

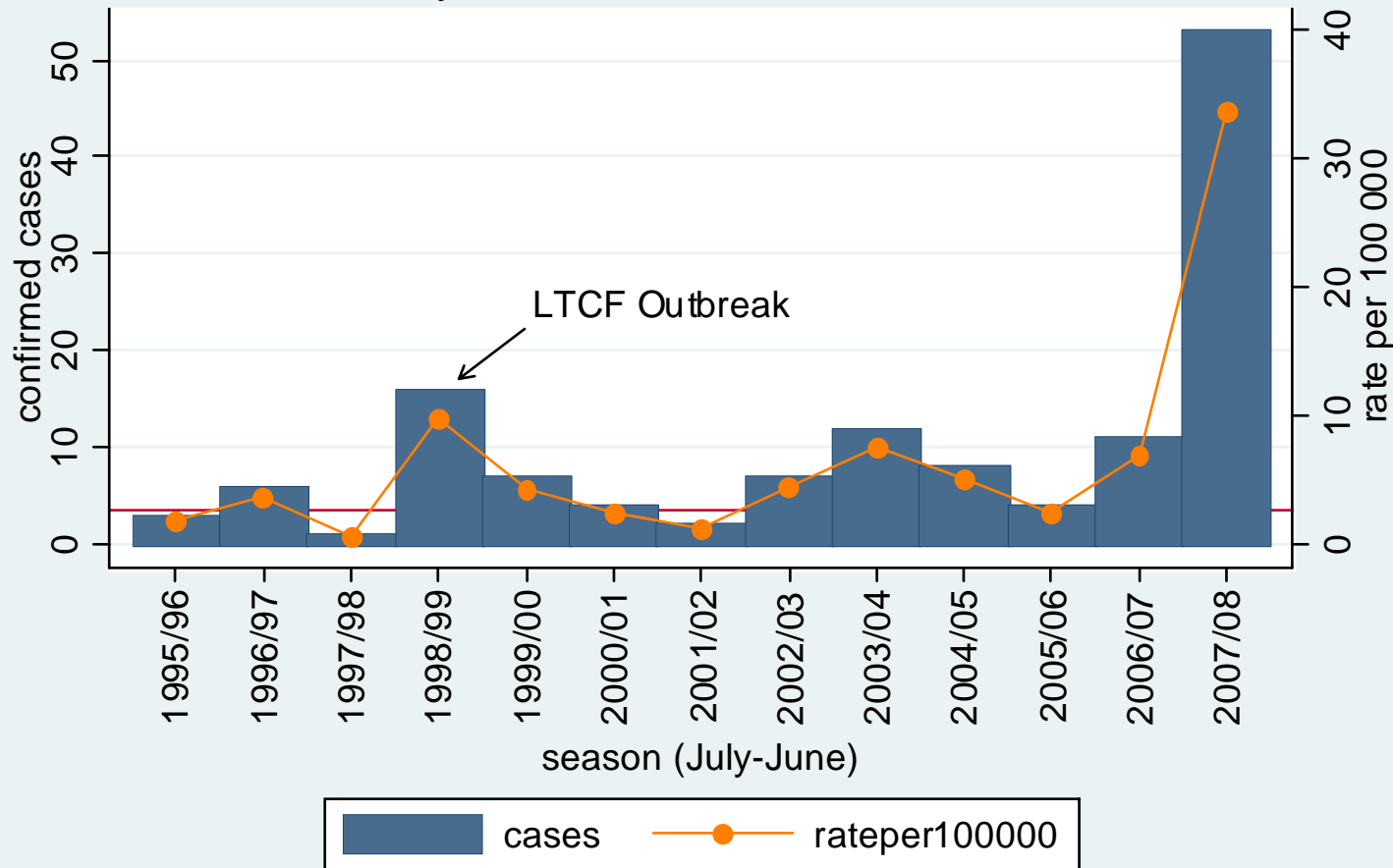
Community-based Outbreak of Invasive Group A Streptococcal Disease in Thunder Bay & District

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Confirmed Invasive Group A Streptococcal Disease

Thunder Bay District Health Unit, 1995/96 to 2007/08



Cases

Expected: 6
Actual: 53

Rates

(per 100,000)
Expected: 3.6
Actual: 33.8

Rate ratio:
9.4 times
baseline rate

Large IGAS outbreak in Thunder Bay & District

- *Streptococcus pyogenes*, group A
- Non-invasive GAS disease is very common and not reportable to public health
 - e.g., strep throat, impetigo, pyoderma, scarlet fever, otitis media, uncomplicated cellulitis
- Invasive GAS disease is much less common and is reportable by law
 - e.g., septicemia, pneumonia, necrotizing fasciitis, streptococcal toxic shock syndrome

Invasive Group A Streptococcal Disease

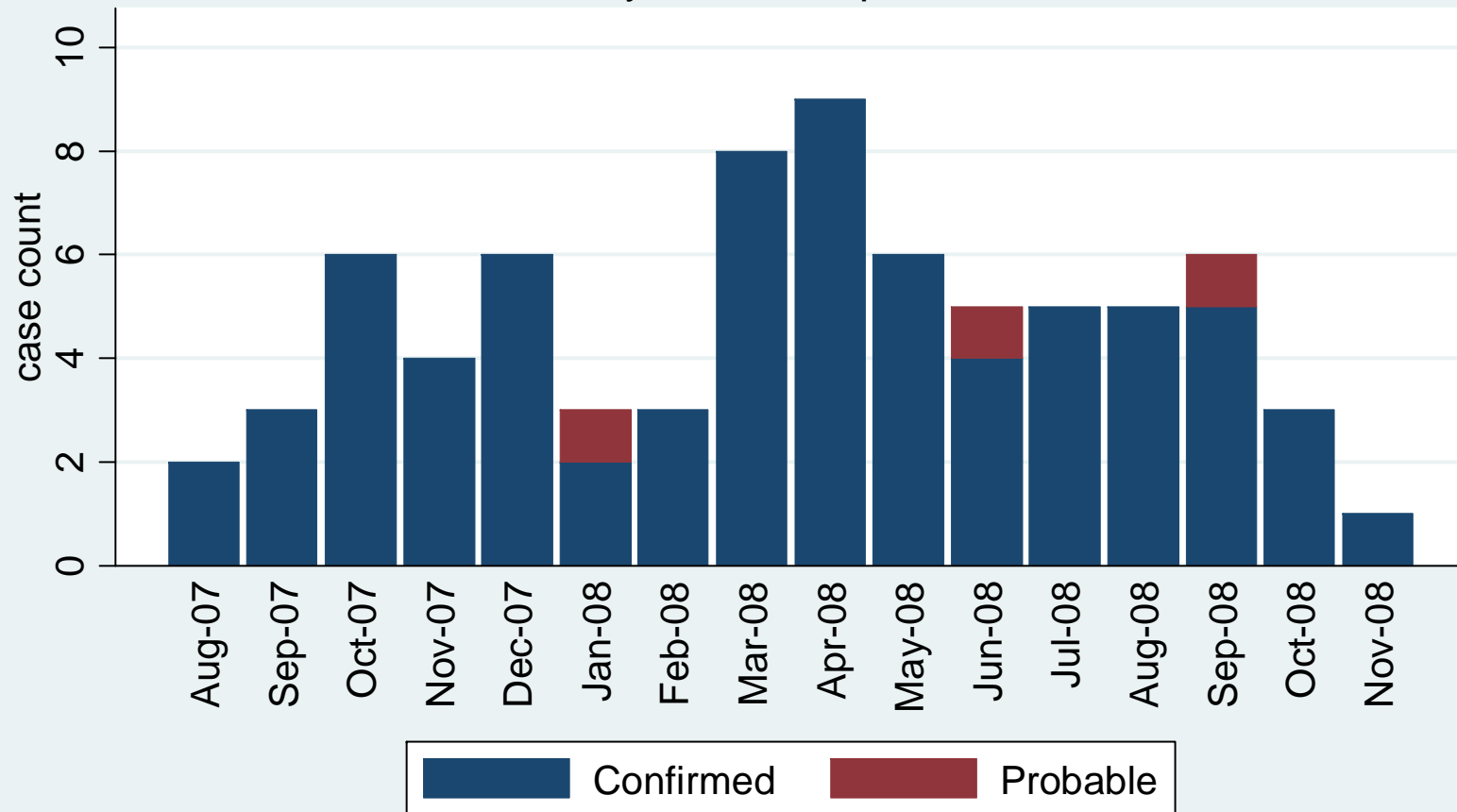
- Confirmed case definition
 - Laboratory confirmation of group A streptococcal infection from a normally sterile site, with or without clinical evidence of invasive disease.
 - Pneumonia with isolation of GAS from a sterile site, or from a bronchoalveolar lavage (BAL) when no other cause has been identified
- Probable case
 - clinical evidence of invasive disease with isolation of group A strep from a non-sterile site

- **Normally sterile sites include:**
 - blood;
 - cerebrospinal, pleural, peritoneal, or pericardial fluid;
 - bone, or joint fluid (including bursa);
 - deep aspirates or tissue specimens taken during *surgery* (e.g. muscle collected during debridement, soft tissue sites below the skin surface including abscess, lymph nodes, and surgical or non-surgical wounds).

Normally Sterile Sites

Thunder Bay Invasive Group A Streptococcal Disease Outbreak

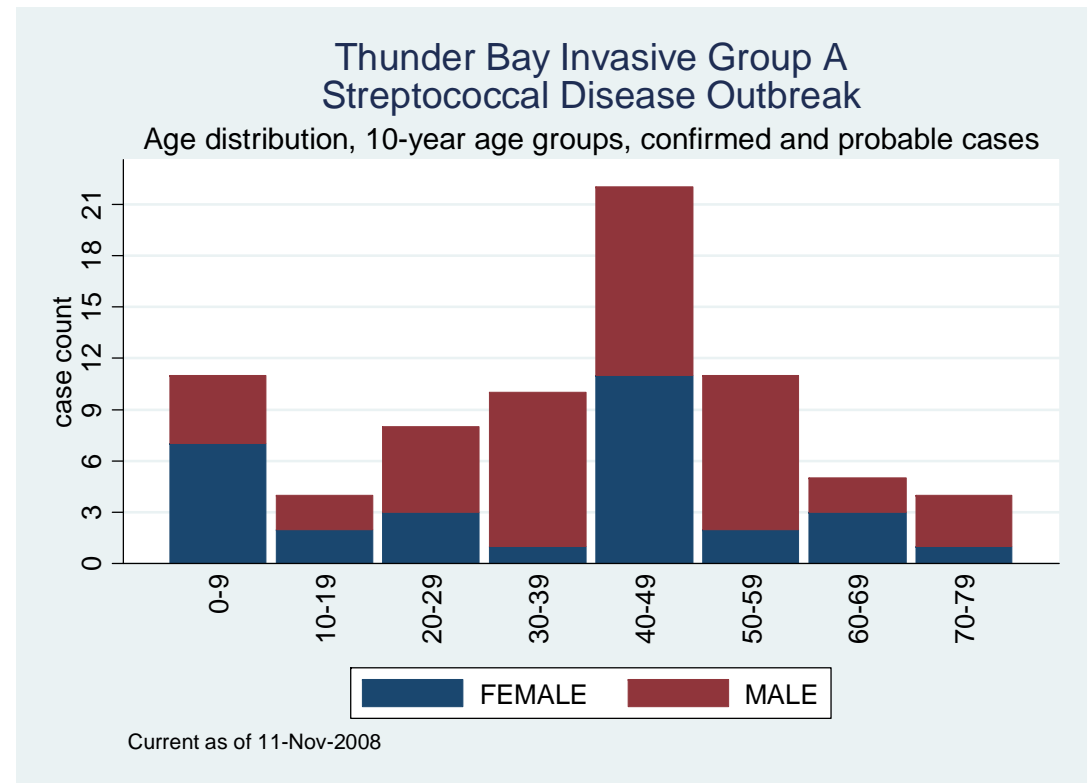
Case count by month of specimen collection



Current as of 11-Nov-2008

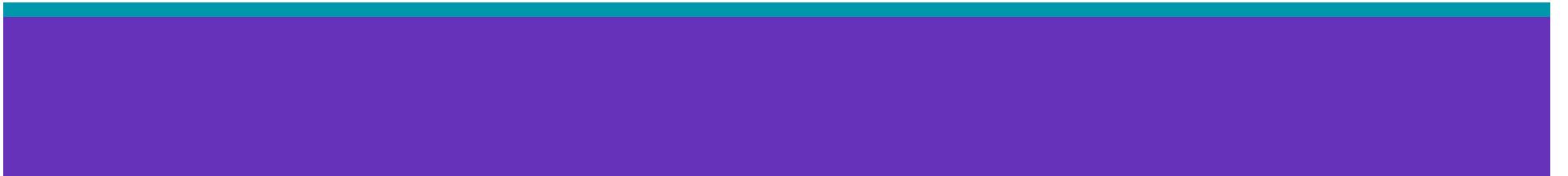
Epidemic curve (n=75)

- Age
 - Range: 1 mo - 77 yrs
 - Median: 40 yrs
- 60% male
- 91% hospitalized
- 33% severe*
- 10 deaths (13%)



* severe = streptococcal toxic shock syndrome (STSS), soft-tissue necrosis, meningitis, GAS pneumonia, death attributable to GAS.

Risk Factors



- 52% Aboriginal
- 37% IVDU
- 25% Hep C positive
- 17% under-housed
- Geographic clusters
 - city south core
 - known drug houses
 - Shelter House

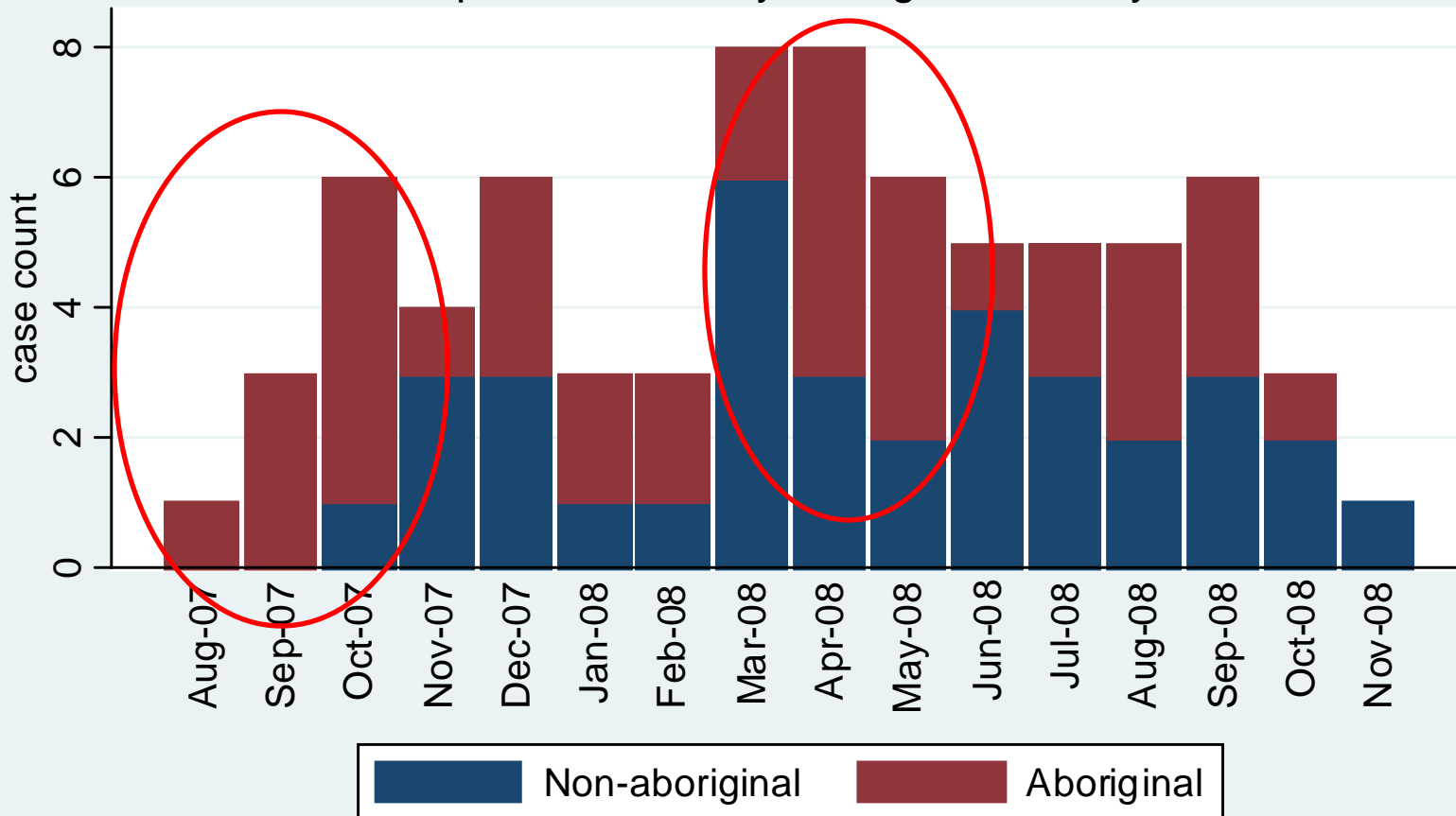
- Chronic conditions (diabetes, renal failure, cancer, obesity, alcoholism, HIV, etc.)

BUT...

- Many cases have no known risk factor

Thunder Bay Invasive Group A Streptococcal Disease Outbreak

Epidemic curve by Aboriginal ethnicity

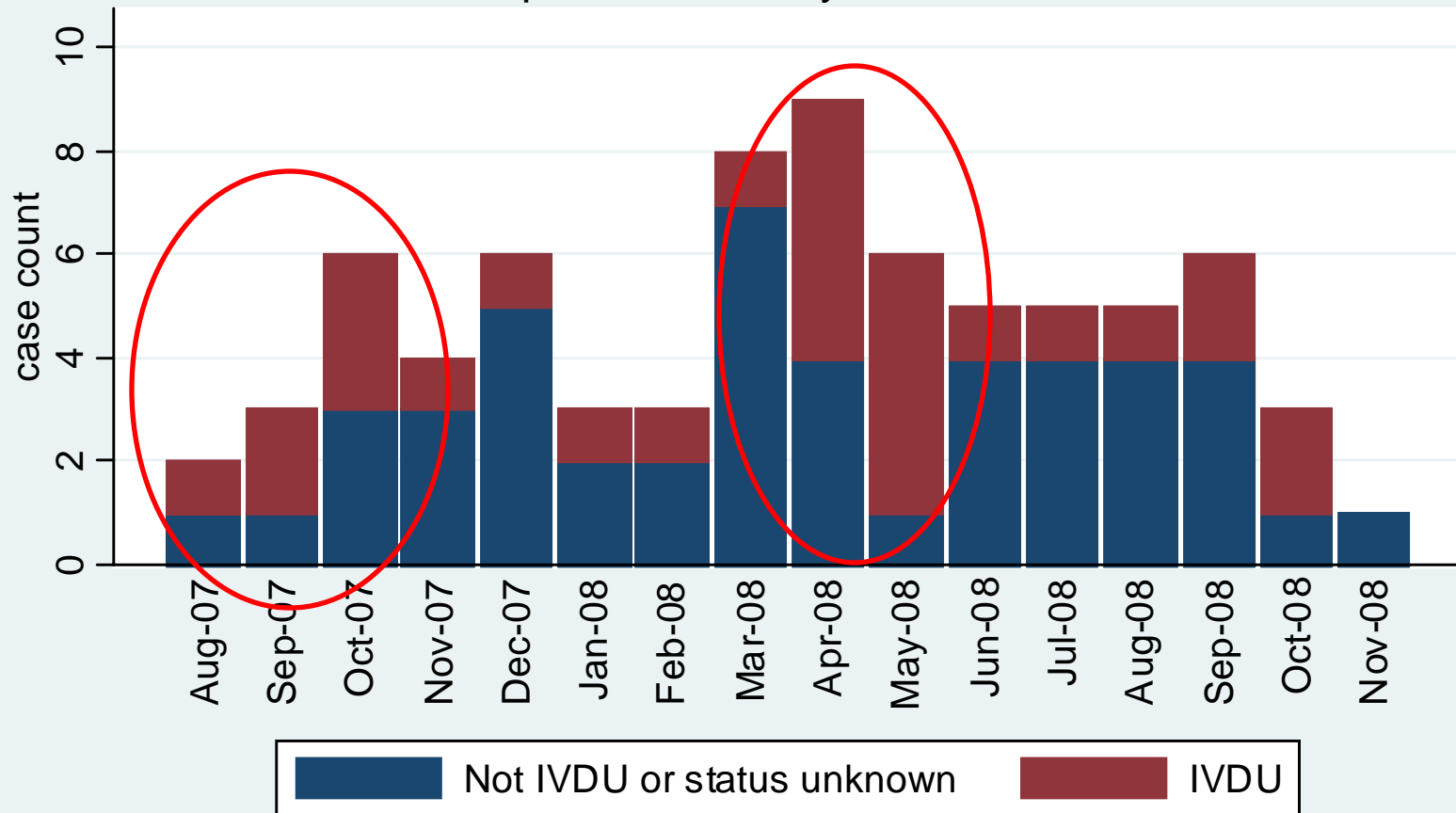


Current as of 11-Nov-2008

Outbreak started in Aboriginal community and...

Thunder Bay Invasive Group A Streptococcal Disease Outbreak

Epidemic curve by IVDU status

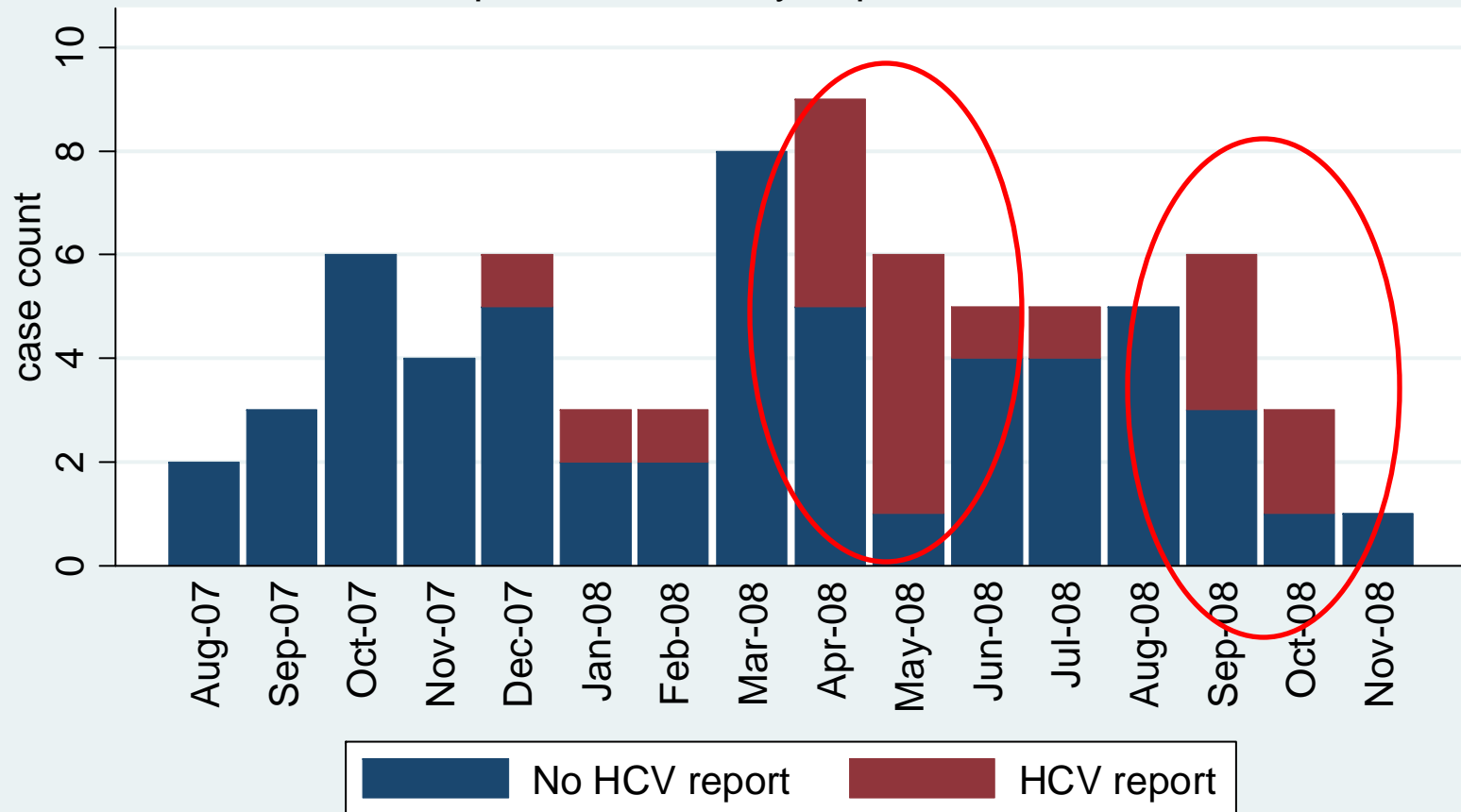


Current as of 11-Nov-2008

...among intravenous drug users

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Epidemic curve by hepatitis C status

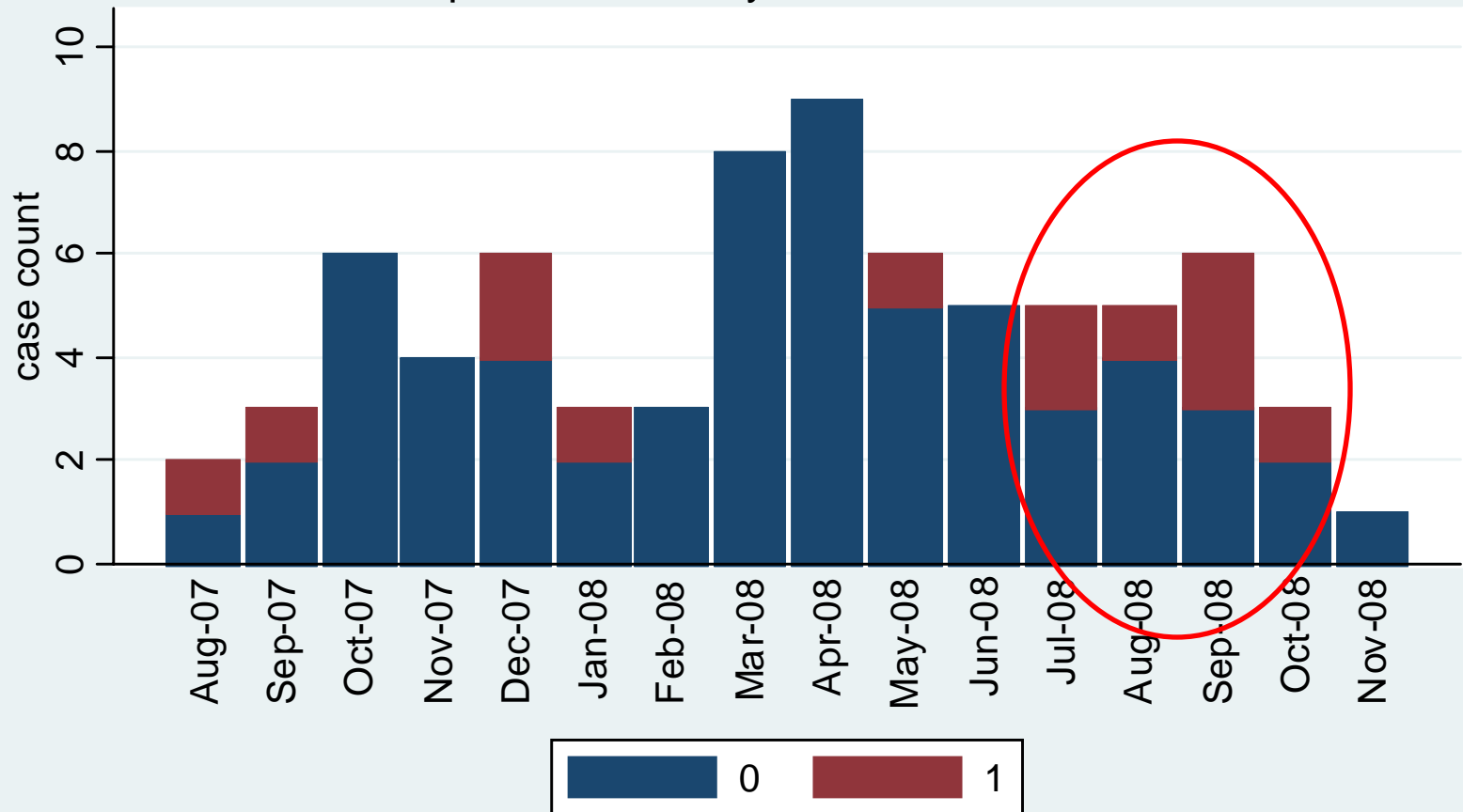


Current as of 11-Nov-2008

Hepatitis C status (IPHIS reports)

Thunder Bay Invasive Group A Streptococcal Disease Outbreak

Epidemic curve by underhoused status



Current as of 11-Nov-2008

Underhousing difficult to assess, except most extreme

- Aboriginal: 39% IVDU
- Non-aboriginal: 31% IVDU
- Pearson chi-square: $p=0.473$

- Aboriginal: 18% HCV+ (reported)
- Non-aboriginal: 23% HCV+ (reported)
- Pearson chi-square: 0.519

Aboriginal identity not related to IVDU or HCV status

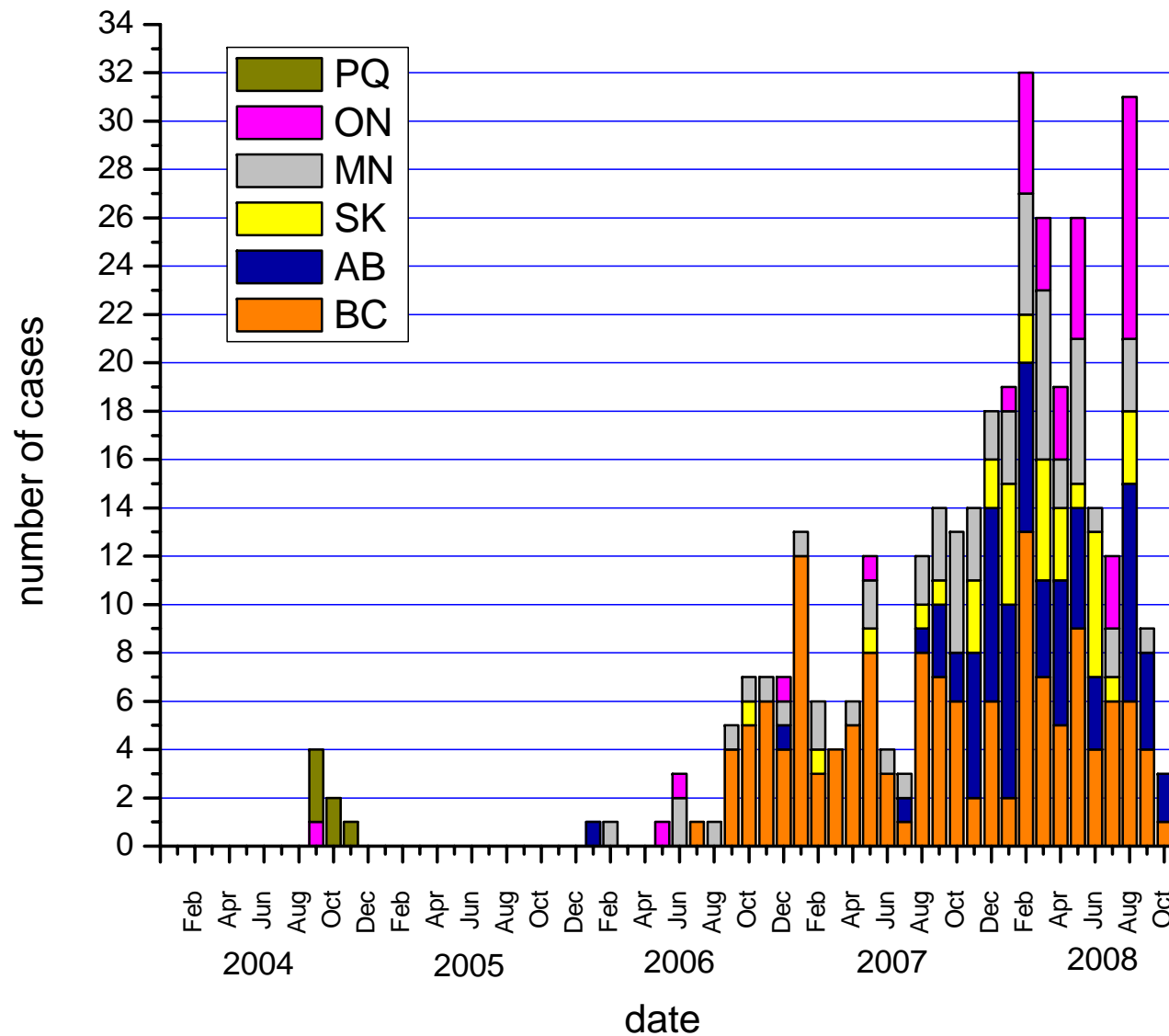
- Possible relationship between aboriginal ethnicity and underhousing
 - Aboriginal: 24%
 - Non-aboriginal: 9%
 - Pearson chi-square: 0.082
- Possible relationship between aboriginal ethnicity and chronic disease
 - Don't have adequate data yet

Why so many Aboriginal people?

- Different parts of the outbreak had different risk factors
- Probably worthwhile to try to better assess chronic disease status, since it is a known risk factor

Emm-59

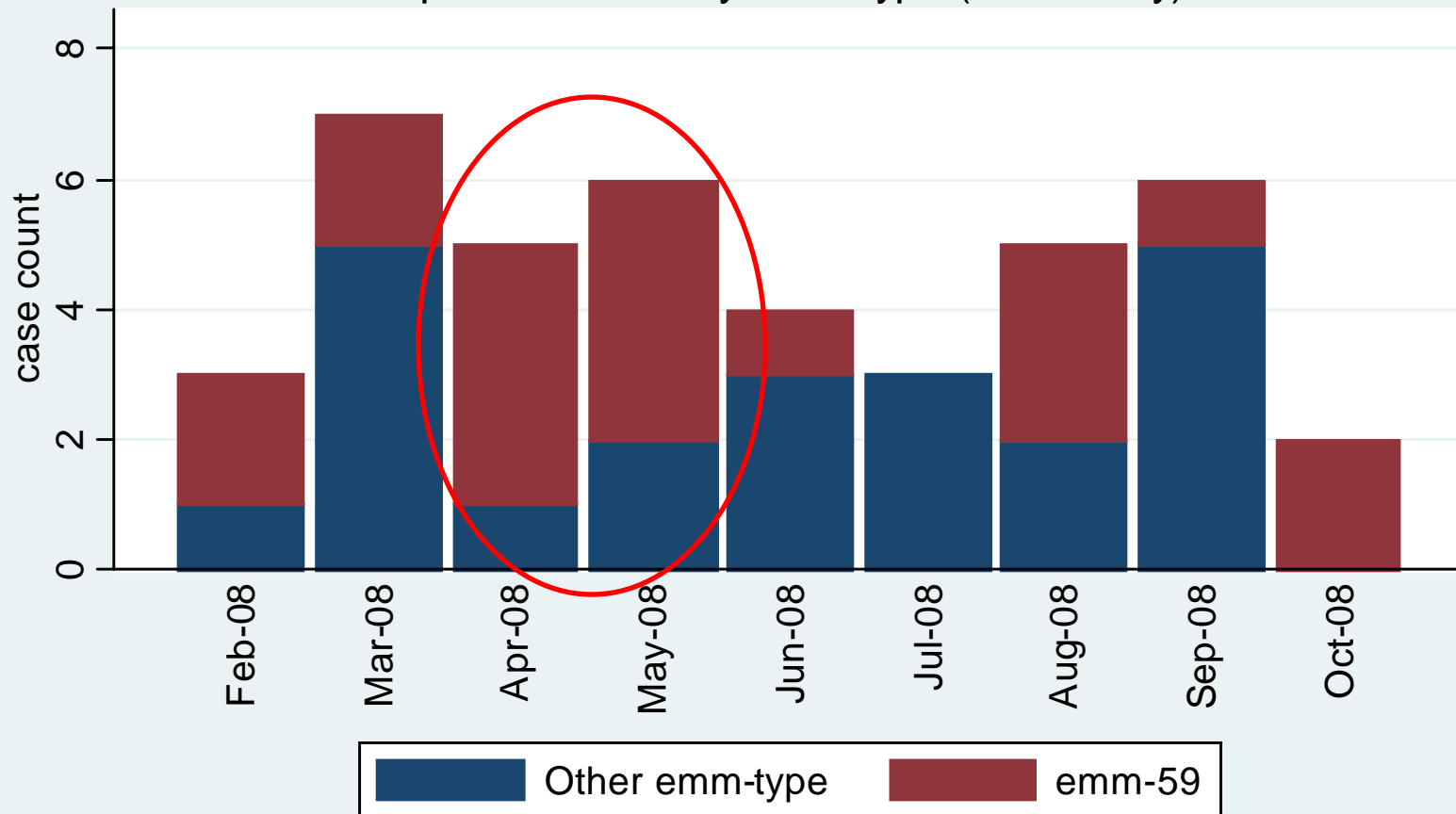




Graph courtesy of
Dr. Greg Tyrrell,
National Centre
for Streptococcus

Movement of emm-59 across Canada

Thunder Bay Invasive Group A Streptococcal Disease Outbreak Epidemic curve by emm-type (cases only)

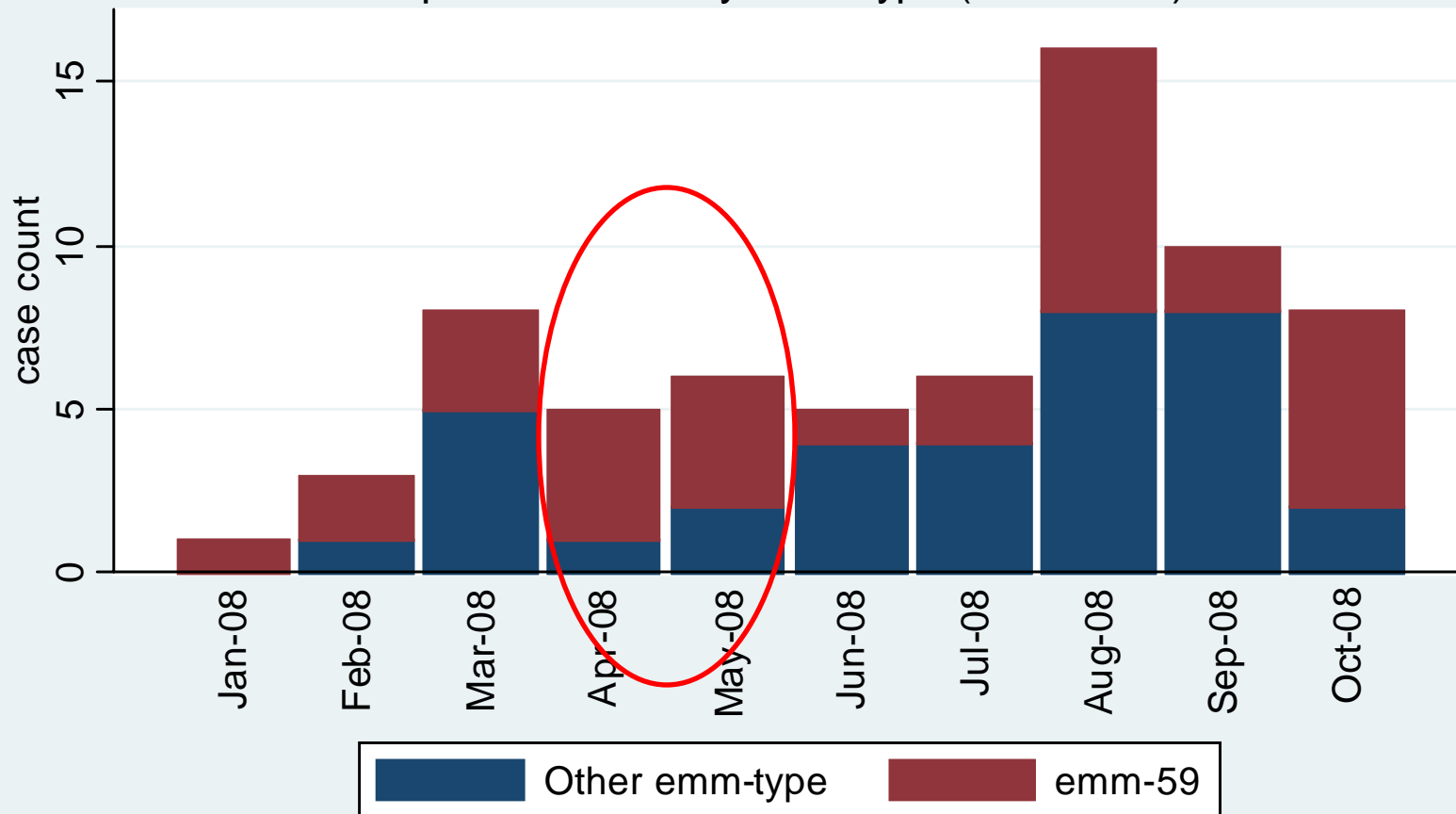


Current as of 11-Nov-2008

Epidemic curve by emm-type (cases only)

Thunder Bay Invasive Group A Streptococcal Disease Outbreak

Epidemic curve by emm-type (all isolates)



Current as of 11-Nov-2008

emm-types of all isolates

	non-invasive	non-severe invasive	severe invasive	death	Total
Other emm-type	11	17	3	4	35
emm-59	12 (52%)	9 (35%)	6 (67%)	3 (43%)	30 (46%)
Total	23	26	9	7	65

Pearson chi-squared test; $p=0.350$

emm-typing results, by severity

	OR for emm-59	95% CI
HCV+	2.8	0.76, 11.2
IVDU	2.6	0.78, 8.7
Aboriginal	1.2	0.38, 3.8
Under-housed	0.14	0.003, 1.2
Any of above	1.0	0.33, 3.3

No relationship between risk factors and emm-59

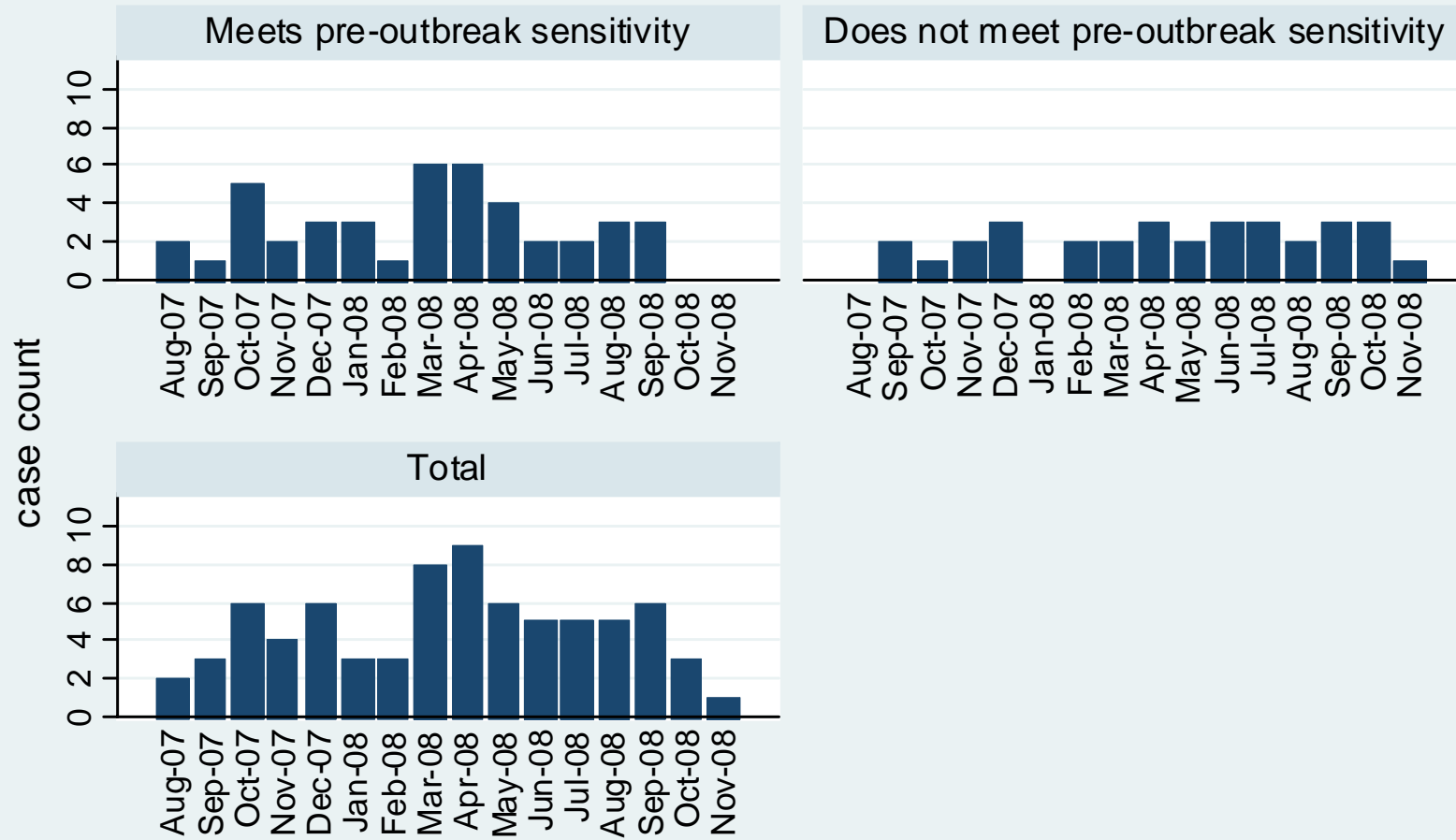
- Thunder Bay first in Ontario to identify emm-59 outbreak
- emm-59 probably not more virulent, but novelty may be partly responsible for the increase in IGAS
- Found throughout the outbreak
- Not related to risk factors thus far identified

Handling the Outbreak

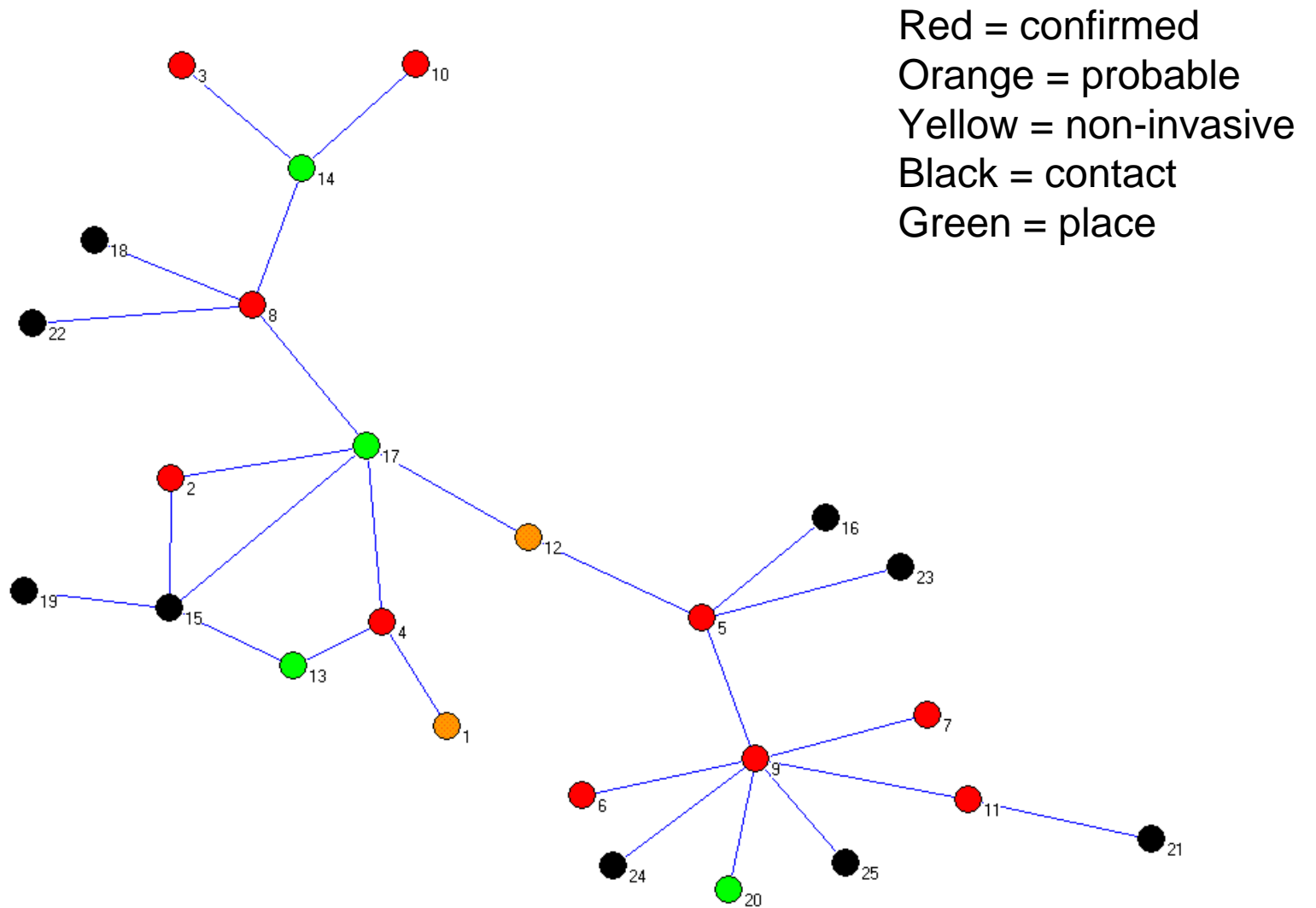


Thunder Bay Invasive Group A Streptococcal Disease Outbreak

Epidemic curve by sensitivity to pre-outbreak case definition



Current as of 11-Nov-2008



Autism-Drug House Network (n=25)

- Outbreak measures
 - promptly identify and treat cases
 - collect sterile specimens to confirm diagnosis (and facilitate contact tracing)
 - identify and chemoprophylax close contacts
 - educate contacts re: signs and symptoms of GAS infection
 - outreach to high risk groups

- Canadian IGAS Guidelines
 - prophylaxis of close contacts is “cornerstone” of outbreak management
 - Canadian guidelines recommend that only close contacts of confirmed *severe* cases be prophylaxed, and only up to 7 days after last contact with infectious case
- Thunder Bay outbreak
 - Close contacts of all invasive cases should be prophylaxed
 - evidence of spread from non-severe invasive cases
 - Prophylax close contacts even if more than 7 days later
 - many instances of close contacts that acquired invasive disease several months after case
 - subsequent cases may have carried bacteria for months before a suitable portable of entry became available
 - carrier state is common (5-20% of population)
 - Consider the likely risk factors of the contacts

- Studies of household contacts of sporadic cases indicate 20-100 fold increased risk
- When baseline risk is low:
 - restrict prophylaxed group based on time since exposure, duration of contact, etc.
- When baseline risk is high:
 - expand prophylaxis group based on known biology of transmission of group A strep
 - consider risk factors of close contacts

Drug	Dosage	Comments
First-generation cephalosporins: cephalexin, cephadroxil, cephadrine	First line. Children and adults: 25 to 50 mg/kg daily, to a maximum of 1 g/day in 2 to 4 divided doses × 10 days	Recommended drug for pregnant and lactating women. Should be used with caution in patients with allergy to penicillin. Use of cephalosporins with nephrotoxic drugs (e.g. aminoglycosides, vancomycin) may increase the risk of cephalosporin-induced nephrotoxicity.
Erythromycin	Second line. Children: 5 to 7.5 mg/kg every 6 hours or 10 to 15 mg/kg every 12 hours (base) × 10 days (not to exceed maximum of adult dose) Adults: 500 mg every 12 hours (base) × 10 days	Erythromycin estolate is contraindicated in persons with pre-existing liver disease or dysfunction and during pregnancy. Sensitivity testing is recommended in areas where macrolide resistance is unknown or known to be ≥ 10%.
Clarithromycin	Second line. Children: 15 mg/kg daily in divided doses every 12 hours, to a maximum of 250 mg po bid × 10 days Adults: 250 mg po bid × 10 days	Contraindicated in pregnancy. Sensitivity testing is recommended in areas where macrolide resistance is unknown or known to be ≥ 10%.
Clindamycin	Second line. Children: 8 to 16 mg/kg daily divided into 3 or 4 equal doses × 10 days (not to exceed maximum of adult dose) Adults: 150 mg every 6 hours × 10 days	Alternative for persons who are unable to tolerate beta-lactam antibiotics.

Public Health Agency of Canada

Guidelines for the Prevention and Control of Invasive Group A Streptococcal Disease

http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/06pdf/32s2_e.pdf

Prophylaxis guidelines

- For high risk groups that will not take 10 days of cephalexin:
- single dose of 1g azithromycin
 - danger of macrolide resistance if overused
 - not recommended for routine use
- ideally free, delivered to client, and directly observed
 - by public health nurse using medical directive if physicians unavailable or don't want to deliver

Alternative prophylaxis to consider

- Large outbreak of IGAS in Thunder Bay and District
 - 75 cases, 10 deaths, 10x baseline rate
- Prompt identification and adequate treatment to prevent relapse
- Chemoprophylaxis of close contacts is the cornerstone of outbreak control
- Extra effort needed when case and contacts are high-risk