Regional Blastomycosis Backgrounder

for Health Care Providers

Presented by Northwestern Health Unit, Sioux Lookout First Nation Health Authority, and Indigenous Services Canada

Epidemiology of Blastomycosis

in the NWHU Catchment Area

Northwestern Health Unit

www.nwhu.on.ca

Background

- Blastomycosis became a reportable disease in Ontario in May 2018, for the first time since 1989
- Routine, ongoing surveillance is now possible since it became reportable again
- Hospitalization data and individual studies provide alternative sources of data for years when it wasn't reportable

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Endemic areas and incidence

- Endemic to eastern US and Canada, primarily around the Great Lakes, and St. Lawrence, Ohio, and Mississippi River valleys
- Endemic areas typically have an incidence of 0.5-2 cases per 100,000 per year
- Certain “hyperendemic” areas can have incidence of 100+ cases per 100,000 per year

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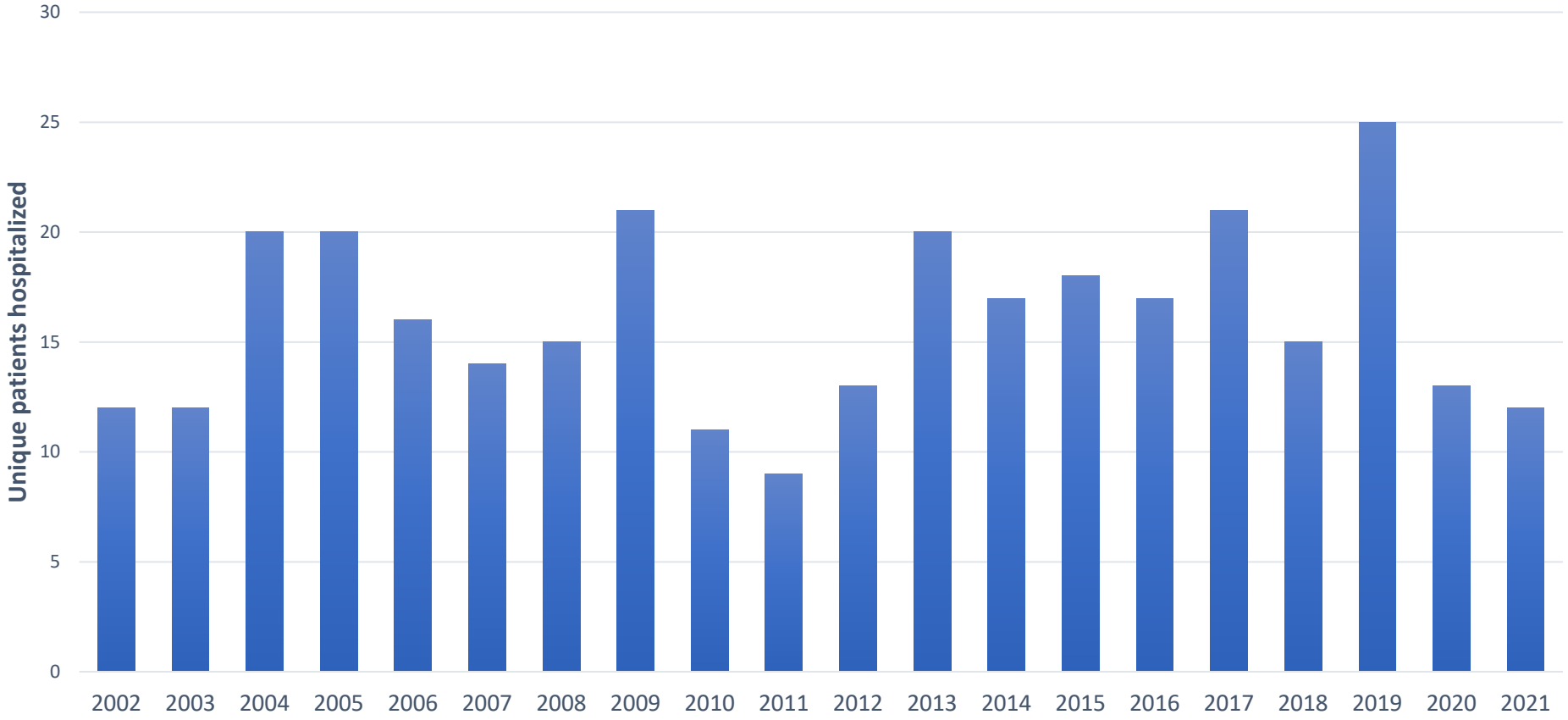
Unique patients hospitalized due to blastomycosis per year in the NWHU area

2002-2021



Source: Inpatient Discharges [2013-2021]. Ministry of Health and Long-Term Care. IntelliHEALTH Ontario. Date Extracted: August 22, 2022

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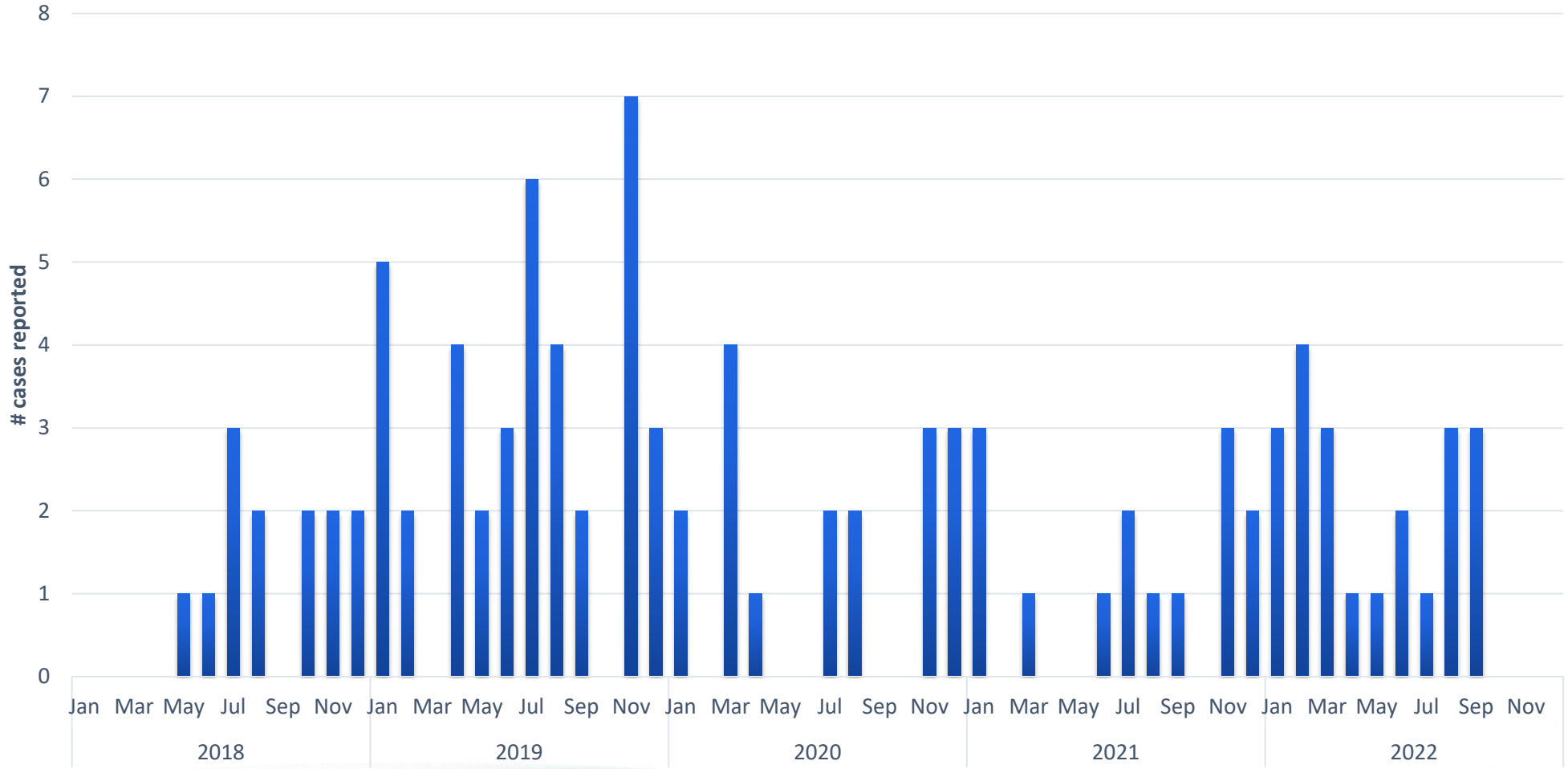
Cases of blastomycosis reported by month, NWHU

May 2018-present



Source: iPHIS. Date Extracted: October 4, 2022

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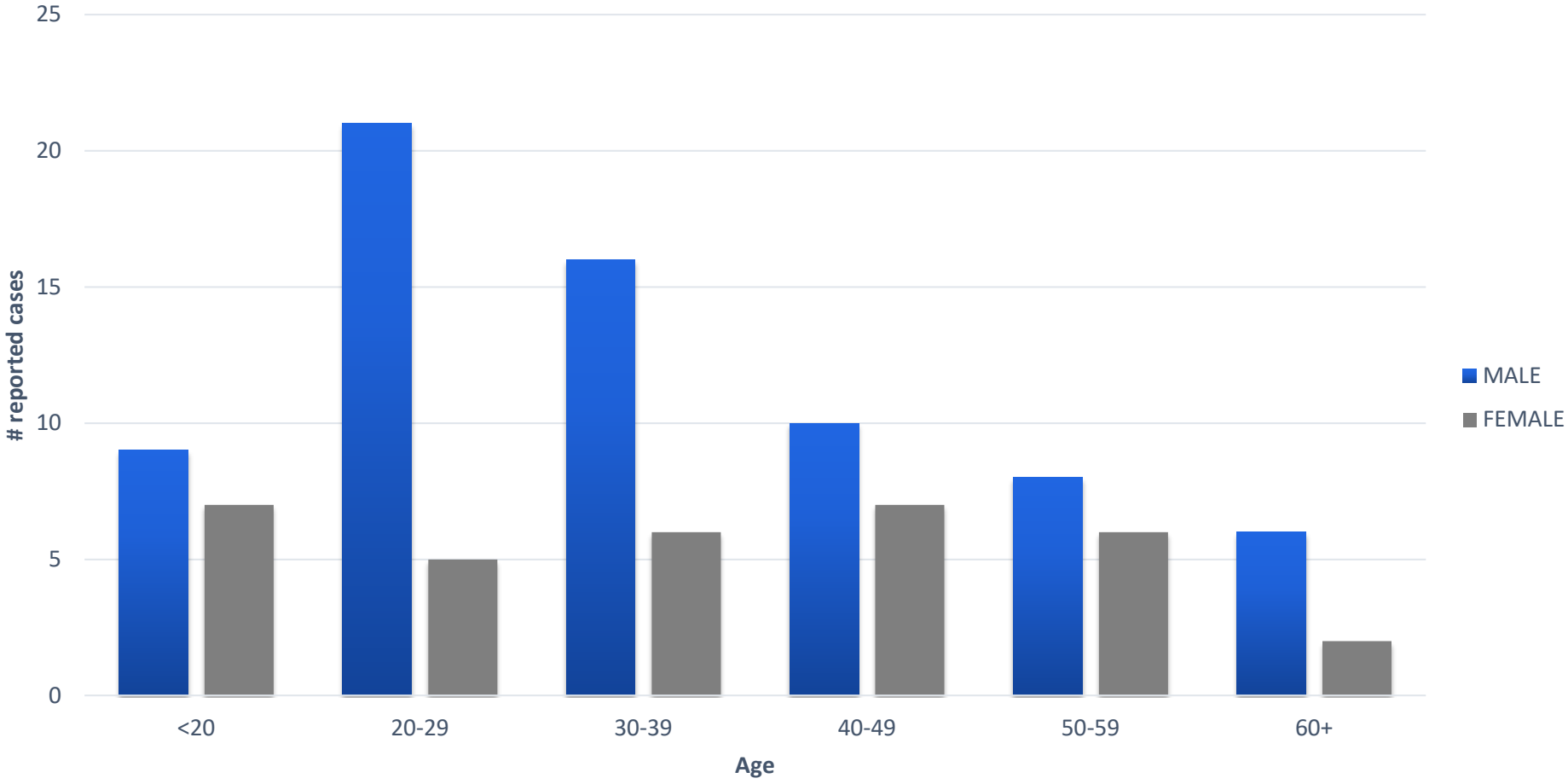
Blastomycosis cases by age group and sex, NWHU

May 2018-present



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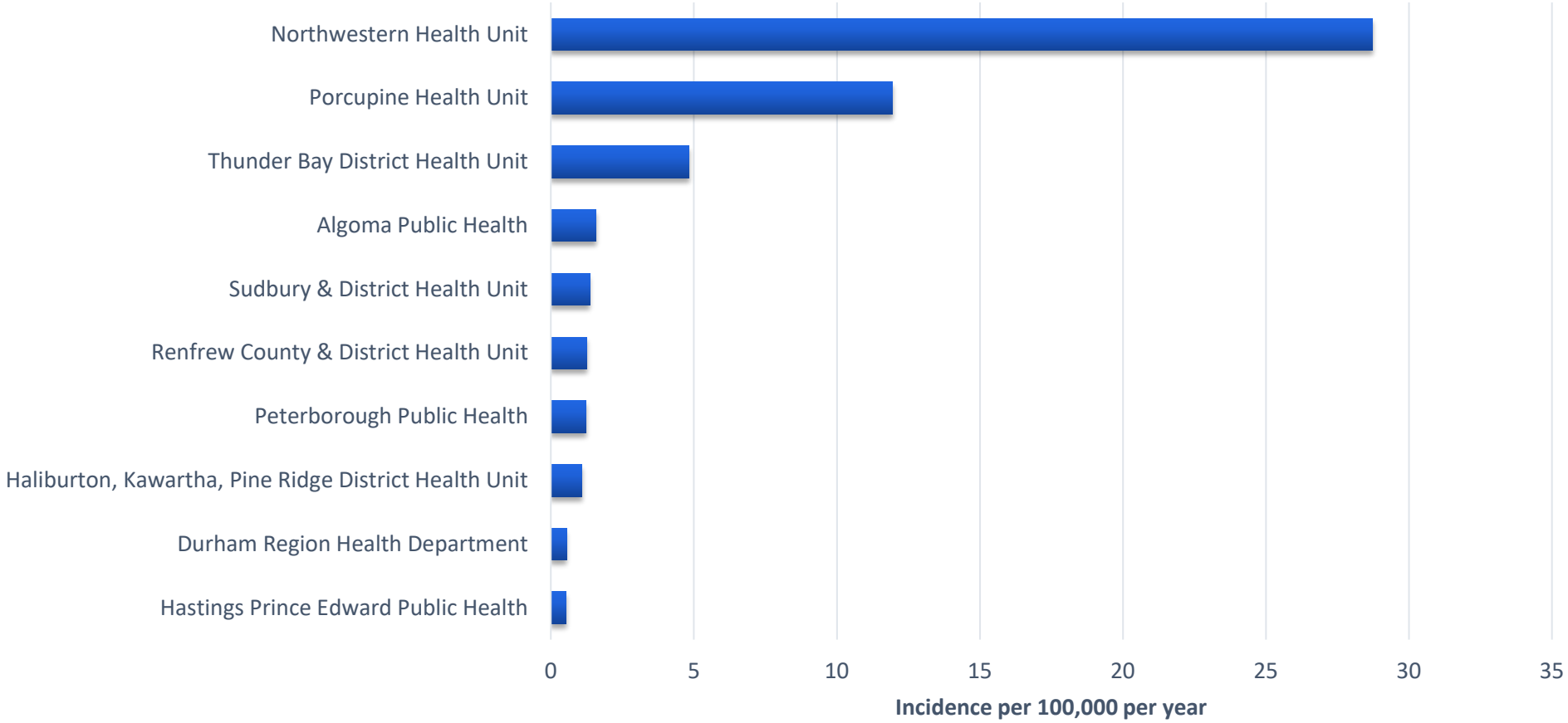
Top 10 PHUs by incidence rate per 100,000 per year

May 2018-present



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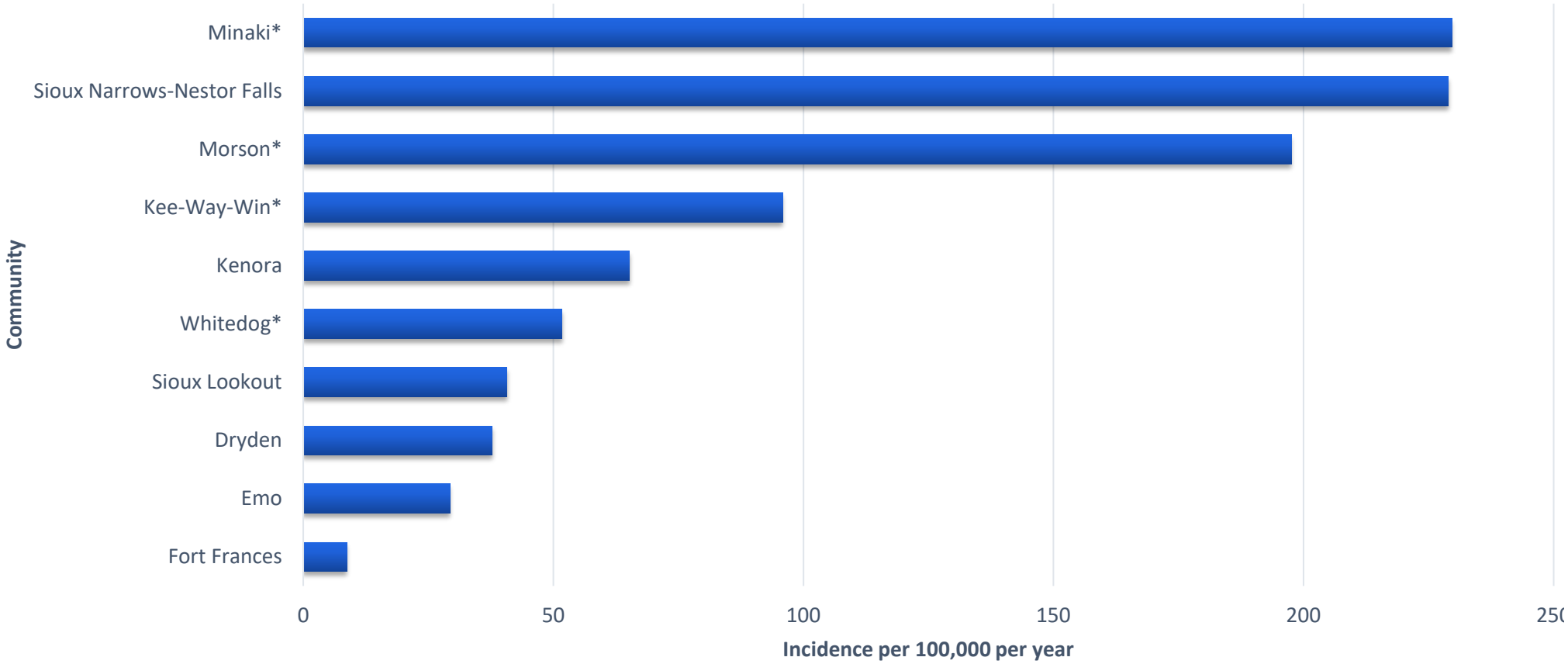
Incidence rates by selected communities, rates per 100,000 per year

May 2018-present



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Risk Factors

- A lot of missing risk factor info for our cases at the present time

- Risk factors that are showing up in our limited data:
  - Chronic illness/underlying medical condition
  - Immunocompromised
  - Contact with soil or untreated manure
  - Smoking
  - Spending time in wooded areas

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Public Health actions: Blastomycosis

Date 12 October 2022

Name Donna Stanley

Northwestern Health Unit

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Blastomyces dermatitidis and B. gilchristi

- Fungus only visible through a microscope
- Infection through inhaled spores; rarely, through skin
- Not known to spread person to person or from pets
- Incubates 21-106 days, median 43 days
- Lives in soil, especially moist, acidic soil rich in decomposing organic matter

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Who gets sick?

- Not everyone exposed in the same area will get sick; pets get sick more often because face is close to the ground
- 50% of those exposed who inhale spores may remain asymptomatic
- Those with immunocompromise may develop more severe illness

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What can be done?

- For case follow up, cannot test the soil
- No known method of eradicating from the soil, or knowing if it is eradicated
- No known effective PPE
- What we can do: knowledge, surveillance

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Surveillance

- Kenora area known to be endemic for decades
- Blastomycosis became reportable in 2018
- Reporting cases identifies endemic risk areas
- Usefulness of reporting and follow-up:
  - Where might the person have become infected
  - Detect clusters by geography
  - Establish geographical areas as endemic

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Prevention

- Turnover and locum or agency health care provider services means many providers without experience with blastomycosis
- Periodic reminders to all providers about risk of blastomycosis to facilitate early diagnosis and treatment
- Inform the public and visitors to facilitate self-advocacy

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Avoid Blastomycosis

BLASTOMYCOSIS ALERT

Blastomycosis is a disease caused by a fungus, Blastomyces, found in the soil, rotting wood, and fallen leaves in our region.

Sioux Lookout First Nations Health Authority

BLASTOMYCOSIS ALERT

Dogs are especially at risk to blastomycosis and can act as a warning to humans.

Sioux Lookout First Nations Health Authority

BLASTOMYCOSIS ALERT

Blastomycosis is a disease caused by a fungus, Blastomyces, found in the soil, rotting wood, and fallen leaves in our region.

Sioux Lookout First Nations Health Authority

Blastomycosis (aka blasto) is a fungal infection, that typically starts as a lung infection with symptoms including difficulty breathing, coughing, chest pain, fever, night sweats, weight loss, joint pain, and exhaustion. It can also cause sores to appear on the skin, especially on the hands and face.

If you have any of these symptoms, and have been digging in the earth, working with rotting wood piles, or have been hunting, trapping, camping, or gardening in the last 30-45 days, please visit your Nursing Station as soon as you can. Blastomycosis can have very serious health effects, including death, if left untreated.

Blastomycosis is most common in the Kenora and Great Lakes region, but serious outbreaks have occurred in Northern Ontario in the past year. Blastomycosis is most common from July to December and when there is more rain and snow.

Blastomycosis

CLINICAL ASPECTS

YOKO SCHREIBER, MD, FRCPC, MSC

OCT 12, 2022

Overview

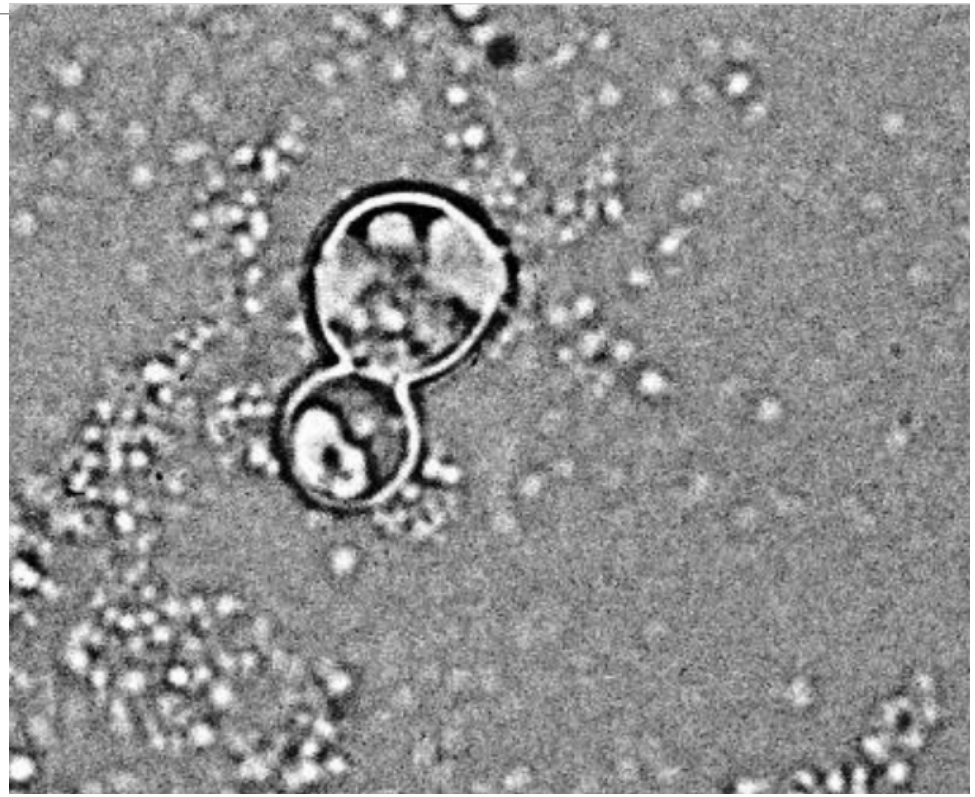
1. When to suspect blastomycosis
2. How to diagnose blastomycosis
3. How to treat a patient with blastomycosis

1. When to suspect blastomycosis

Exposure

Blastomyces dermatitidis, Blastomyces gilchristii

- Great lakes and St. Lawrence seaway
- Mould in moist soil, rotting wood or leaves: Ask about activities on Hx!
- Inhaled spores transform into yeast in lungs, and may travel to distant sites
- Exposure in spring/summer/fall, time to symptoms 20-120 days: can present in winter!



Case A

45F cough x4 weeks

- productive, no hemoptysis, occasional chest pain
- Low energy, some SOBOE
- Trial of amoxicillin in NS, no improvement

In ER: T 39, HR 110, RR 24, BP 100/79, sats 92%, looks unwell

- Decreased air entry L lung, bronchial BS LUL and RML, no axillary LN
- WBC 22, Cr 110 (baseline 80)

CXR shows full opacification of the LLL, with patchy consolidation LUL and RML, RLL.

Case B

24F abdominal wound

- Shallow wound R mid abdomen x 18 months, no trauma, procedures, insect bites
- No resolution with multiple courses of antibiotics, seen by GenSx for wound closure 1 month ago, now skin breakdown noted

On exam: early dehiscence with scant drainage. No cellulitis.

Pre-closure wound “shallow, glistening, several cm in diameter, no purulent discharge”

Initial wound swabs negative (WBC on Gram stain), then grew MSSA, GBS.

Case C

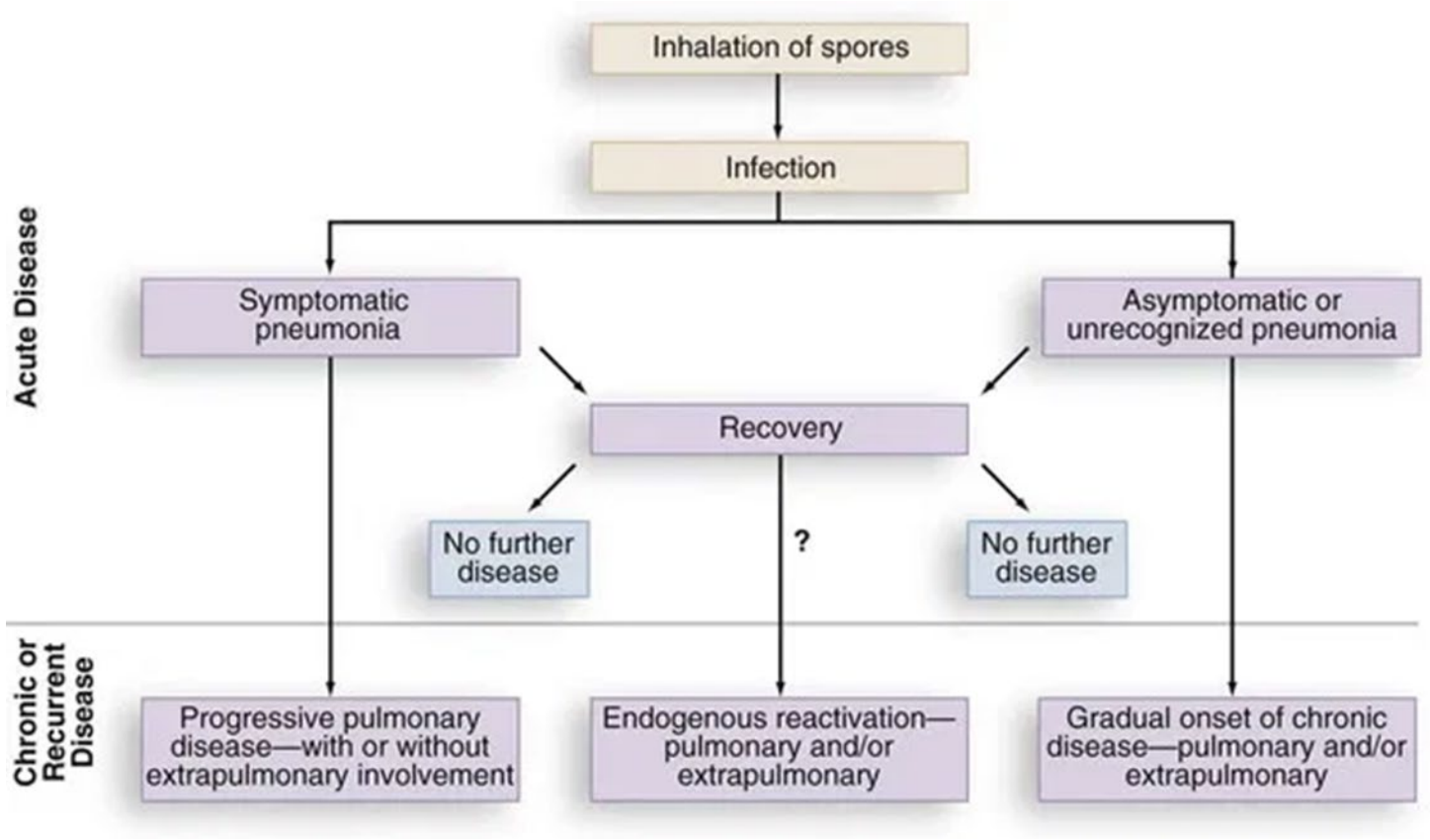
66M weight loss (30lbs), fatigue, SOBOE

- CT May 2020: pulmonary nodules (non-cavitary), hilar and mediastinal LN, splenomegaly, cystic lesions within liver; L flank abscess abutting spleen, lucency 10th rib, soft tissue mass inferolateral chest wall

"This is likely metastatic cancer"

- Upper and lower endoscopies neg for malignancy, attempted aspirate of chest wall mass by local surgeon, no aspirate obtained; sent to TBRHSC for bronchoscopy/transbronchial Bx, converted to bx of chest wall lesion: mixed inflammatory reaction
- Repeat CT July 2020: decreased size and number of pulmonary nodules and LN,
- ER SLKT: spontaneous drainage of chest wall "abscess" NO cultures sent, Rx Cephalexin
- Now complains of swollen L axillary LN

Clinical Syndromes



Pulmonary (~90%)

Skin: papulopustular, verrucous ulcer (18%)

Bone, joint (4%)

RES (liver, spleen, LN)

CNS: meningitis, abscess

Genitourinary (prostate, testes, TOA)

Often mistaken as malignancy, TB

2. How to diagnose blastomycosis

Testing

Think of it!

TEST	COMMENTS
Fungal culture	Sputum, CSF, aspirate, tissue, urine, bone marrow *Need to ASK for fungal culture, not routinely sent Done at PHL: involves fungal stain “thick-walled, broadbased budding yeast” and culture (4-5 weeks). GOLD STANDARD
Direct microscopy	Experienced lab technologist can pick up blastomycosis *Call the lab to have a quick look
Histopathology/cytology	Tissue staining
Antigen test, urine (serum)	Helpful when sputum or tissue diagnosis difficult. Positive earlier than antibody. Sensitivity 89-93%. False positives can occur with other fungal infections *SLMHC can send this out to the US
Serology (serum antibody)	Positive serology denotes exposure, not necessarily acute infection. May take weeks to develop after exposure/infection Sensitivity 32-80%, specificity 100%

Case Diagnosis

Case A – pulmonary disease

Sputum for fungal culture
+/- call local lab

If unable to cough
- Urinary antigen
- Arrange bronchoscopy for BAL for fungal cultures

Case B – chronic wound

Tissue: skin biopsy for fungal culture and pathology

Imaging to r/o dissemintated disease including pulmonary

Case C – multisystem illness, lymphadenopathy

Tissue – excisional Bx of LN for pathology and fungal culture

Blastomyces serology +/- antigen testing

3. How to treat a patient with blastomycosis

Management

I. Counseling:
   - NOT contagious (no human-human or animal-human transmission)
   - Prevention?

II. Pharmacologic management
   - Severity dictates initial therapy and duration
   - Follow-up and monitoring essential

Mild/moderate

Itraconazole 200mg po tid x 3 days,

THEN intraconazole 200mg po bid x 6-12 months

- serum levels of itraconazole after 2 weeks to ensure adequate drug exposure (serum levels vary greatly) * check with lab when best to draw/send out
- Suspension better absorption than capsules
- Monitor for adverse events (clinical and laboratory follow-up)

Severe

Liposomal amphotericin B 3-5mg/kg IV daily

OR Amphotericin B 0.7-1mg/kg IV daily x 1-2 weeks

- Make sure you check the dosing against the correct formulation
- Laboratory monitoring, hydration, management of side effects (protocol)
- Liposomal amphotericin B for CNS disease, for 4-6 weeks, followed by fluconazole (itraconazole has poor CNS penetration)

THEN itraconazole 200mg po tid x 3 days, then 200mg po bid x 6-12 months

Clinical Take-home Points

1. Blastomycosis can present in many ways: acute vs chronic, can mimic malignancy or TB
2. Blastomycosis can be rapidly progressive: in a non-resolving issue or a sick patients, think of blastomycosis to diagnose and treat early
3. For diagnosis, get good quality specimens and order the appropriate tests, communicate with the lab (consider specimen to rule out other diagnoses on the differential)
4. Sick patients: start on IV liposomal amphotericin or amphotericin B
5. Send itraconazole level after 2 weeks, especially if delays in improvement
6. Monitor treatment by regular follow-up (clinical and laboratory)

References

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