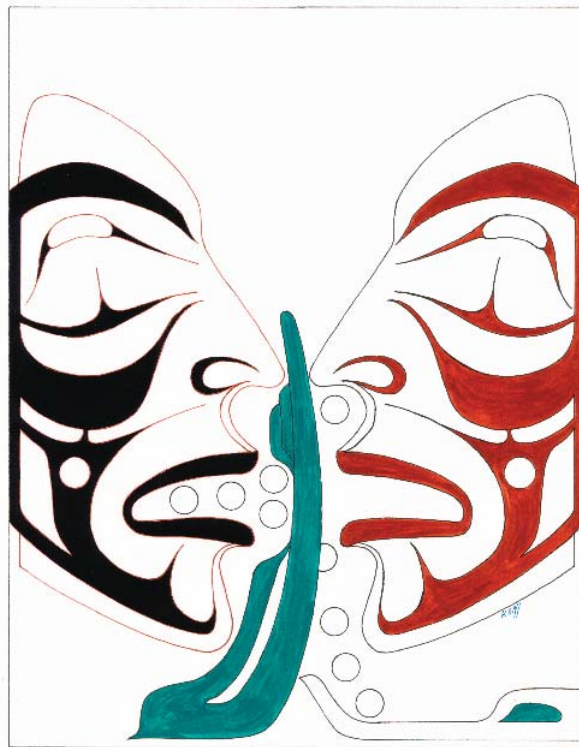
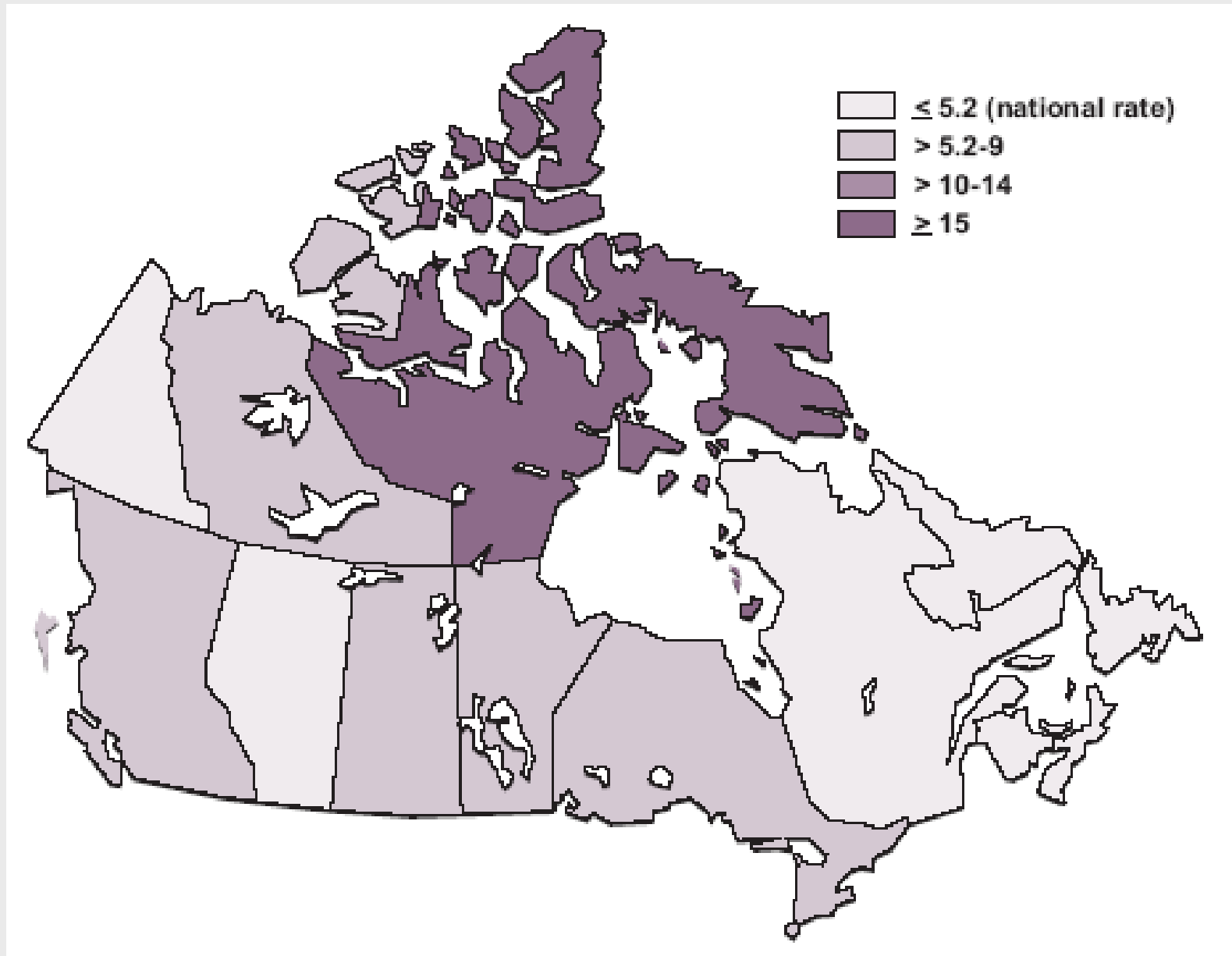


TB in First Nations population

Dr Kevin Elwood



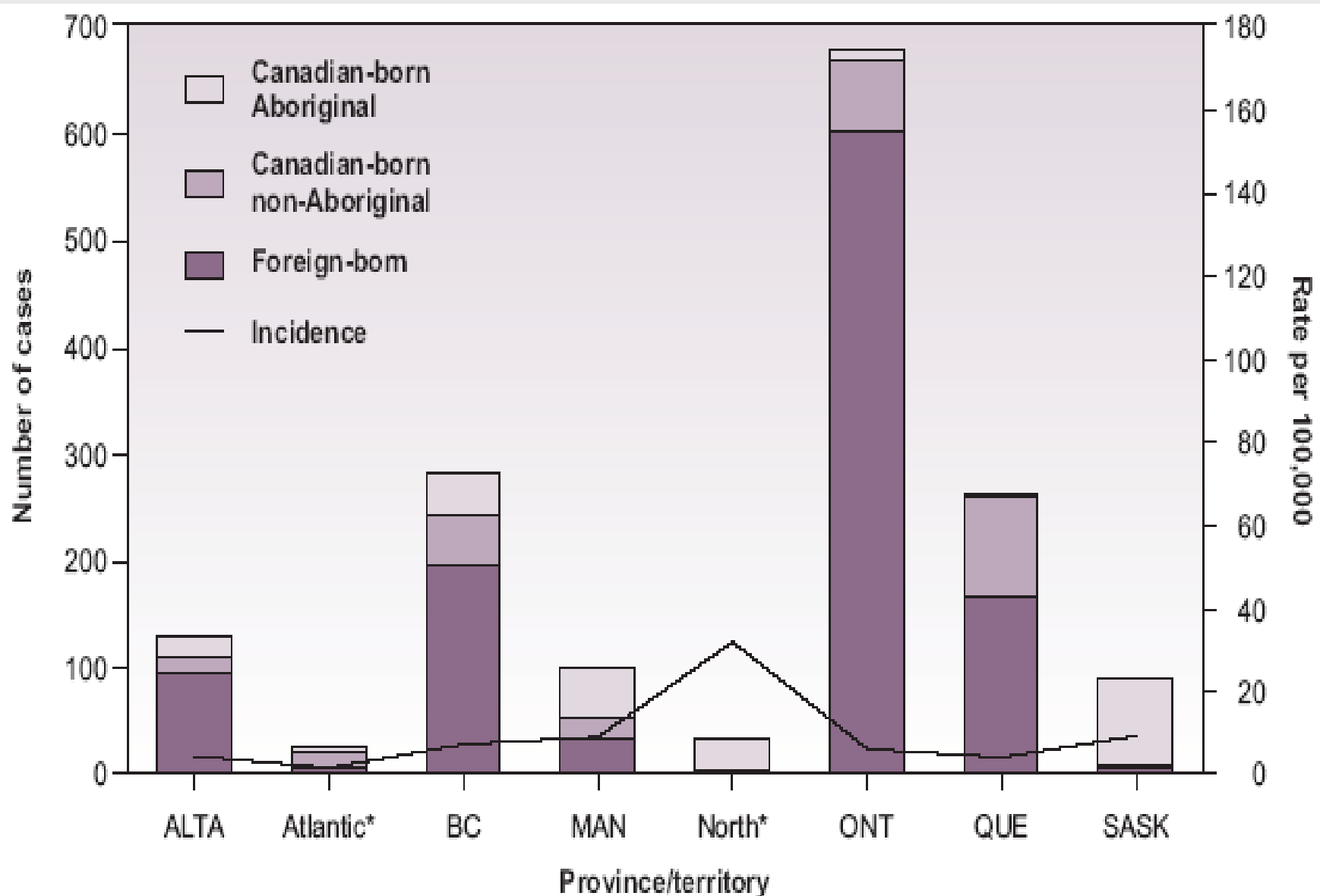
TB Incidence by Province and Territory, 2002



Origin based groups

- Canadian- born Aboriginal
- Canadian- born non Aboriginal
- Foreign-born
- 2001 census 1.3 mil 4.4% Canadian population
- “Aboriginal”-62% North American Indians
 - » 30% Métis, 5% Inuit

TB Cases by Origin and Location, 2002

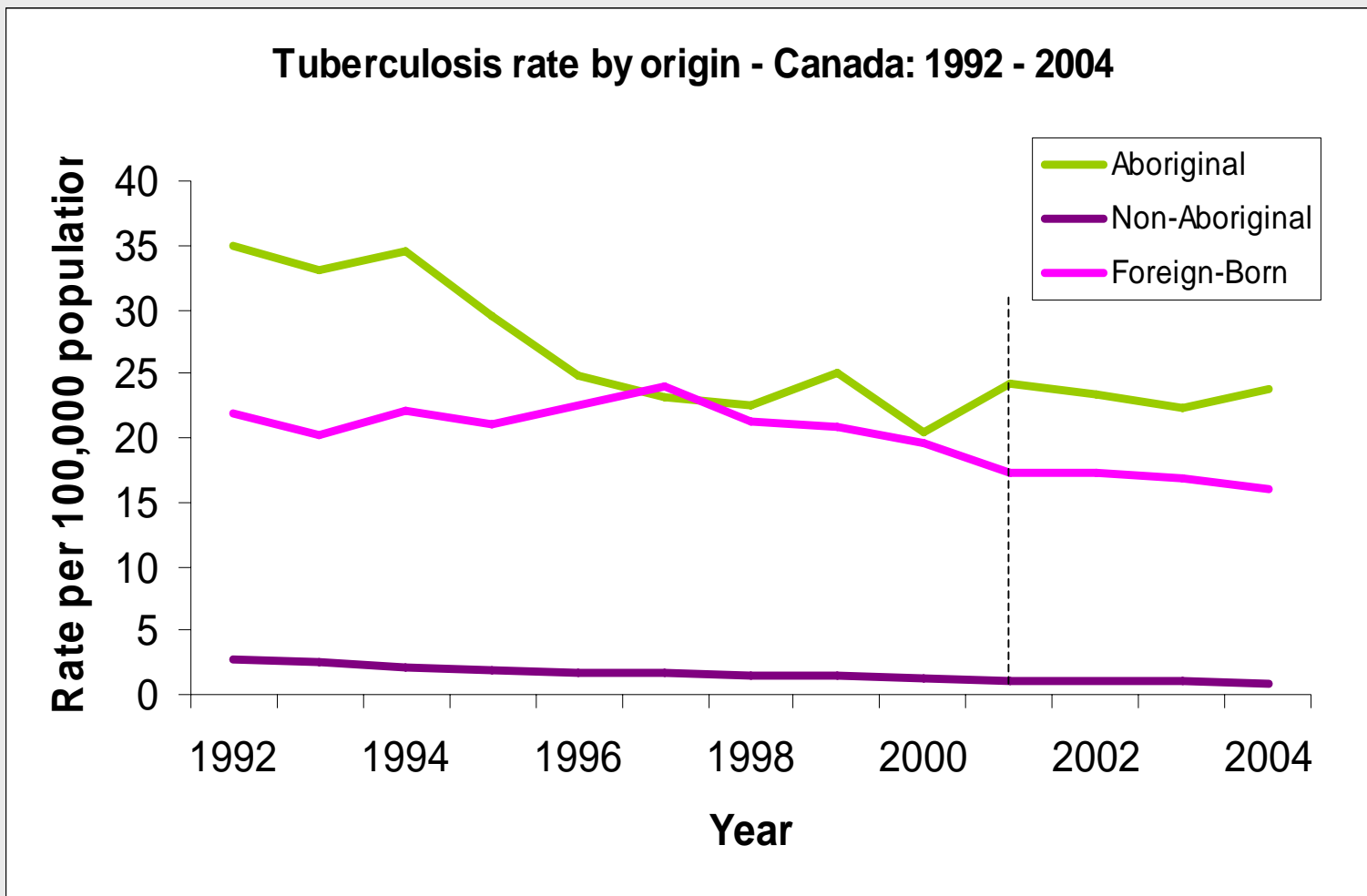


TB Cases by origin 1992-2004

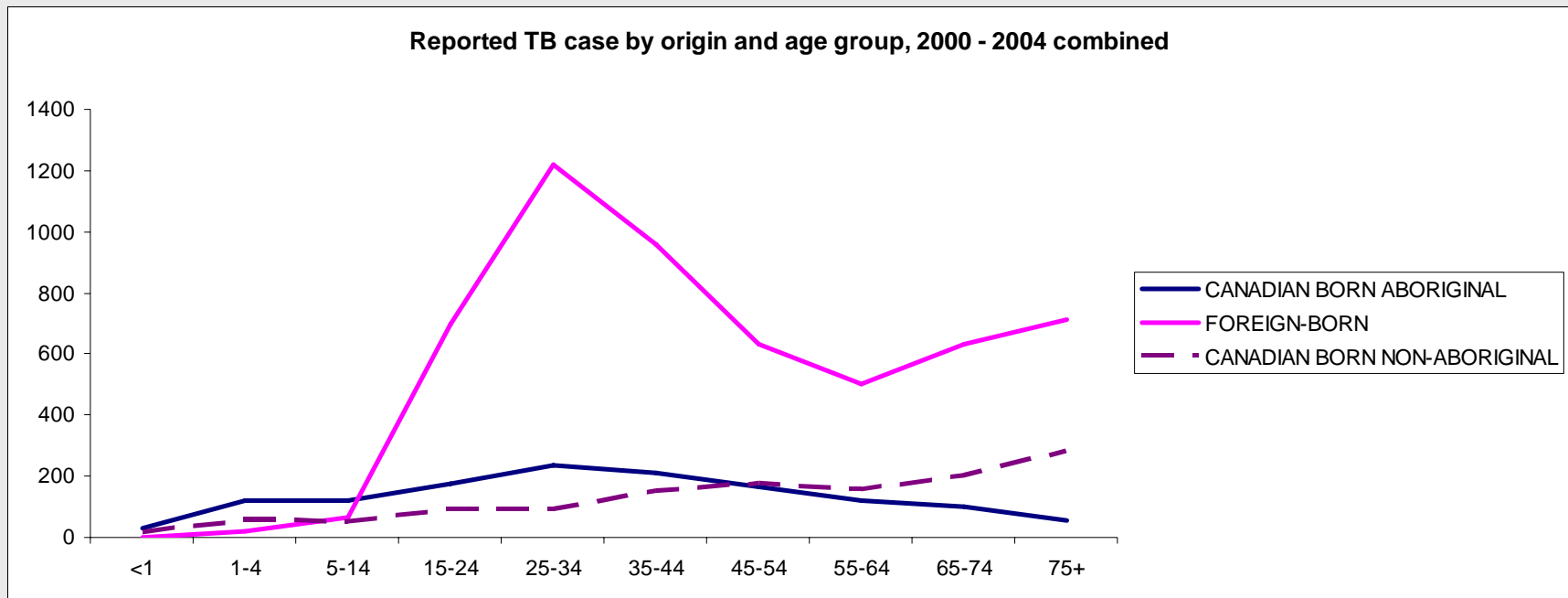
National data 97% recorder origin

| | |
|------------------------------|------------|
| Canadian- born aboriginal | 17% (23.8) |
| Canadian-born non aboriginal | 16% |
| Foreign- born | 67% |

TB Rates by Origin



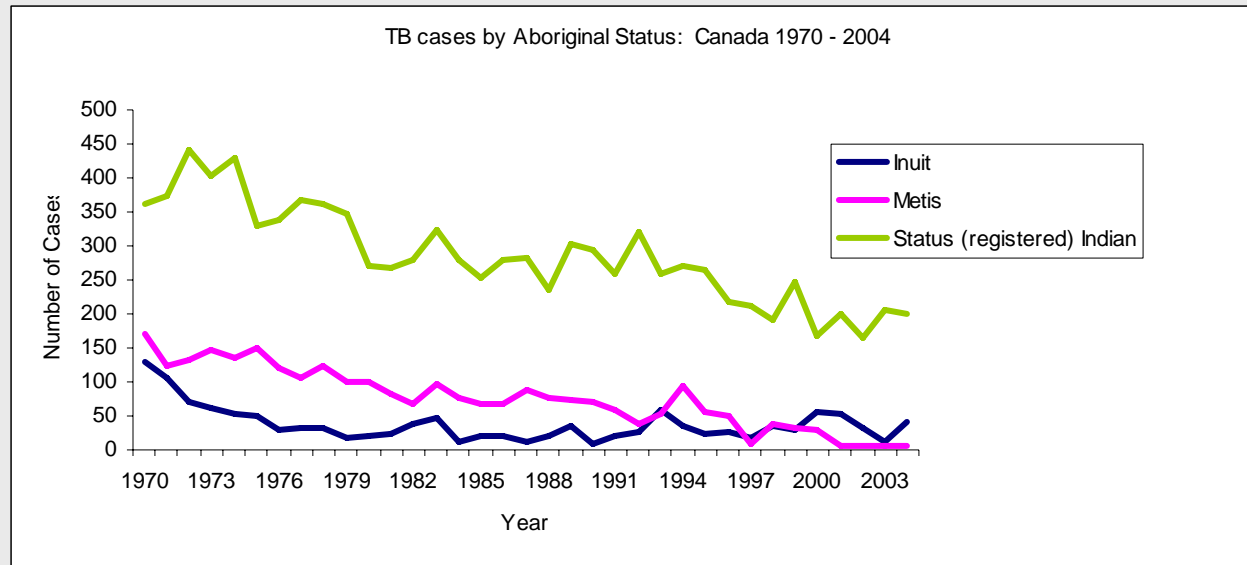
TB cases by origin and age group



TB cases by age 2000-2004

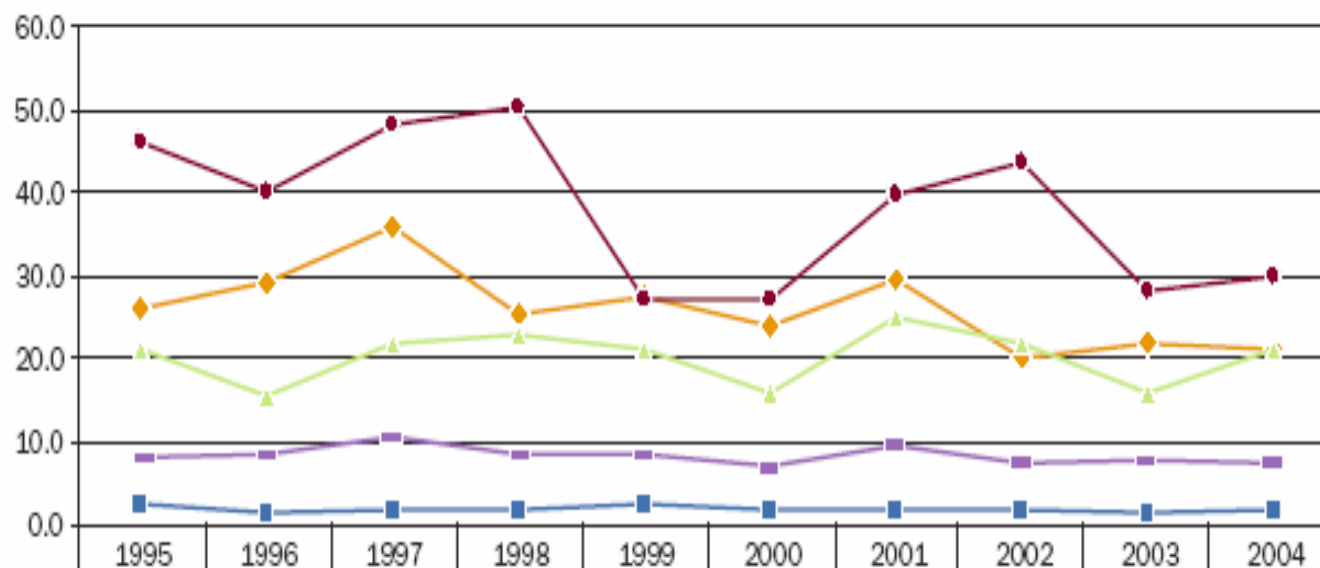
- 33% Aboriginal cases >25yrs (median 34yrs)
- 16% Canadian –born (median 65yrs)
- 14% foreign- born (median 42yrs)

TB cases by Aboriginal status



TB Incidence in BC by Origin and Year

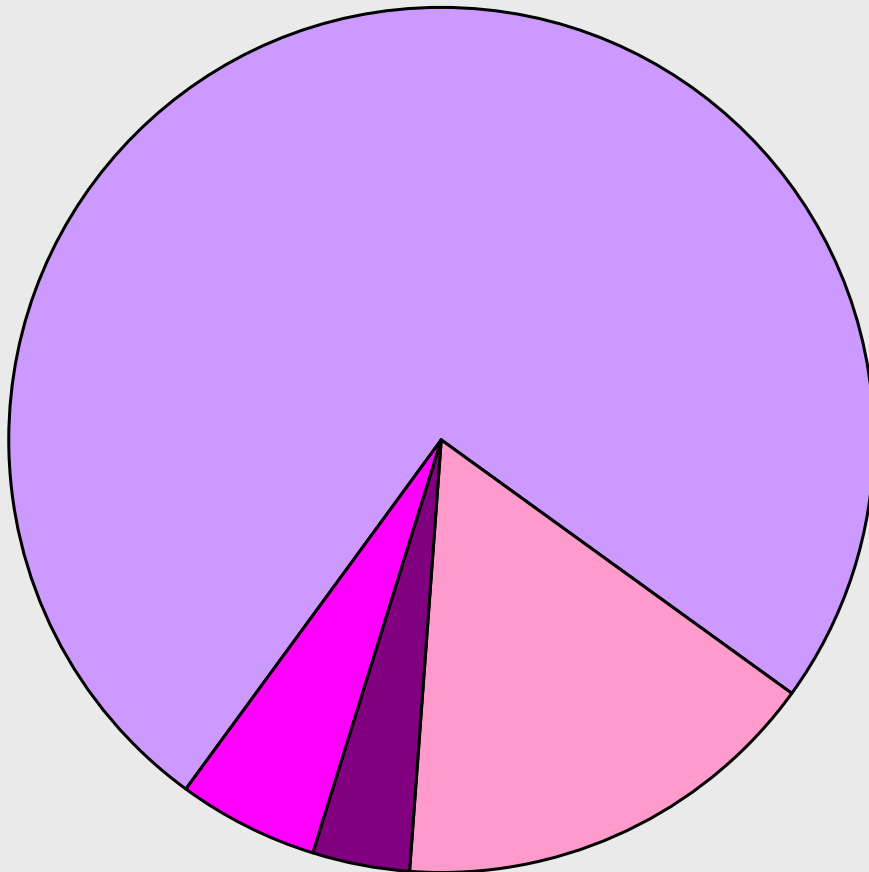
Incident rates
per 100,000
population



| | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 |
|-------------------------------------|------|------|------|------|------|------|------|------|------|------|
| Foreign born | 26.1 | 29.1 | 35.8 | 25.4 | 27.2 | 24.0 | 29.3 | 20.0 | 21.9 | 21.2 |
| Canadian born* | 2.5 | 1.5 | 1.8 | 1.9 | 2.3 | 1.8 | 1.8 | 1.8 | 1.3 | 1.6 |
| Aboriginal, registered, on reserve | 21.0 | 15.3 | 21.9 | 23.0 | 21.2 | 15.9 | 24.8 | 21.7 | 15.7 | 20.9 |
| Aboriginal, registered, off reserve | 46.1 | 39.9 | 48.1 | 50.2 | 26.9 | 26.9 | 39.7 | 43.6 | 28.1 | 29.9 |
| Provincial rate (B.C.) | 8.2 | 8.4 | 10.5 | 8.5 | 8.3 | 7.1 | 9.5 | 7.3 | 7.6 | 7.4 |

TB Cases in BC by Origin, 2004

n = 310



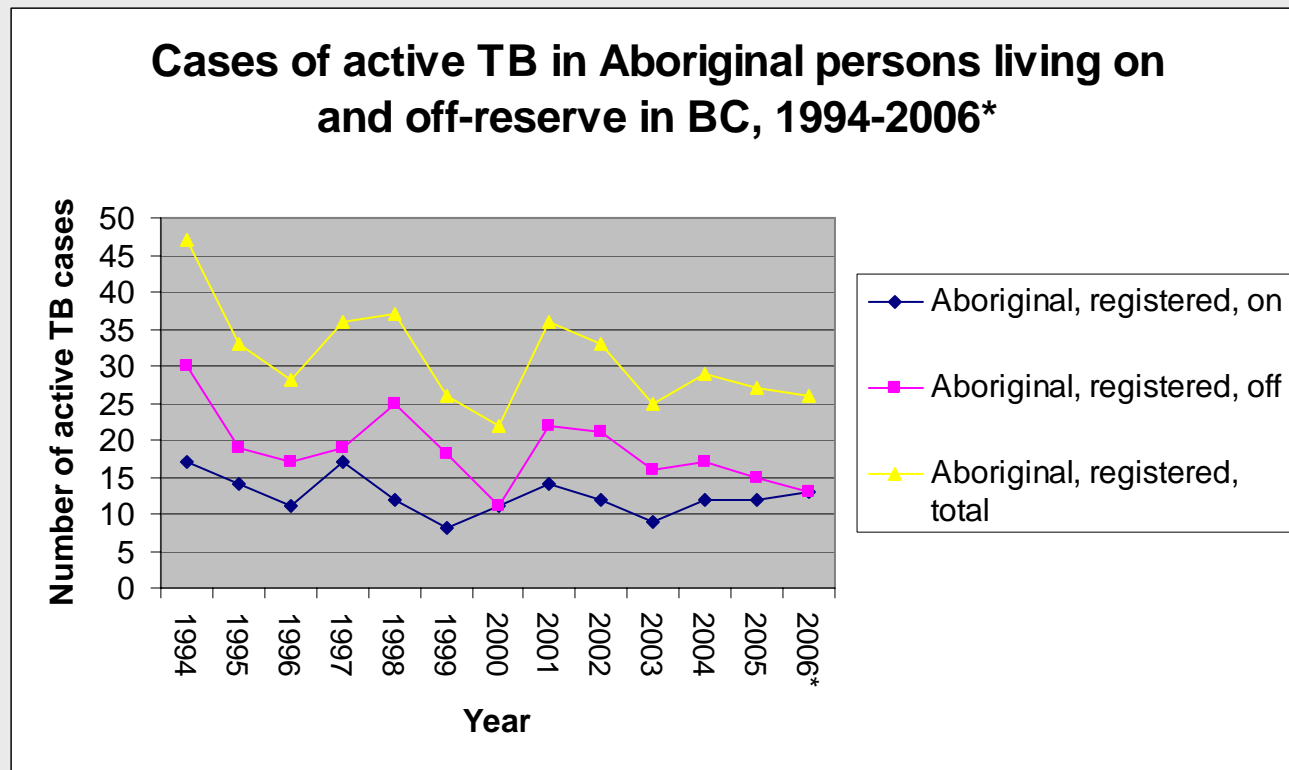
Foreign-Born 75%

Canadian-Born
Non-Aboriginal 16%

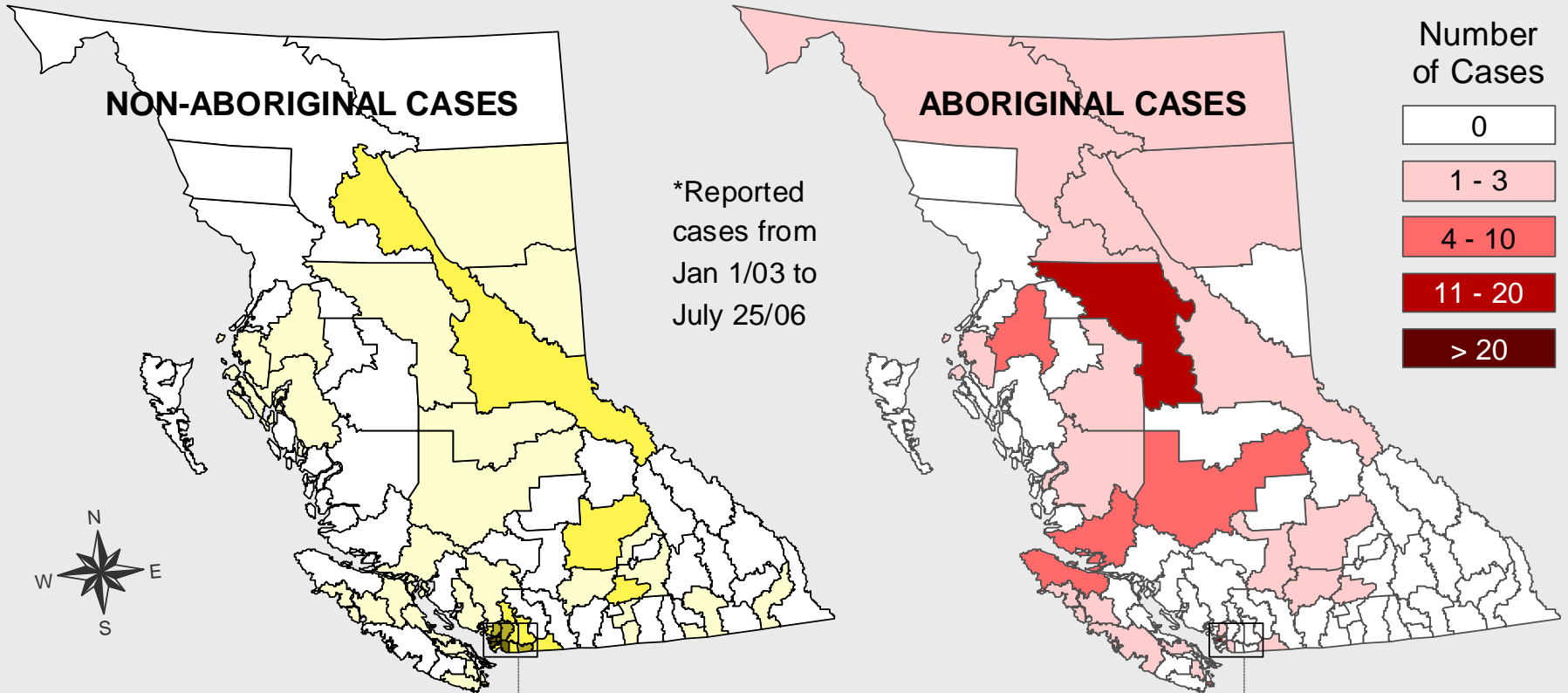
Aboriginal
On-reserve 3.6%

Aboriginal
Off-reserve 5.4%

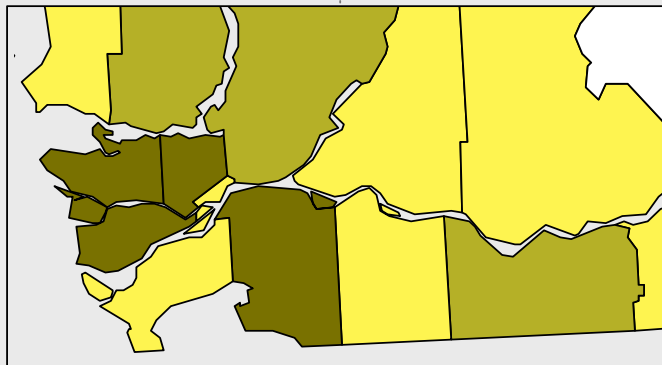
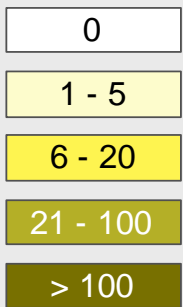
Number of cases on/off res



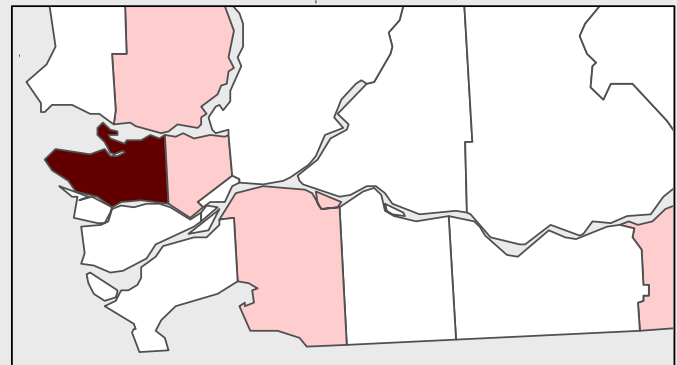
Number of Tuberculosis Cases in BC: Map Comparison of Non-Aboriginal and Aboriginal Cases*



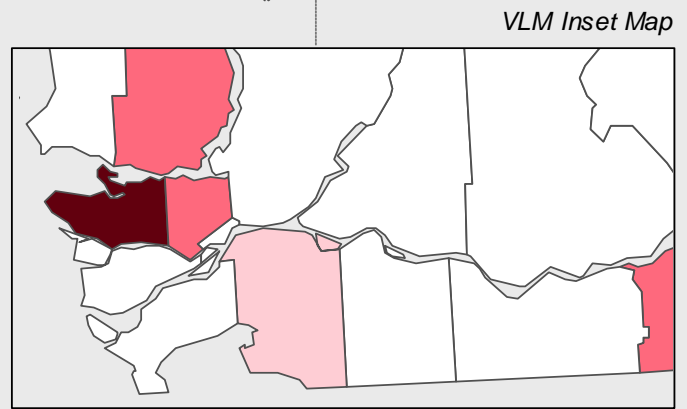
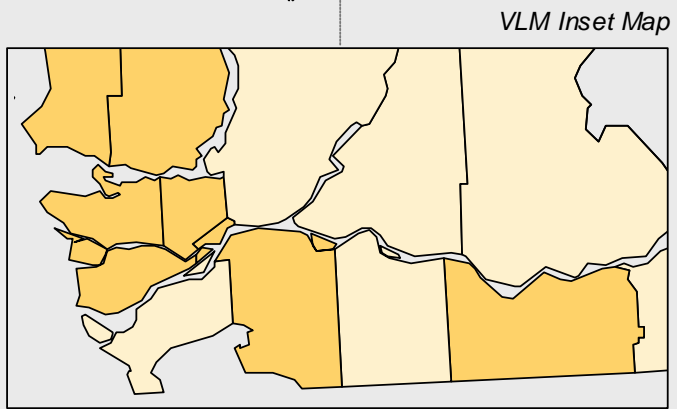
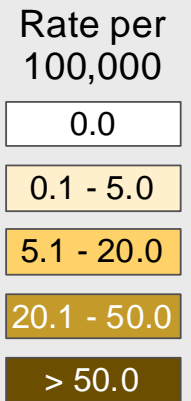
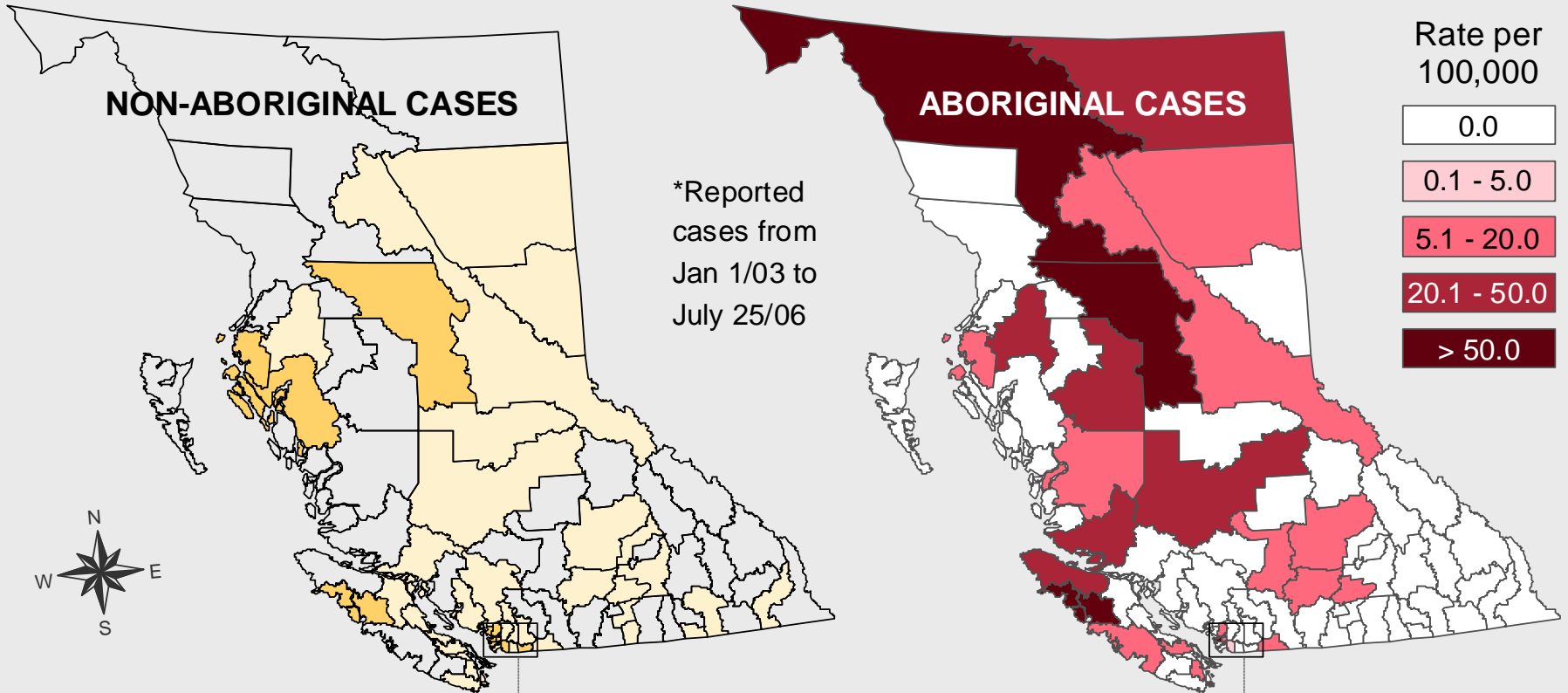
Number of Cases



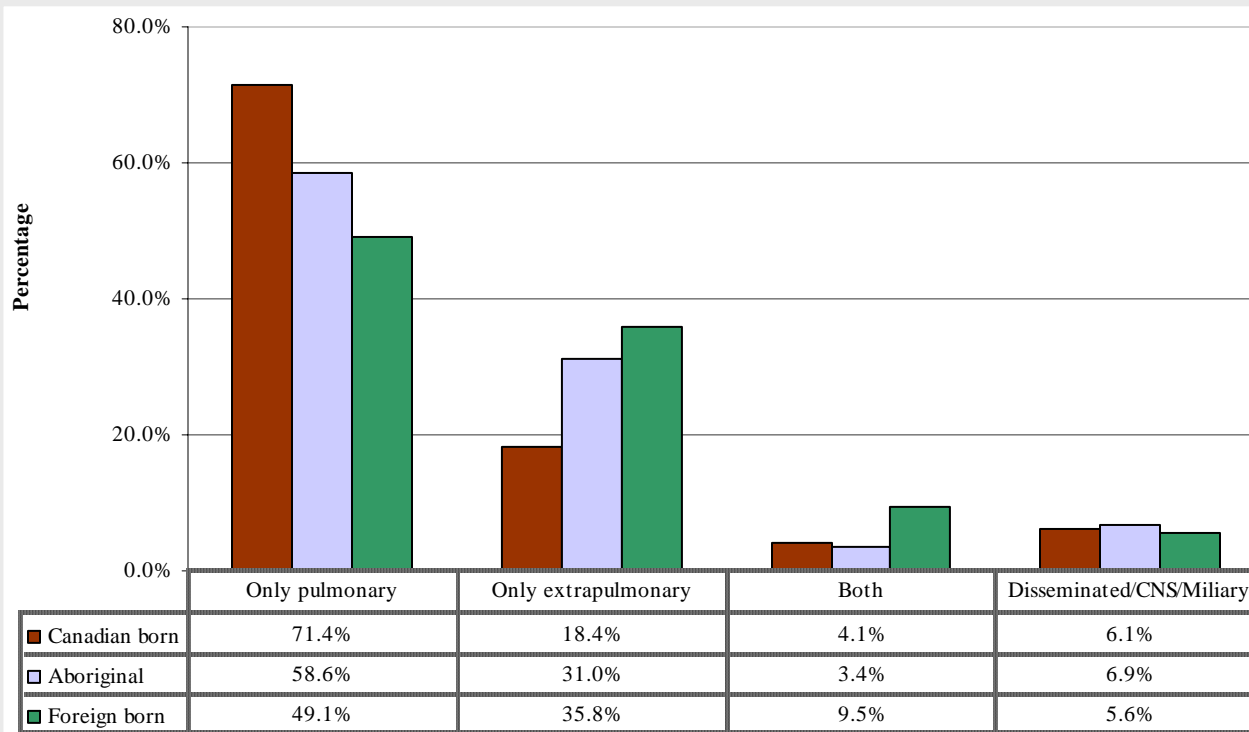
VLM Inset Map



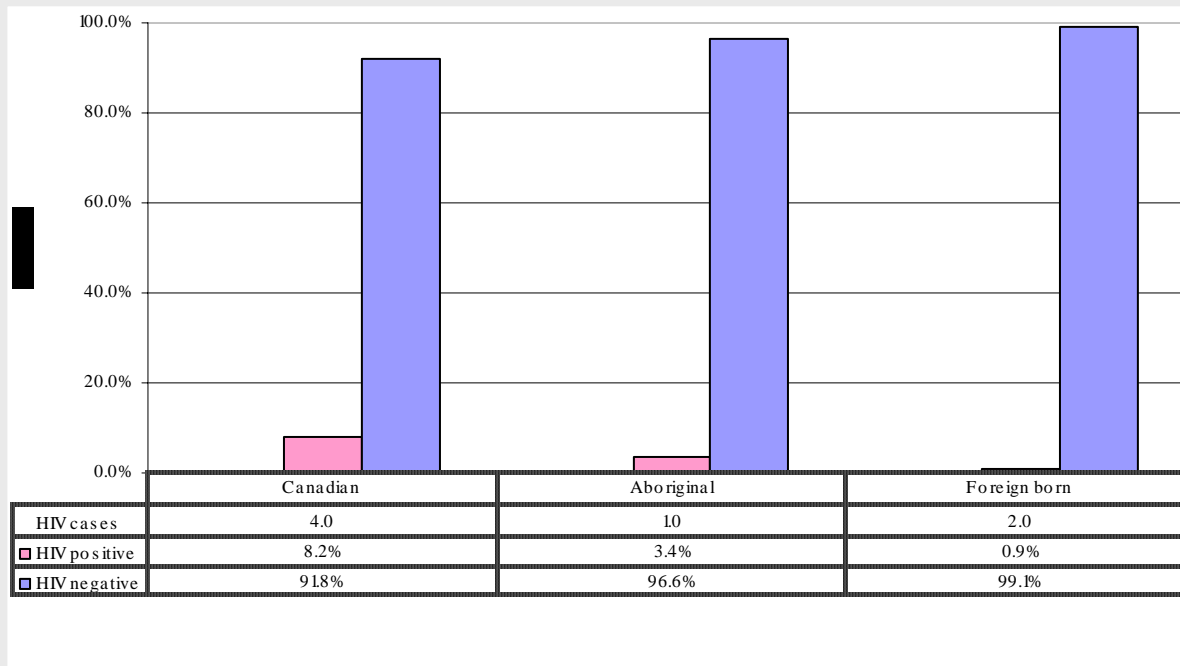
Annualized Tuberculosis Rates in BC: Map Comparison of Non-Aboriginal and Aboriginal Cases*



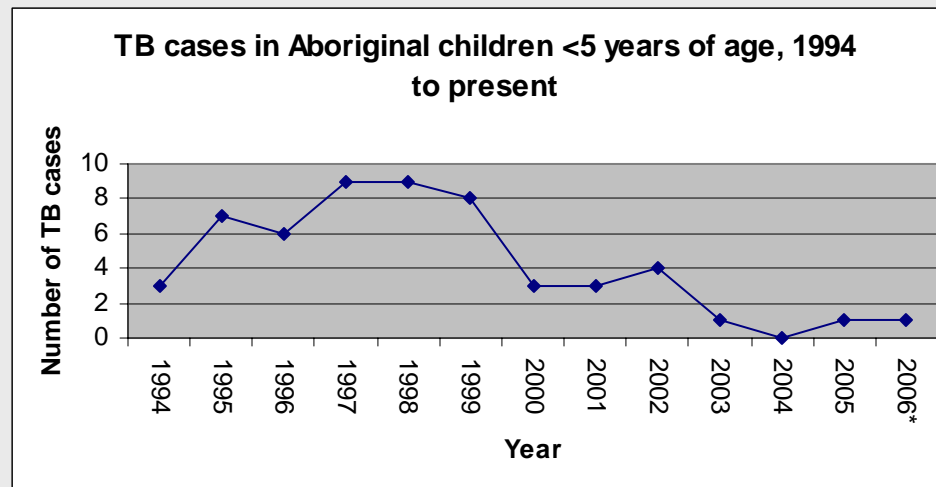
Clinical presentations



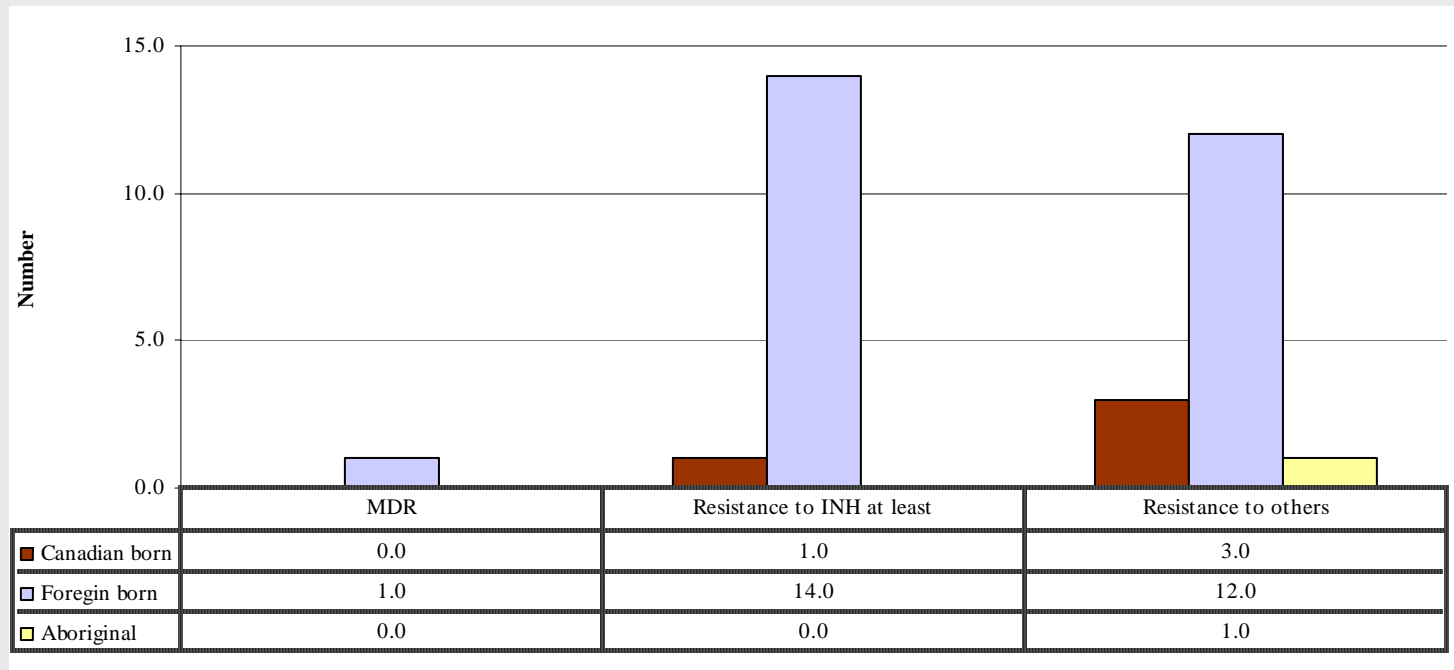
HIV status



Pediatric cases



Drug resistance



Health status Data challenges

- Enumeration of the population
 - Coverage and quality
- Data jurisdiction and utility
- Data governance-right to self – government
- Infrastructure and human resource capacity

Data challenges

- Collaborate internationally-Australia and NZ require ethnicity data when using the healthcare system
- Participate with Aboriginal peoples to collect culturally relevant and meaningful data



Anatomy of an Outbreak: TB in Central Island

**BCCDC Grand Rounds
January 19, 2007**

Kevin Elwood
Elizabeth Brodkin
Lena Shah

Outbreak in Central Vancouver Island



Case 2 - July 2006

- 15 month old FN girl on reserve in Port Alberni
- July 14 developed L-sided weakness
- July 16 admitted to BCCH with L hemiparesis due to cerebral infarctions
- CSF 50% lymphocytes, 50% neutrophils, CXR showed a miliary pattern
- Started on treatment for presumed TB meningitis
- Reverse contact tracing initiated

Case 3 - August 2006

- 20 year old FN man, Port Alberni and Uclulet
- Contact of Case 2
- Daily crack cocaine use
- Symptomatic since April, cough, night sweats
- Skin test negative, CXR showed bilateral airspace disease, L pleural effusion, cavitation both upper lobes
- Treatment challenging due to non-compliance

Case 4 - August 2006

- 40 year old FN woman off reserve in Port Alberni
- History of heavy alcohol use
- Symptoms since April, cough, chest pain, night sweats, weight loss
- June 3 presented to hospital, R pleural effusion, skin test negative, treated for atypical pneumonia
- August 2 returned with increased symptoms, miliary pattern on CXR, respiratory failure, septic shock
- BAL specimen positive for M tuberculosis
- Survived initial presentation, died December

Case 5 - August 2006

- 37 year old FN man, mobile in Port Alberni area
- Daily alcohol and crack cocaine use
- Symptoms of cough and weight loss
- Sister become concerned, brought him to MD
- CXR showed bilateral infiltrates, L pleural effusion, L upper lobe cavitation
- Initially treated as an out-patient, significant challenges, MHO involved, transferred to TB2

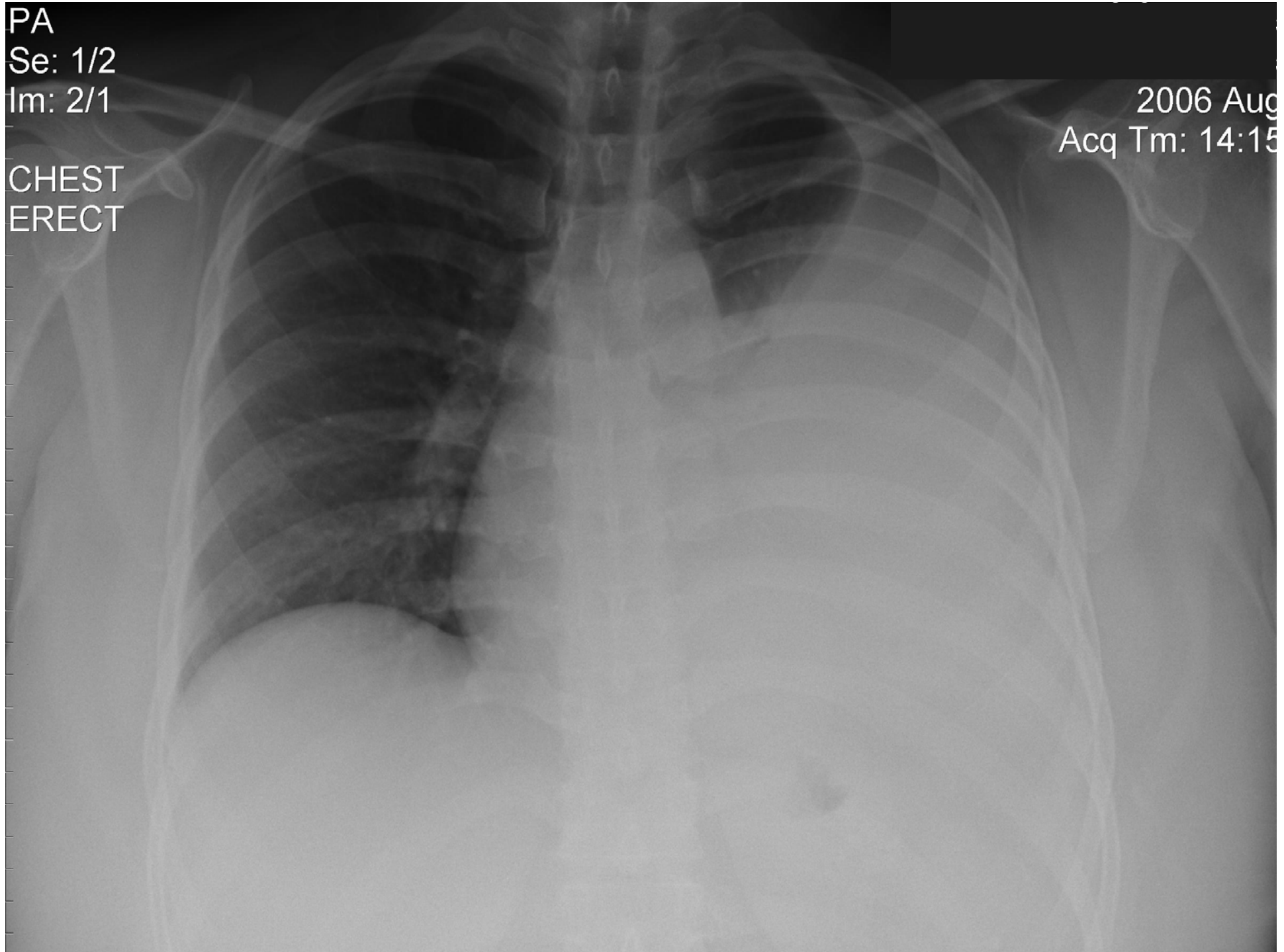
Cases 6 - 11, October 2006

- 6 cases diagnosed in October, all FN
- 4 presented with symptoms, 2 picked up through reverse contact tracing of case 2
- Delay in diagnosis in 3 cases
- 3 pleural cases, 3 pulmonary cases
- 3 heavy drinkers, 1 using crack cocaine
- 3 lived on-reserve, 3 lived off-reserve

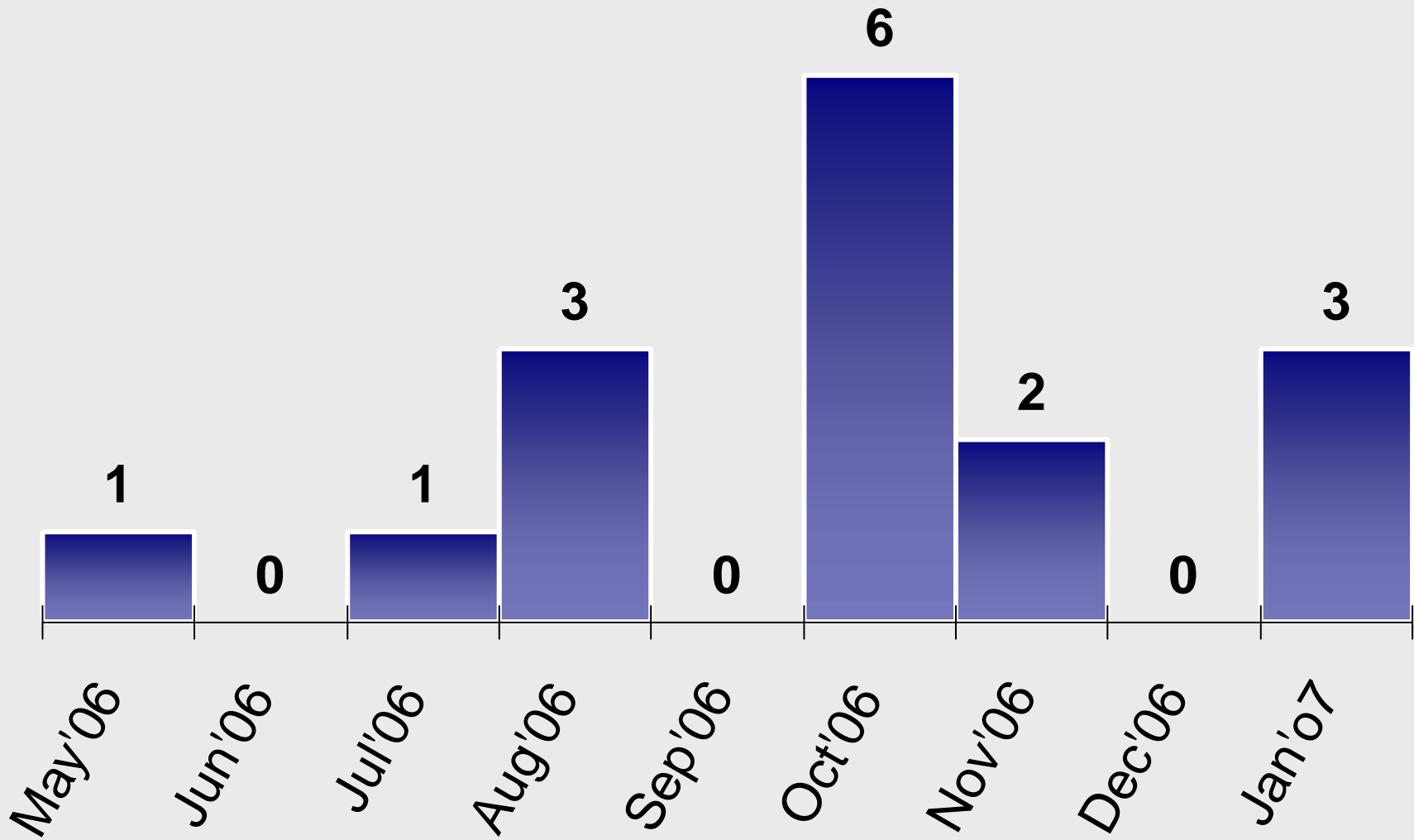
PA
Se: 1/2
Im: 2/1

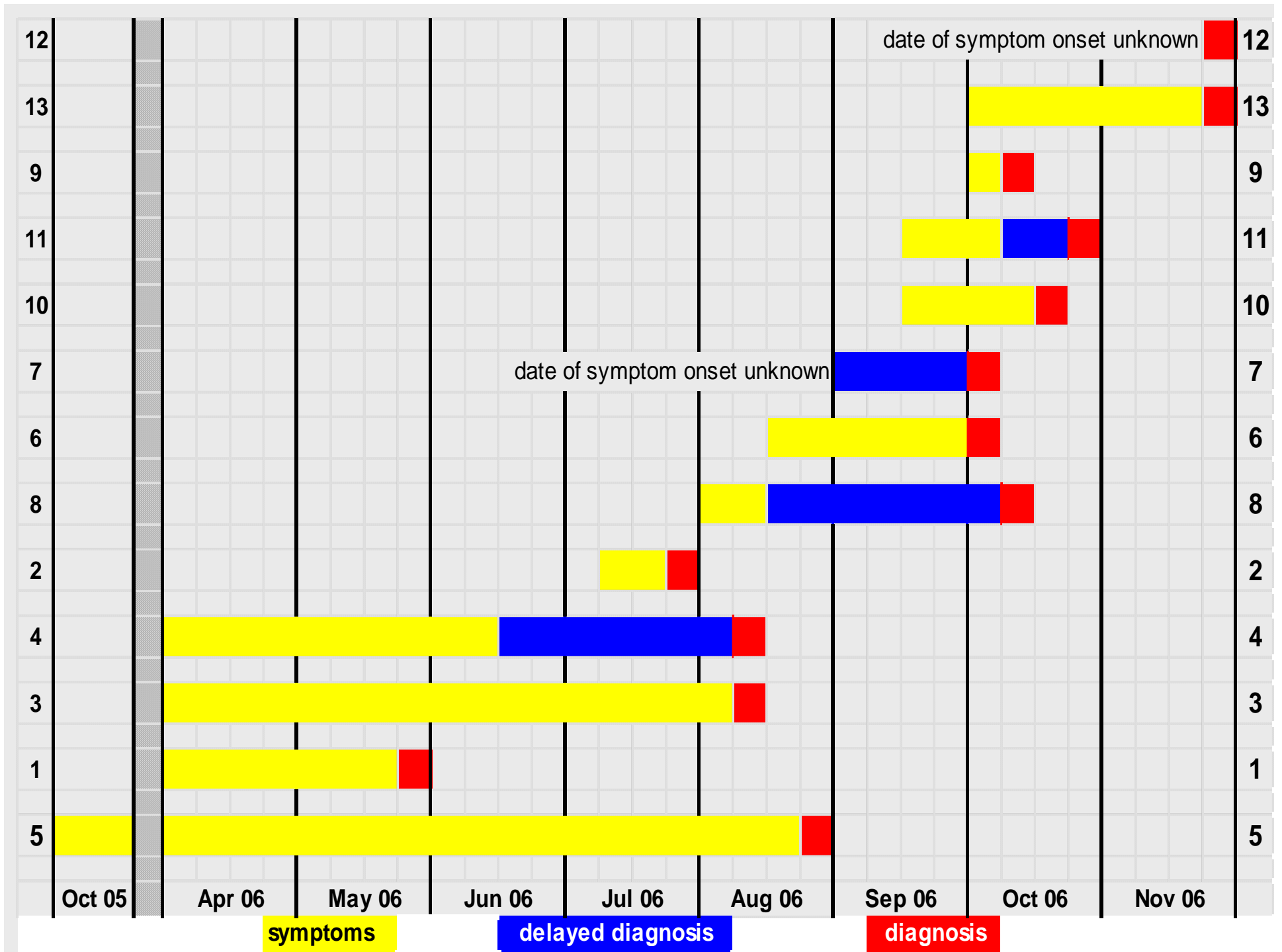
2006 Aug
Acq Tm: 14:15

CHEST
ERECT



Epi Curve

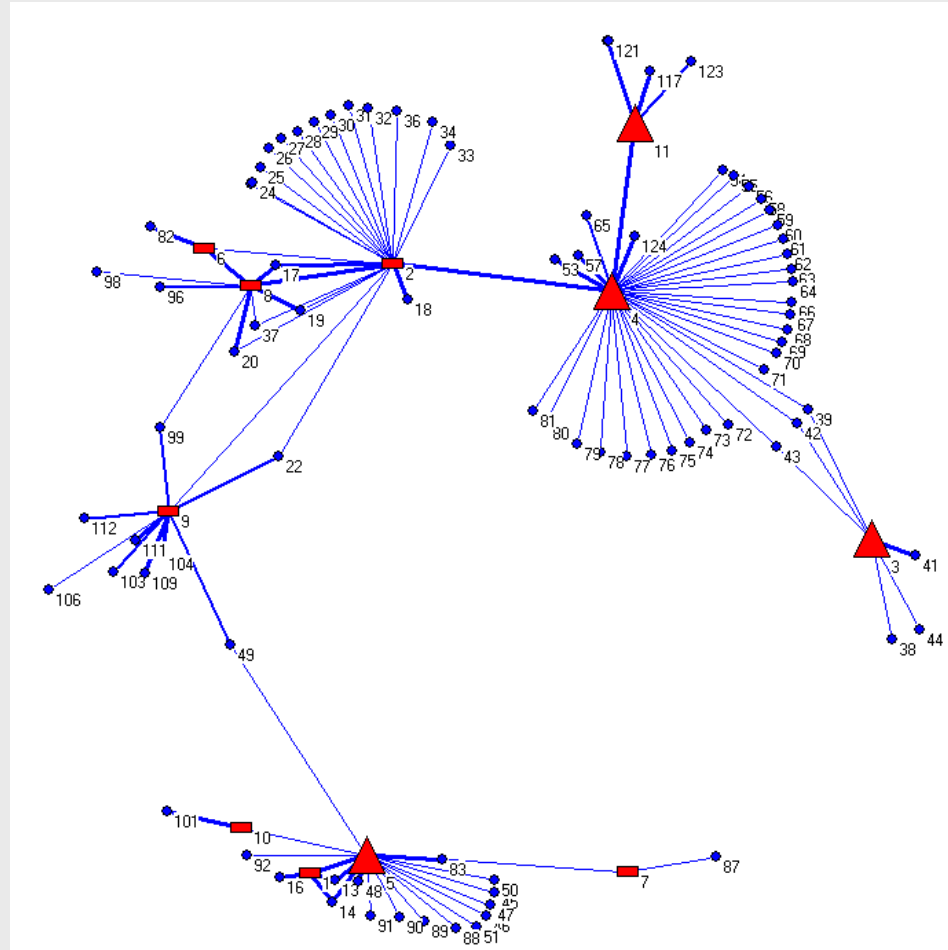




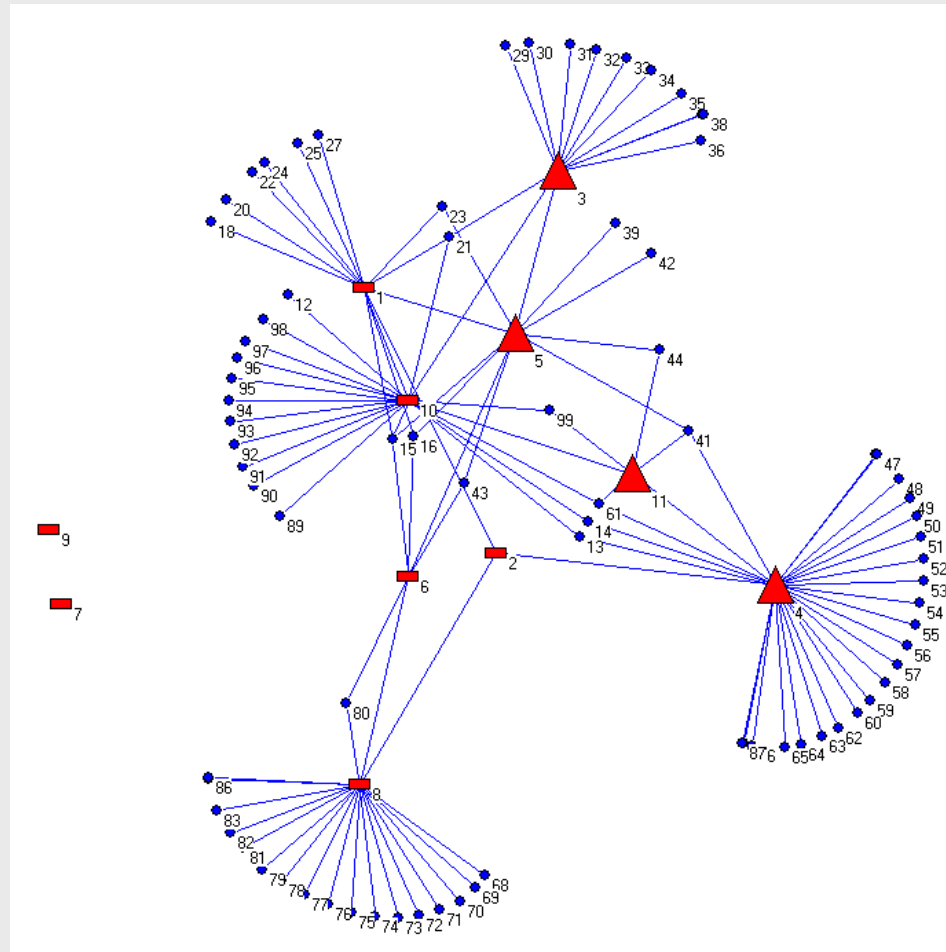
Challenges

- Client issues – disadvantaged, substance abuse, mobile, chaotic lifestyle, compliance
- Delay in diagnosis (4 cases, 2 -7 weeks, 2 smear positive at diagnosis)
- Nursing staff overwhelmed with case load, DOT and contact tracing
- Artificial on-off reserve separation for delivery of care

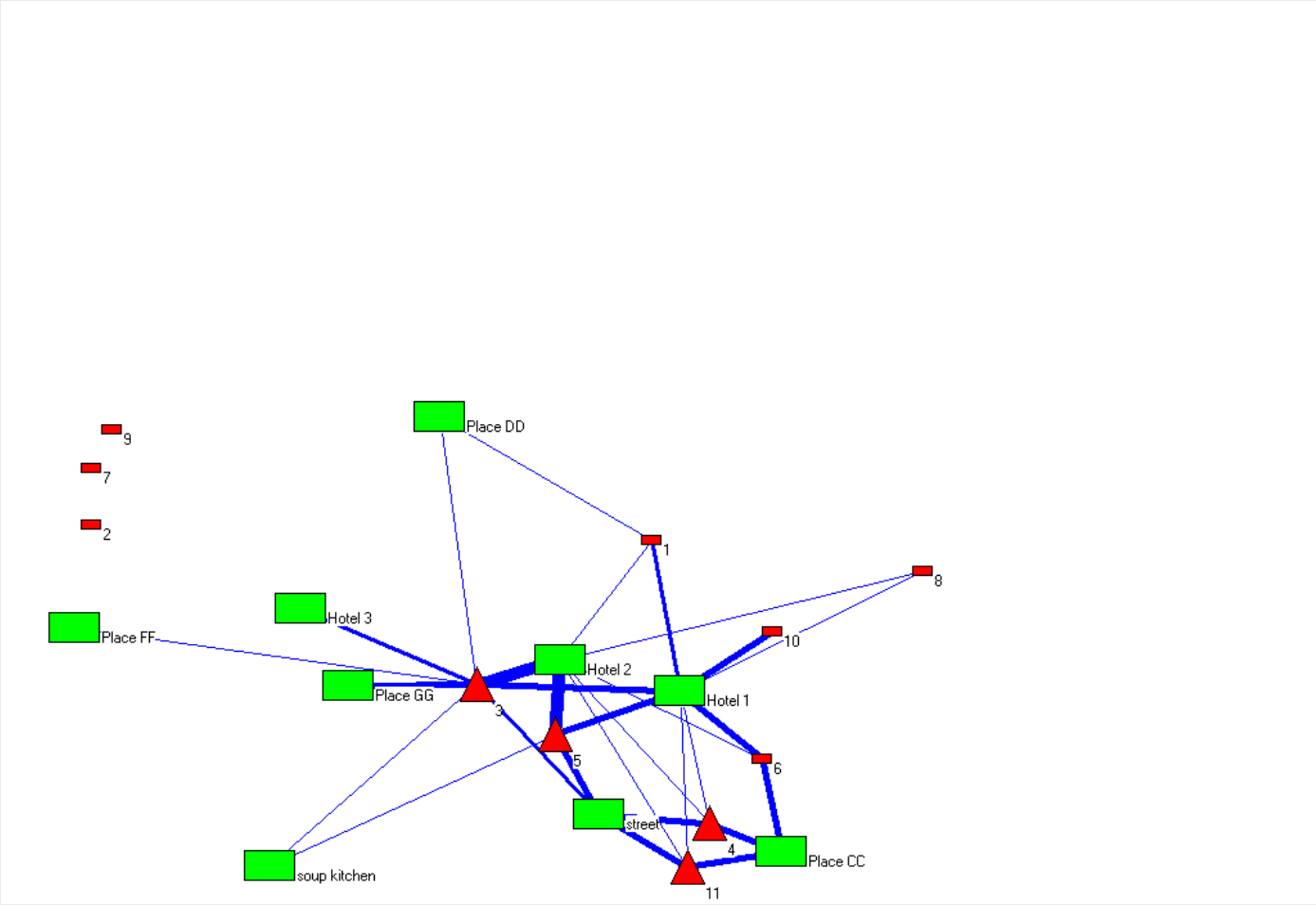
SOCIAL NETWORK ANALYSIS



SOCIAL NETWORK ANALYSIS

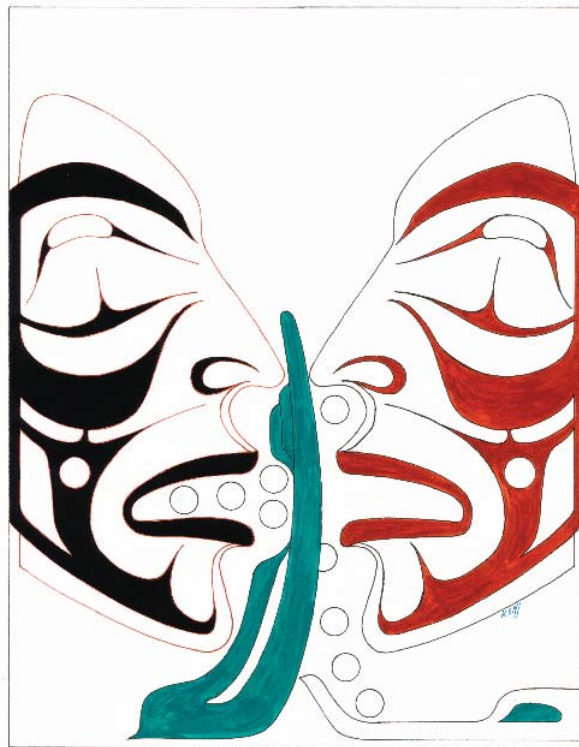


SOCIAL NETWORK ANALYSIS



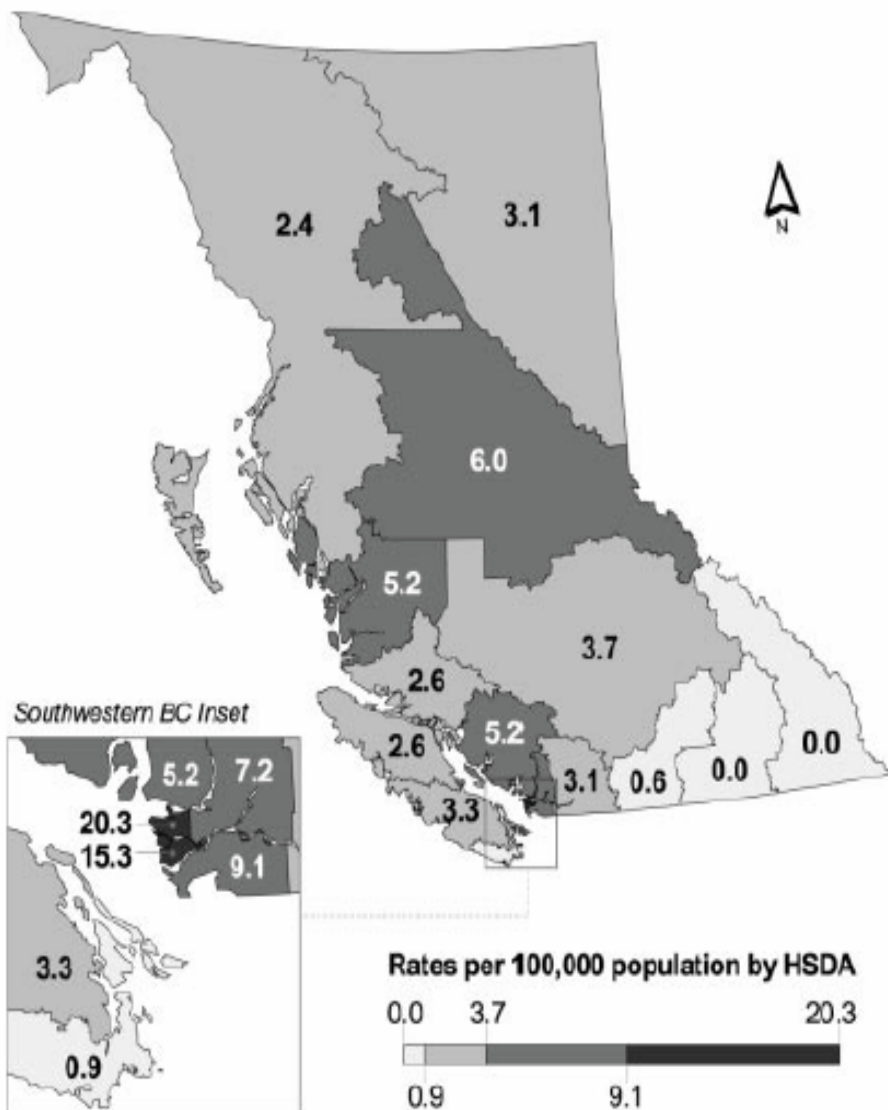
TB in First Nations population

Dr Kevin Elwood



Outline

1. TB Epidemiology
2. Cluster in Northern Health Authority
3. Central Vancouver Island Outbreak
 - Initial cases
 - Challenges
 - Investigation and findings
 - Introduction to social network analysis



| HSDA | Health Service Delivery Area | Cases | Rate |
|------|------------------------------|-------|------|
| 11 | East Kootenay | 0 | 0.0 |
| 12 | Kootenay Boundary | 0 | 0.0 |
| 13 | Okanagan | 2 | 0.6 |
| 14 | Thompson Cariboo Shuswap | 8 | 3.7 |
| 21 | Fraser East | 8 | 3.1 |
| 22 | Fraser North | 41 | 7.2 |
| 23 | Fraser South | 58 | 9.1 |
| 31 | Richmond | 27 | 15.3 |
| 32 | Vancouver | 118 | 20.3 |
| 33 | North Shore/Coast Garibaldi | 14 | 5.2 |
| 41 | South Vancouver Island | 3 | 0.9 |
| 42 | Central Vancouver Island | 8 | 3.3 |
| 43 | North Vancouver Island | 3 | 2.6 |
| 51 | Northwest | 2 | 2.4 |
| 52 | Northern Interior | 9 | 6.0 |
| 53 | Northeast | 2 | 3.1 |

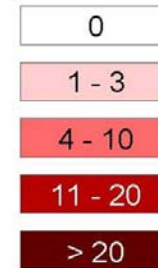
Note: Map classification by Jenks natural breaks method.

Number of Aboriginal Tuberculosis Cases in British Columbia, Jan 1/03 - July 25/06

n = 100 aboriginal cases
 35 cases on reserve
 55 cases off reserve
 10 cases where reserve status was not recorded

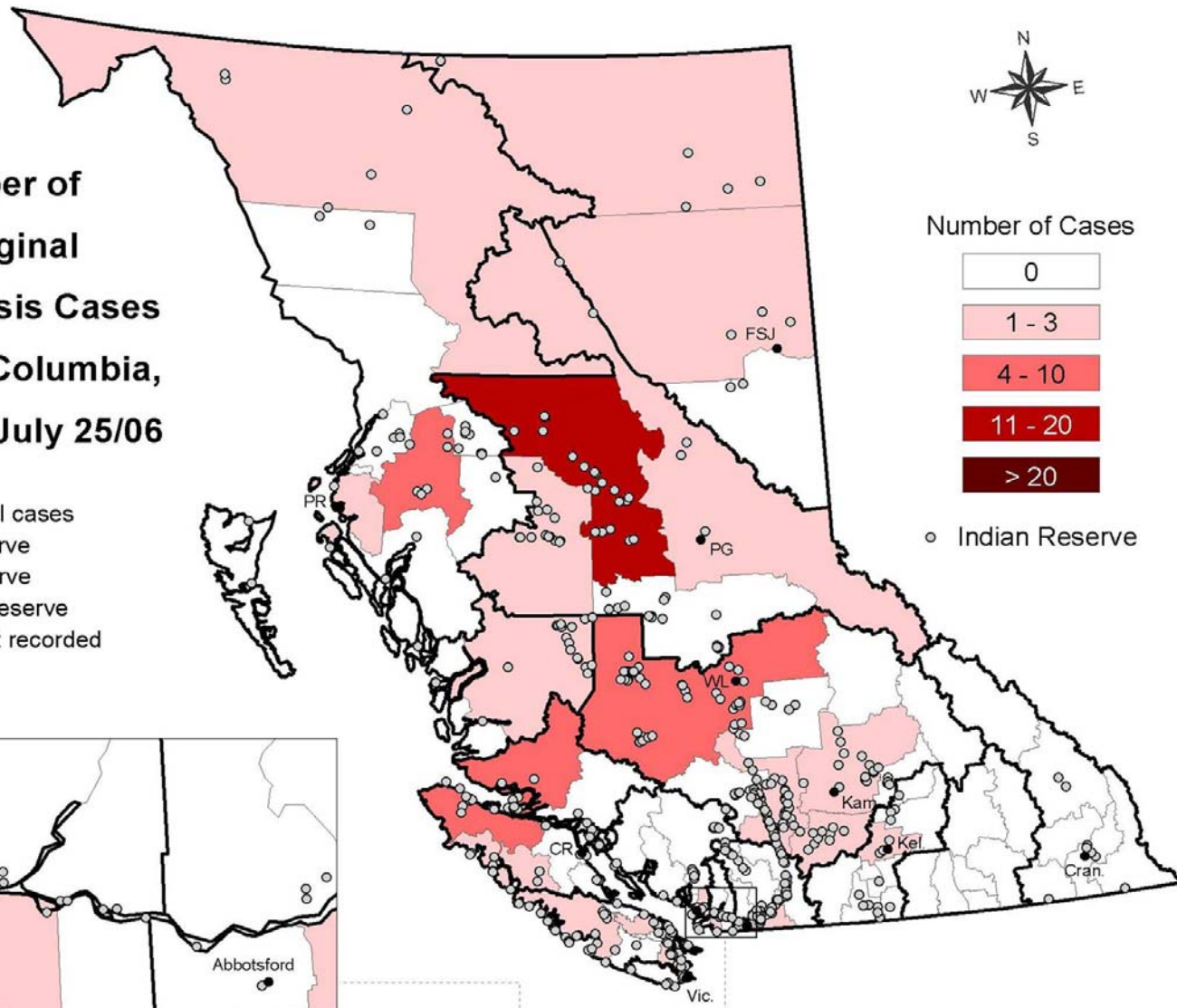
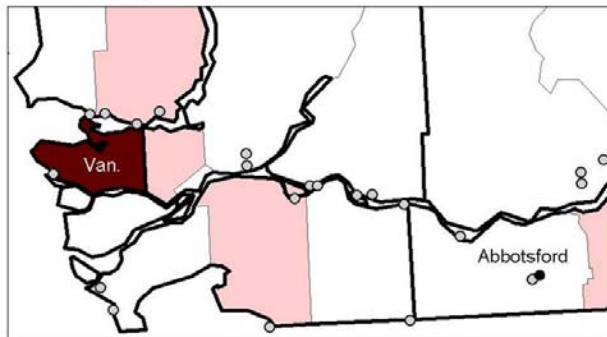


Number of Cases



○ Indian Reserve

VLM Inset Map



Cluster in the NHA

- Jan 2005 – July 2006 15 cases among Aboriginal people living on reserve in the NHA, 9 in 2006
- 6 from the same reserve, 2 from a nearby reserve, 7 from unique reserves
- An outbreak?
- Observed cases on reserve in the NHA significantly higher than expected

Cluster in NHA

- All 6 cases on reserve A epidemiologically linked, no links to remaining 9 cases
- 5 cases reactivation of latent infection, 1 primary pediatric case
- Did not meet the definition of an outbreak
- DNA fingerprinting - 4 shared the same strain
- Likely an endemic strain in the population

TB Incidence, Central Vancouver Island

2003 0.8

2004 3.2

2005 1.6

2006 5.9

2006 Aboriginal 90.7

per 100,000

Case 1 - April 2006

- 29 year old FN woman off reserve in Port Alberni
- History of heavy alcohol use
- April developed increasing dyspnea and chest pain
- May hospitalized with left pleural effusion, bronchoscopy, thoracostomy, decortication of LLL
- Fluid subsequently grew *M. tuberculosis*
- Limited contact tracing, pleural TB, client not very forthcoming

Epi Investigation

- TB Control invited a field epidemiologist and a community medicine resident to conduct an in-depth investigation
- Initially reviewed information in iPHIS, contact lists, discussions with VIHA and NTC nurses
- Developed a questionnaire, in-depth interview of each case

Demographics

| | |
|-----------------|--|
| Age and Sex | Range 15 months – 43 years Median 28 years Male – 6, Female – 10 |
| TB Diagnosis | Pulmonary – 10 Pleural – 5 Meningitis – 1 |
| Substance Abuse | Alcohol – 5 Crack – 3 Both – 3 Neither – 5 |
| On/Off Reserve | On – 5 Off – 9 Mobile – 2 |
| Deaths | 3 |

Suspected Chain of Transmission

5
Index Case

Alcohol Network

hotel pub #1
hotel lounge #2

1

4

6

7

8

12

9

room-mate of 6

10

barmaid at hotel pub #1

Crack Network

crack houses
streets and alleys

3

6

11

12

2

child cared for by 3

13

relative of 3