A black and white electron micrograph showing several large, brick-shaped virus particles with a distinct outer envelope and a dense, granular core. The particles are scattered across the field of view, with some showing clear internal structure.

Communicable disease control in Public Health and the Monkeypox outbreak

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Stéphanie Lanthier-Labonté M.D. M.Sc. FRCPC



I acknowledge with gratitude that I live, work and learn on the traditional unceded homelands of the Skwxwú7mesh (Squamish), x^wməθkwəyəm (Musqueam), and Səlílwətaʔ/Selilwítlh (Tseil-Waututh) Nations.

Objectives

- Know the basics of public health infectious disease management
- Know the basics of the monkeypox virus
- Know how to prevent Monkeypox

Plan

1. Public Health basics
2. Communicable disease control
3. Monkeypox virus

A vibrant illustration of a park scene. In the foreground, a woman in a purple top and blue skirt walks towards the left. To her right, a woman in a blue jacket and purple pants walks towards the right. In the middle ground, a woman in a purple top sits on a bench reading a book. A man in a white shirt sits on a bench talking on a phone. A woman in a blue dress rides a pink bicycle. A man in a brown shirt and purple hat rides a blue scooter. In the background, a man and a woman sit on a bench, and a group of people jogs. A fountain with water spraying upwards is in the center. A pond with swans is on the left. A woman and a child sit on a blanket on the grass with a dog and a beach ball. The scene is filled with green trees, bushes, and park benches under a soft, overcast sky.

Public Health basics

What Is Public Health?

The “branch of the health system that deals with health protection, health surveillance, disease and injury prevention, population health assessment, health promotion and emergency preparedness and response.” (AFMC, 2014)

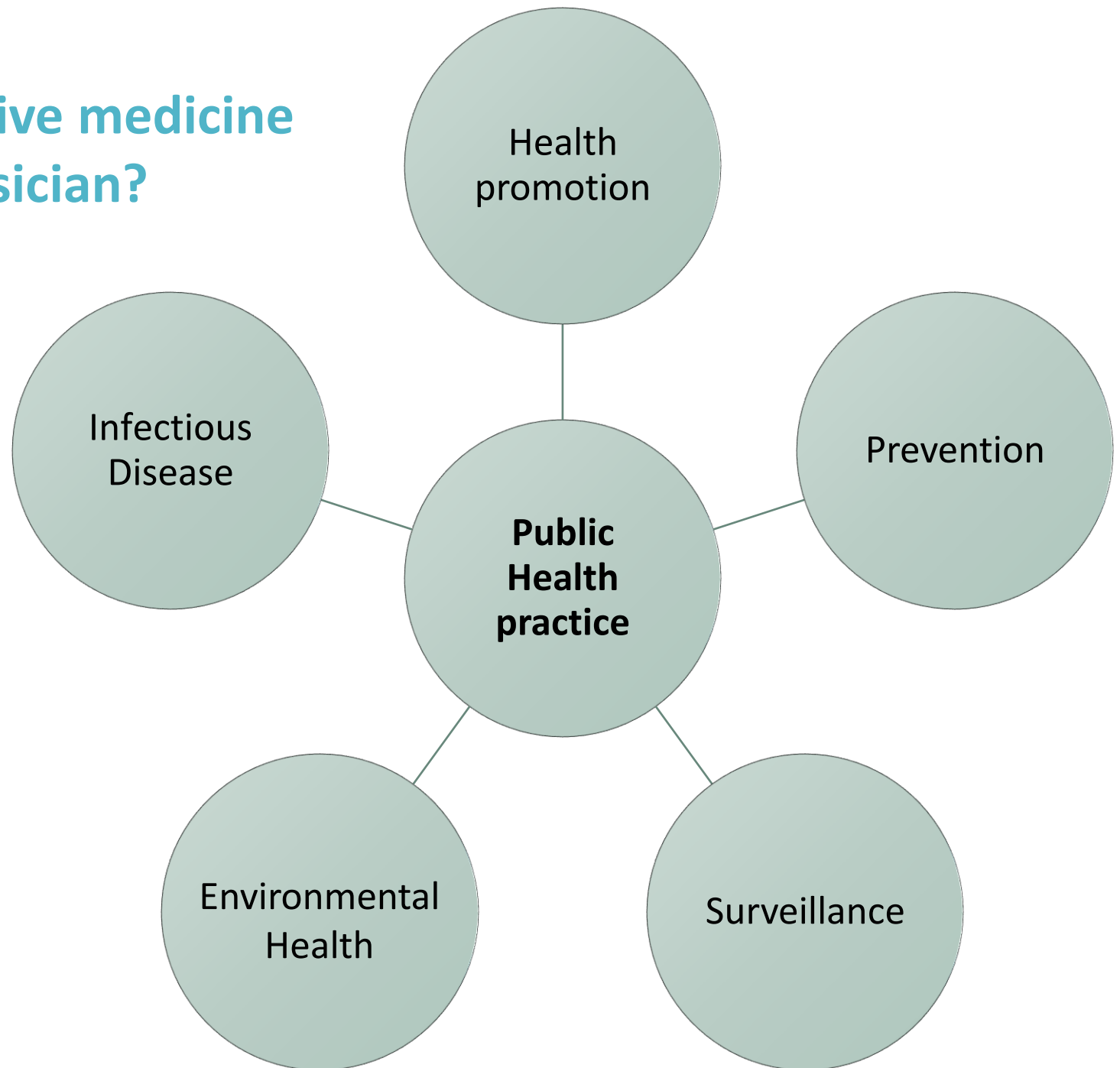
Holistic Definition of Health

A state that gives the “ability to perform personally valued family, work and community roles; ability to deal with physical, biological, psychological and social stress.” (AFMC, 2014)

Vision for Public Health in BC

To promote “vibrant communities in which all people achieve their best health and well-being where they live, work, learn and play” (British Columbia Ministry of Health, 2017, p. 12).

What is the work of preventive medicine and public health physician?



The background of the slide is a grayscale electron micrograph showing various biological structures, including what appear to be cross-sections of cells with internal organelles and membranes. The image is dark and textured, providing a scientific context for the title.

Communicable Disease Control

What is an outbreak?

Cluster: An unusually high incidence of a disease in a certain place and time

Outbreak: The occurrence of a disease in excess of what would normally be expected in a defined community, geographical area, and time interval

Epidemic: The rapid spread of a disease to many people in a population in a short period of time

Pandemic: An epidemic that has spread across a large region; usually multiple continents or worldwide

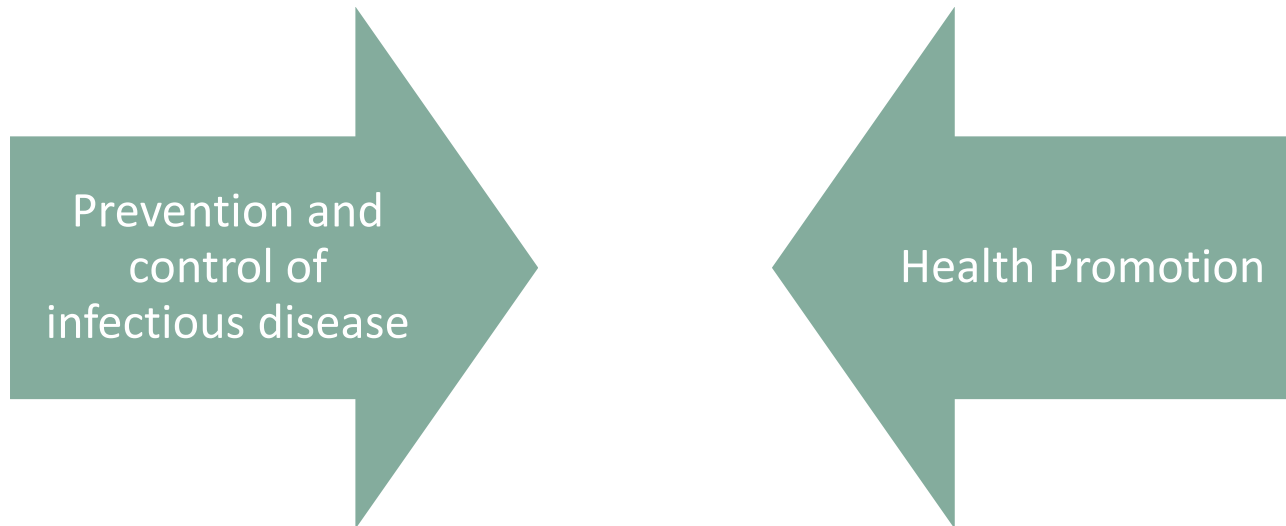
Outbreak management

- 1) Confirm the outbreak
- 2) Identify investigation team
- 3) Establish and maintain regular communications
- 4) Manage sick people
- 5) Conduct an outbreak investigation
- 6) Prevent further transmission by establishing control and prevention measures
- 7) Monitor the response

- Construct a case definition
- Identify additional people with infection by active surveillance
- Find and list cases
- Perform descriptive epidemiology (person, place and time)
- Develop a hypothesis: Identify possible source(s) of infection and means of transmission
- Defining the population at risk

Communicable Diseases and Seniors

Outbreaks of gastroenteritis (eg. *Clostridioides difficile*)
Outbreaks of Influenza or other respiratory diseases
COVID-19 pandemic





Monkeypox outbreak

Quiz

What do you know about Monkeypox?

1. The family of virus causing Monkeypox infection is:
 - a) *Orthopoxvirus* genus, Poxviridae family
 - b) *Simplexvirus* genus, Herpesviridae family
 - c) *Varicellovirus* genus, Herpesviridae family
2. True or false. The transmission of the Monkeypox infection can happen by human contact with contaminated linens (fomites).
3. When was the first case in BC in the current international outbreak?
4. What is the post-exposure prophylaxis recommended?

What is Monkeypox?

Orthopoxvirus genus, Poxviridae family

Symptoms lasting 2 to 4 weeks

- a) **Prodromal illness** that lasts between 1 to 5 days: fever, severe headache, lymphadenopathy, back pain, myalgia, fatigue
- b) **Skin rash** that begins 1 to 5 days after fever: evolves from macules, papules, vesicles then pustules, before crusting, which then scale off. Lesions frequently painful and sometime pruritic.

Current outbreak: lesions begin and affect the genital, anal and oral areas frequently

Less severe than smallpox

Children, pregnant women and immunocompromised individuals are at higher risk of severe disease

What is Monkeypox?



a) early vesicle,
3mm diameter



b) small pustule,
2mm diameter



c) umbilicated pustule,
3-4mm diameter



d) ulcerated lesion,
5mm diameter



e) crusting of a mature
lesion



f) partially removed
scab

[Image credit: United Kingdom](#)

What is Monkeypox?

- Monkeypox is endemic in Central and West African regions (fatality ratio around 3-6%)
- Zoonosis: Animal hosts include many rodents (eg tree squirrels) and non-human primates (unidentified animal reservoir)
- Travel-related cases are sporadically reported internationally

What is new?

- In 2022, several countries with community-acquired cases
- Risk of endemicity outside of Africa

Transmission

Human-to-human transmission:

- Direct contact with lesions
- Fomites on contaminated material (eg. linens, clothing)
- Respiratory droplets from prolonged face-to-face contact
- Vertical transmission
- Need to be studied: airborne (not the primary mode suspected and not demonstrated) and sexual transmission

“However, Monkeypox does not generally spread easily between people.” PICNet, 2022

Incubation and communicability

Incubation period (time contact to symptoms): 5 to 21 days, usually 7 to 14 days

Period of communicability: during symptoms, including prodrome. Lesions are infectious until the scabs fall off and new skin is seen.

Worldwide situation

The World Health Organization has declared the Monkeypox outbreak as a **global health emergency of international concern** on July 23, 2022.

“We are issuing guidance to help countries on surveillance, laboratory work, clinical care, infection prevention and control, as well as risk communication and community engagement to inform communities at risk and the broader general public about Monkeypox and how to keep it safe.” WHO, 2022

Monkeypox – Epidemiology



- Among the cases, a high proportion of people who self-identify as gay, bisexual and other men who have sex with men (gbMSM)
- Anyone can become exposed and infected

Monkeypox – Epidemiology

The total count of confirmed cases of monkeypox in **British Columbia** was **143** as of **September 9, 2022**.

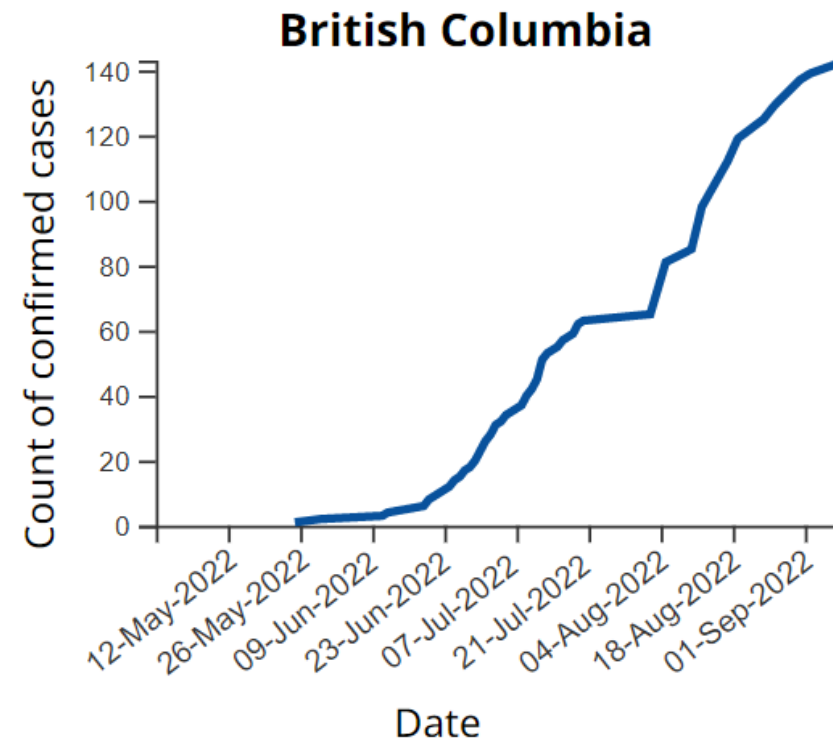
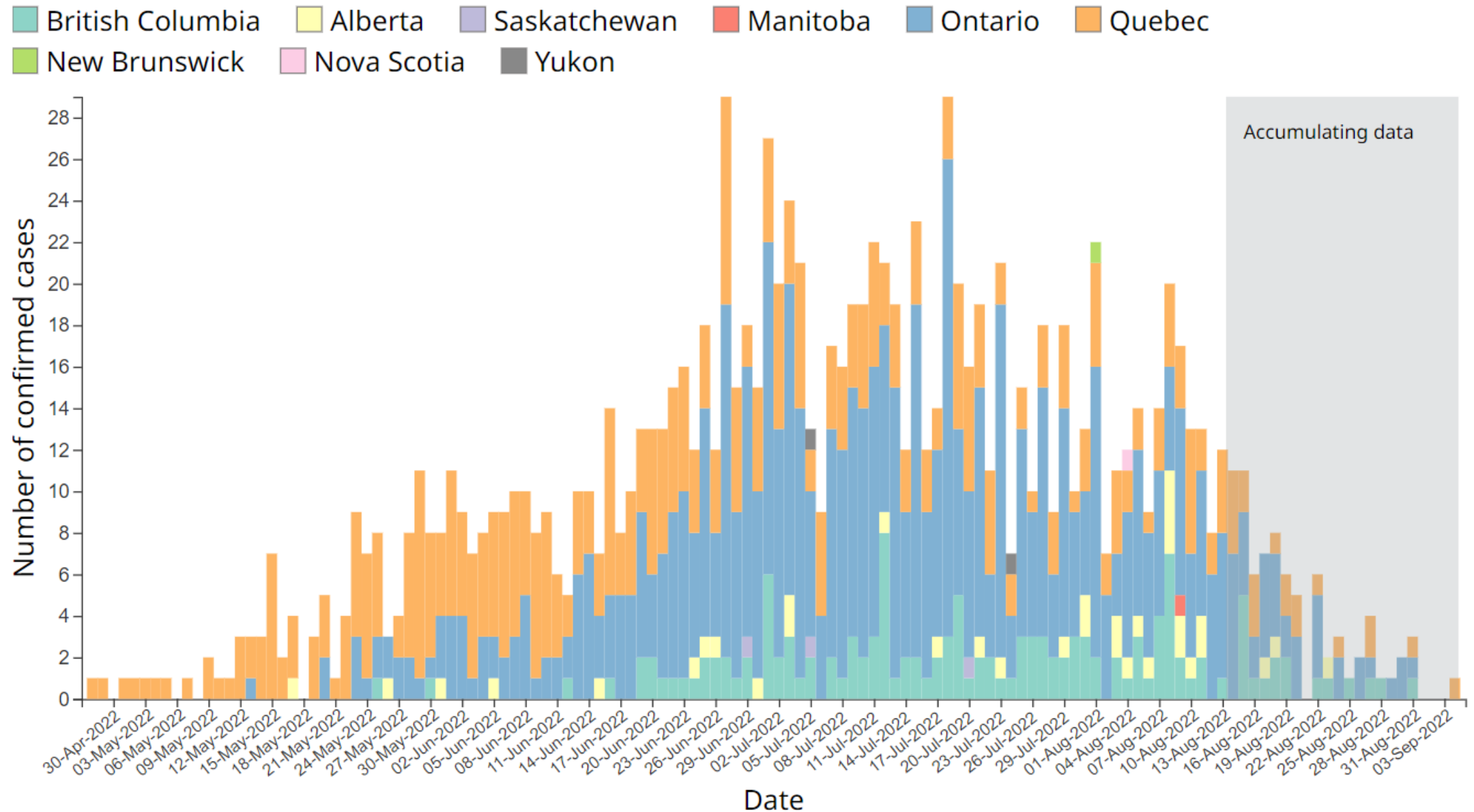


Figure 2. Provincial breakdown of confirmed monkeypox cases (n=1,238) in Canada by date as of August 30, 2022, 12 pm Eastern



Monkeypox – Public Health objectives

Public health objectives

- Stop the transmission chain;
- Prevent endemicity;
- Protect and preserve health and health systems;
- Reduce mortality and morbidity from monkeypox infections.

Guidelines for Long-term Care Home

Provincial Infection Control Network of British Columbia. (2022). *Interim Infection Prevention and Control Guidance for Monkeypox in Health Care Settings*. Provincial Health Services Authority.

https://www.picnet.ca/wp-content/uploads/MonkeyIPACGuidanceHC_08Aug2022Final.pdf

Case definition

Confirmed case: laboratory confirmed for monkeypox virus by detection of unique sequences of viral DNA (PCR and/or sequencing)

Probable case: A person of any age who presents with an unexplained acute rash or lesion(s)

AND

Has one or more of the following:

- Has an epidemiological link to a probable or confirmed Monkeypox case in the 21 days before symptom onset, such as
 - o face-to-face exposure, including health workers without appropriate personal protective equipment (PPE)*
 - o direct physical contact, including sexual contact; or contact with contaminated materials such as clothing or bedding*
- Reported travel history to or residence in a location where Monkeypox is reported in the 21 days before symptom onset

Notification

“Notify the regional medical health officer (MHO) of any confirmed, probable, or suspected cases of Monkeypox that are admitted for care; Notify local infection prevention and control (IPAC) in health authority-operated facilities.” PICNet, 2022

Management of the case

Precaution:

Follow routine IPAC practices + Additional Precautions: “Implement droplet, contact, and airborne precautions for patients who are clinically suspected or confirmed to have Monkeypox.”

Particular attention to [Handling soiled linen safely](#)

Dedicate medical equipment when possible

Transport:

The patient can wear a medical mask and practise hand hygiene; Lesions are covered.

Contact tracing

- Identify at-risk contacts
 - face-to-face exposure, including health workers without appropriate personal protective equipment (PPE)
 - direct physical contact, including sexual contact
 - contact with contaminated materials such as clothing or bedding

Table 3: Risk assessment for monkeypox exposures

Exposure Risk Level	Characteristics	Examples
High Risk	<p>Direct contact between a person’s skin or mucous membrane and the case’s skin lesions, mucosal lesions or bodily fluids without appropriate PPE</p> <p>Unprotected skin or mucous membrane contact with objects that have been in contact with infectious bodily fluid or lesions (i.e. clothing, bedding, sex toys)</p> <p>Any procedure that may generate aerosols from bodily fluids, skin lesions, or dried exudates without the use of respirators (e.g., N95 or equivalent respirators) or a medical masks and other personal protective equipment (e.g., gloves, gowns, and eye protection)</p>	<ul style="list-style-type: none"> • Sexual contact • People sharing the same bed • Household members
Medium Risk	<p>Face-to-face contact within 2 metres for at least one hour, AND does not meet the high-risk exposure characteristics</p>	<ul style="list-style-type: none"> • Co-workers within two meters for one hour or more
Low Risk	<p>Brief close contact AND does not meet the high/medium-risk exposure characteristics</p>	<ul style="list-style-type: none"> • Brief social interactions

Contact tracing

Table 4: Contact tracing and monitoring modalities for monkeypox contacts

Contact Risk Level	Contact Education	Monitoring	Post Exposure Prophylaxis (PEP)
High	By public health	Active monitoring (daily or other appropriate frequency) for 21 days after last exposure	Recommended
Medium	By public health	Passive surveillance or modified active monitoring (initial contact with or without follow up at 21 days)	Generally not required unless recommended by MHO
Low	By case or public health	Passive surveillance or modified active monitoring	Generally not required unless recommended by MHO

Management of the contact

- Offer the post-exposure prophylaxis with the Imvamune Vaccine
 - Within four days of the exposure
 - Up to 14 days
- If continuous risk, second dose at least 28 days after the first dose

Past immunity

Smallpox vaccine (first and second generation) would possibly protect from Monkeypox (efficacy unknown)

In Canada, adults born in 1971 and before may have received the vaccine
“Discontinuation of vaccination for travel was recommended by the WHO in 1980 and was no longer required by any country by 1982.” PHAC, 2007

Imvamune vaccine

- Third generation vaccine. Attenuated vaccinia virus (Ankara strain) non-replicating
- Approved in 2020 for the prevention of Monkeypox in Canada
- Availability limited
- 2 doses: 85% efficiency

Studied in 7 414 people (13 700 doses) + surveillance of over 9 000 people

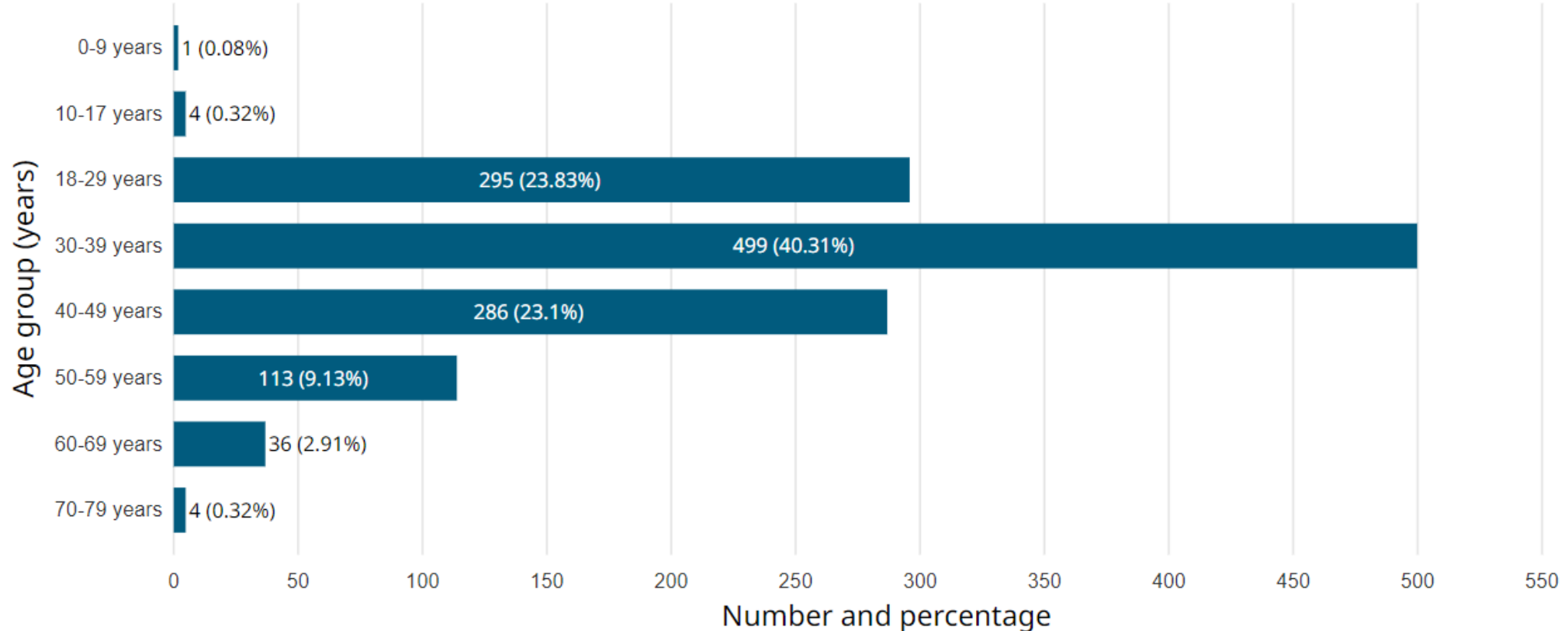
Security: Mild secondary effects lasting 7 days; no severe complications for the moment

Immunogenicity: Good response after the 1st dose.

Data limited on children, pregnant women and immunocompromised, thought to be safe and effective (non-replicating vaccine)

Monkeypox and elders

Figure 3. Age distribution of confirmed monkeypox cases (n=1,238) in Canada by age group as of August 30, 2022, 12 pm Eastern



Quiz - Answers

1. The family of virus causing Monkeypox infection is:
 - a) *Orthopoxvirus* genus, **Poxviridae** family
 - b) *Simplexvirus* genus, Herpesviridae family
 - c) *Varicellovirus* genus, Herpesviridae family
2. **True** or false. The transmission of the Monkeypox infection can happen by human contact with contaminated linens (fomites).
3. When was the first case in BC in the current international outbreak? **June 2022**
4. What is the post-exposure prophylaxis recommended? **Vaccine**

Conclusion

Objectives

- Know the basics of public health infectious disease management
- Know the basics of the monkeypox virus
- Know how to prevent Monkeypox



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