to the lab

**photo is not true patients, from google images**
“Communicable disease”

an illness, due to a specific infectious agent or its toxic products, which arises through the transmission of that agent or its product
(a) directly from an infected person or animal, or
(b) indirectly through the agency of an intermediate host vector or the inanimate environment”

1
“Reportable Communicable Disease”

“means a disease
(a) listed in Schedule A or B, or
(b) which becomes epidemic or shows unusual features”

In general – if a laboratory isolates one of these listed diseases/organisms, they are legislated to report their findings to Public Health
LIST OF REPORTABLE COMMUNICABLE DISEASES IN BC
July 2009

Schedule A: Reportable by all sources, including Laboratories

Acquired Immune Deficiency Syndrome
Anthrax
Botulism
Brucellosis
Chancroid
Cholera
Congenital Infections:
    Toxoplasmosis
    Rubella
    Cytomegalovirus
    Herpes Simplex
    Varicella-Zoster
    Hepatitis B Virus
    Listeriosis and any other congenital infection
    Creutzfeld-Jacob Disease
    Cryptococcal Infection
    Cryptosporidiosis
    Cylindrospora Infection
    Diffuse Lamellar Keratitis
    Diphtheria
    Cases
    Carriers
    Encephalitis:
        Post-infectious
        Subacute sclerosing panencephalitis
        Vaccine-related
        Viral
    Foodborne Illness:
        All causes
    Gastroenteritis epidemic:
        Bacterial
        Parasitic
        Viral
    Genital Chlamydia Infection
    Giardiasis
    Gonorrhea – all sites
    Group A Streptococcal Disease, Invasive
    HIV and H7 strains of the Influenza virus
    Haemophilus Influenzae Disease,
        All Invasive, by Type
    Hantavirus Pulmonary Syndrome
    Hemolytic Uremic Syndrome (HUS)
    Hemorrhagic Viral Fevers
    Hepatitis Viral:
        Hepatitis A
        Hepatitis B
        Hepatitis C
        Hepatitis E
        Other Viral Hepatitis
    Human Immunodeficiency Virus Infection
    Leprosy
    Lyme Disease
    Malaria
    Meningitis: All causes
        (i) Bacterial:
            Haemophilus
            Pneumococcal
        Other
        (ii) Viral
    Mumps
    Neonatal Group B Streptococcal Infection
    Paralytic Shellfish Poisoning (PSP)
    Pertussis (Whooping Cough)
    Plague
    Poliomyelitis
    Rabies
    Reye Syndrome
    Rubella
    Severe Acute Respiratory Syndrome (SARS)
    Smallpox
    Streptococcus pneumoniae Infection, Invasive
    Syphilis
    Tetanus
    Transfusion Transmitted Infection
    Tuberculosis
    Typhoid Fever and Paratyphoid Fever
    Waterborne Illness
    All causes
    West Nile Virus Infection
    Yellow Fever

Schedule B: Reportable by Laboratories only

All specific bacterial and viral stool pathogens:
(i) Bacterial:
    Campylobacter
    Shigella
    Yersinia
(ii) Viral
    Amoebiasis
    Borrelia burgdorferi Infection
    Cerebrospinal Fluid Micro-organisms
    Chlamydial Diseases, including Psittacosis
    Creutzfeldt-Jacob Disease
    Cryptococcal Infection
    Herpes Genitalis
    Human Immunodeficiency Virus Infection
    Influenza Virus, including the H9 and H7 strains
    Legionellosis
    Leptospirosis
    Listeriosis
    Malari
    Q Fever
    Rickettsial Diseases
    Severe Acute Respiratory Syndrome (SARS)
    Smallpox
    Typhus
    West Nile Virus Infection

As per Health Act Communicable Disease Regulation B.C. Reg. 4/83 O.C. 6/83
includes amendments up to B.C. Reg. 70/2008, April 10, 2008
http://www.gp.gov.bc.ca/statreg/reg/H/Healthb4_83.htm
“Public Health”  
(from PHAC – federal)

“Public health involves the organized efforts of society to keep people healthy and prevent injury, illness and premature death. It is a combination of programs, services and policies that protect and promote the health of all Canadians. Public health includes activities like immunization, healthy eating and physical activity programs, infection control measures in hospitals, along with the detection, lab testing and regulation that support these activities. By helping keep Canadians healthy, public health can relieve some of the pressure on the health-care system.”

2
From office of the provincial health officer of BC

“Public health shares the same overall goals as the rest of the health system: reducing premature death and minimizing the effects of disease, disability, and injury. However, public health achieves these goals by focusing “upstream” through preventing illness, and protecting and promoting health and well-being” ³
Not to be confused with **public health care**

“Health care, sometimes referred to as the public health-care system, focuses mainly on treating individuals, while public health targets entire populations to keep people from becoming sick or getting sicker. Both work to limit the impacts of disease and disability.”

---

1. Not to be confused with **public health care**

2. “Health care, sometimes referred to as the public health-care system, focuses mainly on treating individuals, while public health targets entire populations to keep people from becoming sick or getting sicker. Both work to limit the impacts of disease and disability.”
“Individual”
A single person, distinct from group, class, family
Lab isolates a Shigella from an individual with complaints of diarrhea (and reports to PH)

“Population”
A particular section, group, or type of people or animals living in an area or country.
Several individuals living within a group setting have complaints of diarrhea; all have Shigellosis as confirmed by the laboratory; by receiving reports from the lab, PH has connected the cases to a specific population
“Surveillance”

Systematic, ongoing collection, collation, and analysis of health-related information that is communicated in a timely manner to all who need to know which health problems require action in their community. Surveillance is a central feature of epidemiological practice, where it is used to control disease. Information that is used for surveillance comes from many sources, including reported cases of communicable diseases, hospital admissions, laboratory reports, cancer registries, population surveys, reports of absence from school or work, and reported causes of death. (A public health system core function.)
11.1 Shigellosis Rates by Year, 2006-2015

<table>
<thead>
<tr>
<th>Year</th>
<th>Reports</th>
<th>BC Rate</th>
<th>Canadian Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>170</td>
<td>4.01</td>
<td>1.99</td>
</tr>
<tr>
<td>2007</td>
<td>272</td>
<td>6.34</td>
<td>2.53</td>
</tr>
<tr>
<td>2008</td>
<td>203</td>
<td>4.67</td>
<td>2.26</td>
</tr>
<tr>
<td>2009</td>
<td>194</td>
<td>4.40</td>
<td>2.05</td>
</tr>
<tr>
<td>2010</td>
<td>189</td>
<td>4.23</td>
<td>2.68</td>
</tr>
<tr>
<td>2011</td>
<td>161</td>
<td>3.68</td>
<td>3.09</td>
</tr>
<tr>
<td>2012</td>
<td>175</td>
<td>3.85</td>
<td>3.08</td>
</tr>
<tr>
<td>2013</td>
<td>141</td>
<td>3.08</td>
<td>1.94</td>
</tr>
<tr>
<td>2014</td>
<td>150</td>
<td>3.23</td>
<td>2.21</td>
</tr>
<tr>
<td>2015</td>
<td>182</td>
<td>3.89</td>
<td></td>
</tr>
</tbody>
</table>

Rate per 100,000 population.
Percentage of respiratory specimens that tested positive for influenza
By influenza transmission zone

Status as of 01 September 2017

Note: The available country data were joined in larger geographical areas with similar influenza transmission patterns to be able to give an overview (www.who.int/influenza/surveillance_monitoring/updates/EN_GIP_Influenza_transmission_zones.pdf). The displayed data reflect reports of the week from the 07 August 2017 to 20 August 2017, or up to two weeks before if not sufficient data were available for that area.

The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

Data Source: Global Influenza Surveillance and Response System (GISRS), FluNet (www.who.int/influenza).
“Epidemiology”

- A science based on observation, inference, and experiment, to evaluate therapeutic and preventive regimens aimed at controlling health conditions.

- Laboratory Technologist = ‘what’

- PH Epidemiologists =‘who’, ‘where’, ‘why’
  - improve the health of affected populations in the future

- “Two regional outbreaks of Shigella sonnei were reported in 2015; one in a homeless shelter and one associated with a restaurant. Each outbreak had four lab-confirmed cases identified.”
“Outbreak”
When an occurrence of events (such as infections) exceeds expected numbers

“Endemic”
Presence of a disease at a known or expected level, within a given geographic area or population

“Epidemic”
The occurrence in a specific population of deaths or cases of a condition in numbers greater than usual expectation for a given time.

“Pandemic”
An epidemic that transcends national boundaries and extends over much or all of the world.
Pertussis, 2015

Note that several health regions are comprised of separated geographical areas.

Footnotes
1 Confirmed and epidemiologically linked cases are collected from the health regions in British Columbia through Panorama based on the date reported to the health authority as of June 2016.


3 National rates are provided by the Public Health Agency of Canada, Division of Surveillance and Epidemiology.

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History of Public Health
History of Public Health

- 1795: Quarantine Act of Lower Canada
  - Typhus and smallpox control
- 1890: First Public Health Laboratory est. in Ontario
  - One physician and one stableboy/dishwasher
- 1894-97: more labs est. in Nova Scotia, Quebec, and Manitoba
  - Testing of milk, water, and meat; investigating suspected cases of diphtheria and typhoid; rabies outbreaks
- Early 1900s; preparation of vaccines and antitoxin
History of Public Health

- 1940s: Diagnosis of VD and associated challenges
- 1950s: Government sponsored health care, which included funding of diagnostics
- 1960s-1970s: Global travel brings needs for better diagnosis of emergent pathogens
- 1976: Ontario built a level 4 Lab – was never opened – Federal Lab in Winnipeg 1999
- 1980s: HIV/Hep C contaminated blood supply
Administration of Public Health Federally

- Public Health Agency of Canada
  - Infection Control guidelines
  - National surveillance
  - Lab Biosafety and Biosecurity
    - includes HPTA licensing
  - Pathogen Safety Data Sheets and Risk Assessment
  - Biosafety Directive, Advisories and Notifications

- Plus many more guidelines, programs
Canadian Biosafety Handbook, Second Edition

Second Edition
May 26, 2016

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  - 1.2 Overview
  - 1.3 The Canadian Biosafety Standard
  - 1.4 How to Use the Canadian Biosafety Handbook
- CHAPTER 2 - BIOLOGICAL MATERIAL
  - 2.1 Bacteria
  - 2.2 Viruses
Administration of Public Health Provincially (BC)

- Health Act – legislates all communicable diseases to be reported in BC
- Office of the Provincial Health Officer
  - Medical Health Officers
    - Duties: statutory, managerial, consultation, population health, advocacy, and program development
    - Specific responsibilities for communicable disease control
  - Laboratories have policies describing when the MHO should be contacted; understanding and following these policies is very important.
Administration of Public Health Locally – Health Authority

- MHO(s) and CMHO associated with a health authority and/or geographic region
- Recent change from health units to ‘Primary care’
- In NHA, recent change to single reporting hub
  - affect on the lab/communication
Role of the Laboratory

- Various types of labs with unique roles
- 3 broad types:
  - Public Health Laboratory
  - Acute Care Laboratory
  - Community Sector Laboratory

- All 3 have roles in Pre-analytical, analytical, and post-analytical areas
Role of the Laboratory

- Public Health Laboratory
- In BC = BCCDC
  - Provides expertise for detection, identification, characterization of microorganisms, environmental safety and bioterrorism response
  - Only CL3 in BC
  - Provincial reference lab
  - Linked to public health through legislation
  - Informs local public health and provides data to the Federal database
Role of the Laboratory

- Community Sector Laboratory
  - Generally private, out-patient based
  - Simpler test menu
  - Community level of patient care
  - Linked to BCCDC as their reference lab
  - Often pre-analytical – samples referred
  - Linked to public health through legislation

9
Role of the laboratory

- Acute Care Laboratories
  - Routine and complex tests; multiple disciplines
  - Inpatient and outpatient
  - Identifies agents of communicable disease, reports and refers as required
  - Linked to public health through legislation
  - Linked to BCCDC as their reference lab
  - May conduct pre-analytical, analytical, and post analytical work
  - Linked to local infection control\(^9\)
Figure 1: Hierarchy of Sample Flow in the Provincial Network

- Some samples referred to national or international referral centres
- Some samples referred to provincial public health laboratories
- Some samples referred to regional “hub” laboratories
- Public health or clinical questions asked and samples sent to local community or hospital laboratories
Role of the Laboratory

- Identify microorganisms
- Communicate with Public Health
  - Manual or integrated databases
  - Time is important
  - Phone call to MHO may be required
- Refer samples for further testing as required
Figure 2: Event Recognition, Verification, and Response

- Number of People Affected
- Time: Minutes, Hours, Days, Weeks, Years
- Red line: Early intervention
- Blue line: Delayed intervention
- Arrows indicating Event recognition, Verification, and Response
Role of the Laboratory

- QMS system
  - "Poor quality laboratory data can produce poor public health outcomes"
  - Accreditation
  - Support for QMS programs
  - Support for program delivery (staffing/training/policies and procedures)
  - Data integration
Major failures in Canada⁹

- HUS in Ontario in 1982; lack of lab infrastructure
- SARS outbreak Ontario 2003; multiple failures including lack of integrated database
- Walkerton E. coli O157:H7; deficient quality assurance, lack of audits
Major successes in Canada⁹

- Shiga-toxin E.coli in Salami in 1999; Early interventions due to investment in expertise, research and technology at BCCDC
- Detection of problems with HIV point-of-care testing in 2002; allowed retesting of thousands improved QA programs for POC
Organism Specific Discussions

- Why do we report?
- Why do we refer for further testing?
- Why is a call to the MHO necessary?
- What does PH do?

Common reportables from a CL2, acute care laboratory with clinical microbiology department
**Neisseria Gonorrhoea**

<table>
<thead>
<tr>
<th>Legislated requirement</th>
<th>reportable from all sites</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Public Health Significance</strong></td>
<td>easily sexually transmissible and often asymptomatic; underreported; becoming drug resistant; complications; coinfections with HIV</td>
</tr>
<tr>
<td>Is reporting to Public Health urgent?</td>
<td>No</td>
</tr>
<tr>
<td>Is referral to BCCDC required?</td>
<td>yes - if from culture</td>
</tr>
<tr>
<td>What additional testing is done?</td>
<td>Susceptibility testing on cultures as a way to monitor resistance</td>
</tr>
<tr>
<td>Is referral urgent?</td>
<td>No</td>
</tr>
<tr>
<td><strong>Public Health's Process:</strong></td>
<td>Partner counselling and referral for potential exposure in the past 60 days</td>
</tr>
<tr>
<td></td>
<td>High risk populations may not only access clinics</td>
</tr>
<tr>
<td></td>
<td>Counselling on harm reduction</td>
</tr>
<tr>
<td></td>
<td>Epidemiology/Surveillance</td>
</tr>
<tr>
<td></td>
<td>Tailored Public Health Programs</td>
</tr>
</tbody>
</table>
16. Genital gonorrhea case reports in BC by age group and gender, 2014

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Reports - Female</th>
<th>Reports - Male</th>
<th>Reports - Other *</th>
<th>Rate - Female</th>
<th>Rate - Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 - 14 yrs</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1.8</td>
<td>0.0</td>
</tr>
<tr>
<td>15 - 19 yrs</td>
<td>76</td>
<td>49</td>
<td>0</td>
<td>58.3</td>
<td>34.7</td>
</tr>
<tr>
<td>20 - 24 yrs</td>
<td>136</td>
<td>235</td>
<td>1</td>
<td>88.9</td>
<td>142.5</td>
</tr>
<tr>
<td>25 - 29 yrs</td>
<td>110</td>
<td>284</td>
<td>1</td>
<td>69.5</td>
<td>180.8</td>
</tr>
<tr>
<td>30 - 39 yrs</td>
<td>104</td>
<td>346</td>
<td>2</td>
<td>33.4</td>
<td>113.2</td>
</tr>
<tr>
<td>40 - 59 yrs</td>
<td>68</td>
<td>334</td>
<td>0</td>
<td>10.0</td>
<td>50.4</td>
</tr>
<tr>
<td>60+ yrs</td>
<td>5</td>
<td>47</td>
<td>0</td>
<td>0.9</td>
<td>9.1</td>
</tr>
</tbody>
</table>

* Other - transgender and gender unknown
### Chlamydia trachomatis\textsuperscript{11,12}

<table>
<thead>
<tr>
<th><strong>Legislated requirement</strong></th>
<th>Genital Chlamydia infection</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PH significance</strong></td>
<td>easily sexually transmissible and often asymptomatic; PID and infertility; coinfections with other STIs; LGV</td>
</tr>
<tr>
<td><strong>Is reporting to Public Health urgent?</strong></td>
<td>no</td>
</tr>
<tr>
<td><strong>Is referral to BCCDC required?</strong></td>
<td>yes - if from male non genital or Lymphogranuloma Venereum (LGV) requested</td>
</tr>
<tr>
<td><strong>What additional testing is done?</strong></td>
<td>DNA sequencing for C. trachomatis confirming serovars of L1, L2, or L3 present</td>
</tr>
<tr>
<td><strong>Is referral urgent?</strong></td>
<td>no</td>
</tr>
</tbody>
</table>

**Public Health’s Process:**
- Partner counselling and referral for potential exposure in the past 60 days
- High risk populations may not only access clinics
- Counselling on harm reduction
- Epidemiology/Surveillance
- Tailored Public Health Programs
Lymphogranuloma venereum

- ‘Re-emerging’ STI = ID and surveillance critical
- More common in MSM population
- Serovar of Chlamydia, infects the lymph glands in the genital area
- Serious sequelae
  - Lymphatic obstruction
  - Colorectal fistulae
  - Genital tissue destruction
## Haemophilus influenzae invasive/epiglottitis

<table>
<thead>
<tr>
<th>legislated requirement</th>
<th>Haemophilus influenzae Disease, all invasive, by type, &amp; epiglottitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH significance</td>
<td>Vaccine preventable (type b); severe and often fatal infection; severe sequelae; droplet transmission; need for contact immuno and or chemoprophylaxis</td>
</tr>
<tr>
<td>Is reporting to Public Health urgent?</td>
<td>yes</td>
</tr>
<tr>
<td>Is referral to BCCDC required?</td>
<td>yes</td>
</tr>
<tr>
<td>What additional testing is done?</td>
<td>Serotyping for type b</td>
</tr>
<tr>
<td>Is referral urgent?</td>
<td>Yes – need to know type for chemoprophylaxis</td>
</tr>
<tr>
<td>Public health's process:</td>
<td>Goal to eliminate preventable cases in children under 5</td>
</tr>
<tr>
<td></td>
<td>immunization to those unvaccinated or incompletely vaccinated, or with chronic conditions</td>
</tr>
<tr>
<td></td>
<td>Chemoprophylaxis with Rifampin - Hib only</td>
</tr>
</tbody>
</table>
Case: Youngest child admitted with meningitis.....CSF sent to the lab
Recent immigrants to Canada; none of the children are vaccinated

**photo is not true patients, from google images**
Case: Youngest child admitted with meningitis.....CSF sent to the lab
CSF culture positive for *Haemophilus influenzae*
Isolate NOT sent to BCCDC, and NOT reported to public health

**photo is not true patients, from google images**
Figure 2: Event Recognition, Verification, and Response

Number of People Affected

Response
Verification
Event recognition

Time: Minutes, Hours, Days, Weeks, Years

Early intervention
Delayed intervention
Case: Youngest child sent to larger hospital...blood cultures sent to that facilities lab
-Blood cultures positive for *Haemophilus influenzae*
-Isolate reported to public health and sent to BCCDC, confirmed as hiB
-Rifampin for contacts, informed discussion on vaccination

**photo is not true patients, from google images**
Haemophilus influenzae invasive/epiglottitis

- Missed or delayed reporting to PH = high risk
  - huge risk to families or communities
  - lack of technologist experience/understanding
  - lack of process controls (no automatic reporting)
- Urgent referral is a challenge for remote sites, even when protocols are followed
- Risks of Rifampin
**Neisseria meningitidis**

<table>
<thead>
<tr>
<th>legislated requirement</th>
<th>Meningococcal disease - all invasive including &quot;primary meningococcal pneumonia&quot; and Primary meningococcal conjunctivitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH significance</td>
<td>Vaccine preventable; severe and often fatal infection; severe sequelae; has known to reach epidemic levels; droplet transmission; need for contact immuno and or chemoprophylaxis</td>
</tr>
<tr>
<td>Is reporting to Public Health urgent?</td>
<td>yes</td>
</tr>
<tr>
<td>Is referral to BCCDC required?</td>
<td>yes</td>
</tr>
<tr>
<td>What additional testing is done?</td>
<td>Serotyping; C, A, Y, W135</td>
</tr>
<tr>
<td>Is referral urgent?</td>
<td>yes</td>
</tr>
<tr>
<td>Public health's process:</td>
<td>Goal to eliminate preventable cases in children under 5</td>
</tr>
<tr>
<td></td>
<td>Chemoprophylaxis of close contacts; rifampin/Cipro/ceftriaxone</td>
</tr>
<tr>
<td></td>
<td>Immunoprophylaxis of close contact based on immune status and serogroup</td>
</tr>
</tbody>
</table>
## Invasive Group A Streptococcus

<table>
<thead>
<tr>
<th>legislated requirement</th>
<th>Group A Streptococcal disease - all invasive</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH significance</td>
<td>Potential risk of nosocomial infection and outbreaks; risk of severe disease; investigation into need for chemoprophylaxis; monitoring of strains/virulence</td>
</tr>
<tr>
<td>Is reporting urgent?</td>
<td>yes - phone call to MHO</td>
</tr>
<tr>
<td>Is referral to BCCDC required?</td>
<td>yes</td>
</tr>
<tr>
<td>What additional testing is done?</td>
<td>Forwarded to National Lab for emm gene (gene that codes for M type surface protein) typing, T-agglutination typing and detection of GAS exotoxins</td>
</tr>
<tr>
<td>Is referral urgent?</td>
<td>no</td>
</tr>
<tr>
<td>Public health's process:</td>
<td>epidemiology</td>
</tr>
</tbody>
</table>

**Chemoprophylaxis generally NOT recommended for contacts (exceptions = severe disease, potentially for LTCF residents, hospital or childcare setting); self monitoring for symptoms**

If chemoprophylaxis recommended: 1st gen cephalosporins, Erythromycin, Clarithromycin, Clindamycin
Figure 52. Regional distribution of *S. pyogenes* emm types

- Eastern (n=43)
- Central (n=837)
- Western (n=414)
# Invasive Streptococcus pneumoniae

<table>
<thead>
<tr>
<th>legislated requirement</th>
<th>Menigitis: Pneumococcal, Streptococcus Pneumoniae infection, Invasive</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH significance</td>
<td>Vaccine preventable - surveillance of serotypes associated with invasive disease; Vaccination rates</td>
</tr>
<tr>
<td>Is reporting urgent?</td>
<td>no</td>
</tr>
<tr>
<td>Is referral to BCCDC required?</td>
<td>yes</td>
</tr>
<tr>
<td>What additonal testing is done?</td>
<td>Forwarded to National Lab for serotyping by Quellung reaction, rpoB gene confirmation, or PCR; AST</td>
</tr>
<tr>
<td>Is referral urgent?</td>
<td>no</td>
</tr>
<tr>
<td>Public health's process:</td>
<td>Assessment of vaccine efficency</td>
</tr>
<tr>
<td></td>
<td>Assessement of vaccination programs - accesibility and education</td>
</tr>
<tr>
<td></td>
<td>Surveillance data informas vaccine composition</td>
</tr>
</tbody>
</table>
Figure 5. Distribution of invasive *S. pneumoniae* serotypes from CSF, 2014

![Bar chart showing percentage distribution of S. pneumoniae serotypes from CSF, 2014.](chart.png)

- **CSF (n=72)**

- **Serotype**
  - PCV7
  - PCV13
  - PPV23
### Streptococcus agalactiae (Group B Strep)\(^{16}\)

<table>
<thead>
<tr>
<th>legislated requirement</th>
<th>Neonatal Group B Streptococcal infection, Meningitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH significance</td>
<td>Prenatal care, surveillance</td>
</tr>
<tr>
<td>Is reporting to Public health urgent?</td>
<td>no</td>
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<tr>
<td>Is referral to BCCDC required?</td>
<td>no (not standardised)</td>
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<tr>
<td>What additional testing is done?</td>
<td>some jurisdictions submit isolates to National lab for serotyping, AST</td>
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<tr>
<td>Is referral urgent?</td>
<td>no</td>
</tr>
<tr>
<td>Public healths process:</td>
<td>Epidemiology</td>
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<td>Surveillance</td>
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</tbody>
</table>
# Listeria

<table>
<thead>
<tr>
<th>_legislated requirement</th>
<th>Congenital infections: listeriosis, Foodborne illness, Listeriosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH significance</td>
<td>Potential for severe disease; congenital disease; food borne = single source may affect large population, Investigation by environmental health required; food recalls may be required; all isolates entered into PulseNet national database</td>
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<tr>
<td>Is reporting to Public health urgent?</td>
<td>high priority (not urgent)</td>
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<tr>
<td>Is referral to BCCDC required?</td>
<td>yes</td>
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<tr>
<td>What additional testing is done?</td>
<td>DNA 'fingerprinting by pulse field gel electrophoresis (PFGE) - to detect clusters of isolates, aides in identifying sources</td>
</tr>
<tr>
<td>Is referral urgent?</td>
<td>no</td>
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<tr>
<td>Public healths process:</td>
<td>Investigation into food safety;</td>
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</tbody>
</table>
Nature's Path brand Coconut & Cashew Butter Crunchy Granola recalled due to Listeria monocytogenes

Starting date: June 14, 2017
Type of communication: Recall
Alert sub-type: Food Recall Warning
Subcategory: Microbiological - Listeria
Hazard classification: Class 1
Source of recall: Canadian Food Inspection Agency
Recalling firm: Nature's Path Foods Inc.
Distribution: Alberta, British Columbia, Manitoba, Saskatchewan
Retail
Extent of the product distribution:
CFIA reference number: 11478

Advisory details
Ottawa, June 14, 2017 - Nature's Path Foods Inc. is recalling Nature's Path brand Coconut & Cashew Butter Crunchy Granola from the marketplace due to possible Listeria monocytogenes contamination. Consumers should not consume the recalled product described below.
Estimates of illness caused by food-borne bacteria, parasites and viruses

Some bacteria, parasites and viruses are responsible for the most illnesses, hospitalizations and deaths in Canada. Yearly estimates for the most common causes are broken down below.

Number of illnesses

- norovirus (1,048,000 or 65% of known causes of food-borne illnesses)
- *Clostridium perfringens* (177,000 or 11%)
- *Campylobacter* spp. (145,000 or 8%)
- *Salmonella* spp., non-typhoidal (87,500 or 5%)

Number of hospitalizations

- norovirus (1,180 or 30% of known causes of food-borne hospitalizations)
- *Salmonella* spp., non-typhoidal (925 or 24%)
- *Campylobacter* spp. (565 or 14%)
- *Escherichia coli* 0157 (245 or 6%)

Number of deaths

- *Listeria monocytogenes* (35 or 33% of known causes of food-borne deaths)
- norovirus (21 or 20%)
- *Salmonella* spp., non-typhoidal (17 or 16%)
- *Escherichia coli* 0157 (8 or 8%)
Malpeque oyster buck a shuck. Hello PEI...

UGH I WISH
# Enteric Pathogens

<table>
<thead>
<tr>
<th>Communicable disease/organism:</th>
<th>Salmonella, Shigella, Vibrio, E, coli O157, Campylobacter, Aeromonas, pleasiomonas, Yersinia, parishes (Giardia, Cryptosporidium, entamoeba etc). Hep A, GI virus</th>
</tr>
</thead>
<tbody>
<tr>
<td>legislated requirement</td>
<td>All Bacterial and viral stool pathogens; Amoebiasis; Foodborne illness, waterborne illness; gastrointestinal epidemic; cholera; cryptosporidiosis, cyclospora infection; giardiasis; hepatitis A</td>
</tr>
<tr>
<td>PH significance</td>
<td>Potential for outbreak or epidemic; severe disease in some populations; indication of contaminated food or water</td>
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</tbody>
</table>
## Enteric Pathogens

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
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</thead>
<tbody>
<tr>
<td>Is reporting to Public health urgent?</td>
<td>Salmonella and Hep A = yes</td>
</tr>
<tr>
<td>Is referral to BCCDC required?</td>
<td>Salmonella, Shigella, Hep A, Vibrio, E.coli O157</td>
</tr>
<tr>
<td>What additional testing is done?</td>
<td>Serotyping</td>
</tr>
<tr>
<td>Is referral urgent?</td>
<td>no</td>
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<tr>
<td>Public health’s process:</td>
<td>Edidemiology</td>
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<td>Surveillance</td>
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<td>Investigation into food safety - suppliers, restaurants, food workers</td>
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<td>Investigation into water sources</td>
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<td>Recalls or boil water alerts</td>
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<td>Shutdowns of facilities</td>
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</tbody>
</table>
**Influenza virus**

<table>
<thead>
<tr>
<th>legislated requirement</th>
<th>Influenza virus, including the H5 and H7 strains</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH significance</td>
<td>Potential for severe disease; outbreak, epidemic and pandemic potential; vaccine composition; certain strain have greater significance</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Is reporting to Public health urgent?</th>
<th>no</th>
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<tbody>
<tr>
<td>Is referral to BCCDC required?</td>
<td>yes</td>
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<tr>
<td>What additional testing is done?</td>
<td>Typing for strains</td>
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<tr>
<td>Is referral urgent?</td>
<td>no</td>
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</table>

**Public health process:**
- Assessment of vaccine efficacy
- Assessment of vaccination programs - accessibility and education
- Surveillance data informs vaccine composition
- Global role
Percentage of respiratory specimens that tested positive for influenza
By influenza transmission zone

Status as of 01 September 2017

Note: The available country data were joined in larger geographical areas with similar influenza transmission patterns to be able to give an overview (www.who.int/influenza/surveillance_monitoring/updates/EN_GIP_Influenza_transmission_zones.pdf). The displayed data reflect reports of the week from the 07 August 2017 to 20 August 2017, or up to two weeks before if not sufficient data were available for that area.

The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.
Process improvement at NHA

- Major gaps
  - Lacking good SOPs
  - Confusion regarding what to refer
  - Change in local PH structure
  - No automatic reporting process
    - Dependent on technologist
    - Room for error
    - Lack of training/experience/knowledge
Process improvement at NHA

- Improved SOPs
  - Specific for Public health reporting
  - Specific for referral to BCCDC
  - Critical Communicable disease also included in Critical results list
Process improvement at NHA

- Development of automatic reporting system, interfaced with single public health hub
  - Lots of granular work
  - Jan –
  - Developed an auditing system in the meantime
### Process improvement at NHA

<table>
<thead>
<tr>
<th>Reportable disease</th>
<th>Testing done</th>
<th>Testing type</th>
<th>specimen type</th>
<th>Deposited type</th>
<th>Species (if applicable)</th>
<th>Follow up or confirmation</th>
<th>comments</th>
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</table>
Process improvement at NHA

- New automated reporting system went live in late September
- Huge improvement
- Still rely on technologist to follow SOP in regards to calling MHO, referring isolates
Questions?

Thank You!

Please direct any questions to: deanna.danskin@northernhealth.ca
References


References cont…


