School Screening Program Review

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Mycobacterium tuberculosis

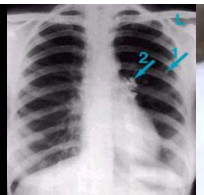
Canada

Background & Context

Process & Results

Discussion & Conclusions






Background

- Alberta FNIH School Screening Program
  - All children with no history of previous positive TST or TB disease are screened in grade 1 and grade 6
    - reactors of ≥10 are referred to TB control and offered treatment for latent TB infection
    - based on evidence that BCG has waned by age 6*
    - based on assumption of medium to high risk of infection

*** Am Rev Respir Dis 1992; 145: 621-625**
Int J Tuberc Lung Dis 1999 Jan;3(1):23-30,
Chest 2007; 131: 1806-1810

Start of the process

School screening data review

- We noticed trend
- Most children with significant TST had a BCG
- Is this real?

Start of the process - “the straw count”

At region we reviewed the school screening reports from previous 10 years

- **8678** TSTs were read
- 241 had significant TST
- 227 of the 241 had history of BCG vaccination
- **97%** of school reactors had BCG vaccine

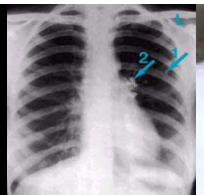
This would be interesting to look at further

Start of the process

- Took this information to TB Control / First Nation Inuit Health TB Program meeting
- TB experts agreed
- Project was launched

- FNIH, in partnership with TB Program Evaluation and Research Unit,
  - review of school screening program to examine the effect of BCG on TST in low risk school children






The Isolated Effect Of BCG (Bacille Calmette-Guerin) Vaccination In Infancy On Tuberculin Reactivity In Grade 1 and Grade 6 School Children: Confirmatory Testing Using the Quantiferon Test

Background

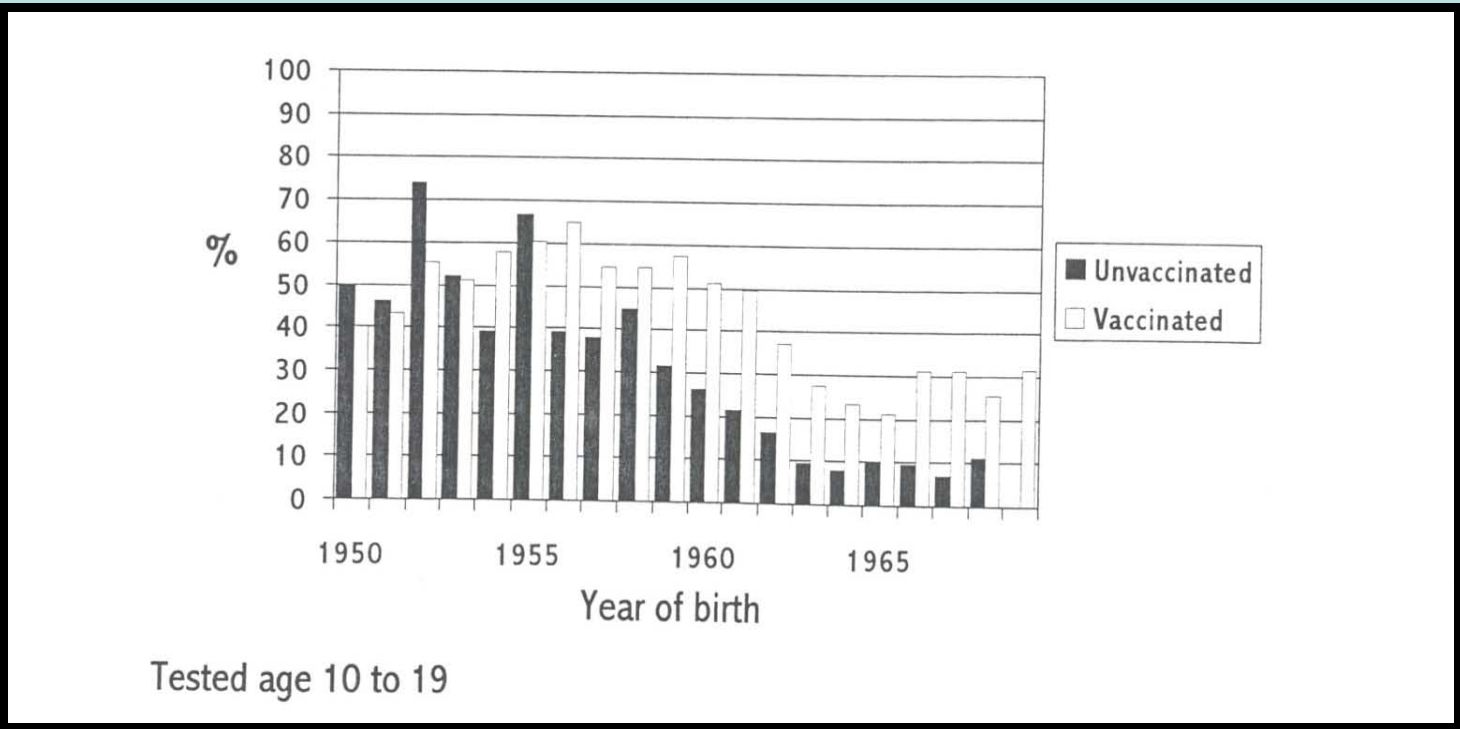


Figure 3: Prevalence of significant tuberculin reactions in Aboriginals of Alberta, tested at ages 10 to 19, by year of birth.

Int J Tuberc Lung Dis 1998; 2 (9): 516-522

Background

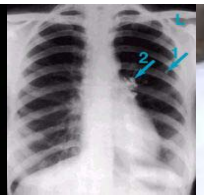
Alberta Incidence of TB Relatively Low

- Infectious TB rates adult smear positive on reserve 2004 to 2008 : **4.1/1000,000**

- Annual Rate of Infection of on reserve preschoolers 2004-2005 : **0.03%**

  (Can J Public Health 2007; 98: 116-120)






Process: Step One

- 5 years of school screening data reviewed (April 1, 2004 through March 31, 2009)
- TST results were compared
  - BCG vaccinated and non BCG vaccinated groups
  - age and gender
  - age at vaccination – before 30 days of age and after 30 days of age
  - school screen as first TST and school screen with history of prior TST



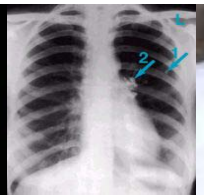


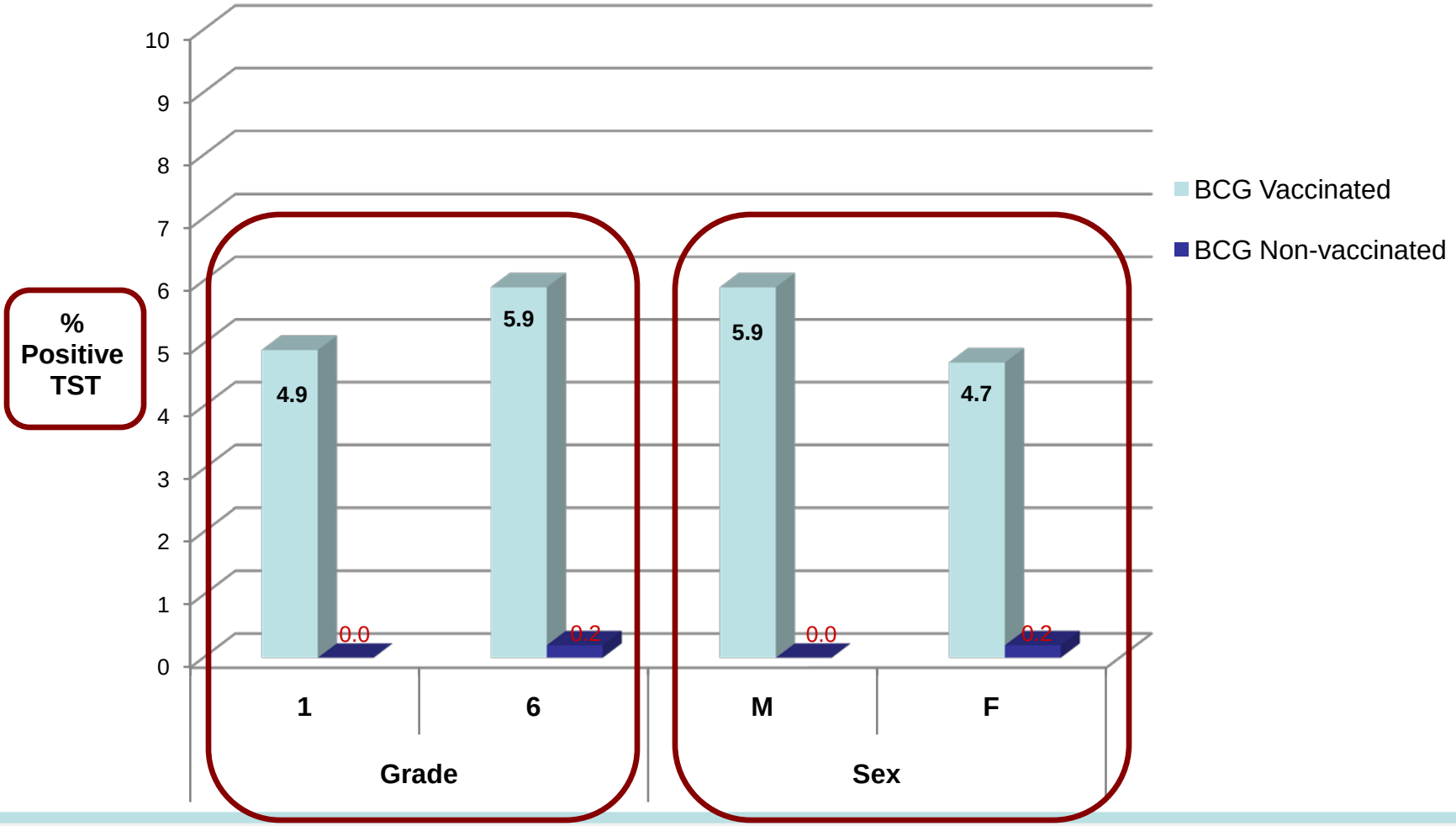

Table 1 — **TST Results in BCG Vaccinated and Non-vaccinated First Nations School Children Grouped According to Age and Sex***

Age and Sex		BCG Vaccination History					
		BCG Vaccinated No. (%)			BCG Non-Vaccinated No. (%)		
		Total No. (%)	TST (+) No. (%)	TST (-) No. (%)	Total No. (%)	TST (+) No. (%)	TST (-) No. (%)
Number Assessed		2017 (100.0)	107 (5.3)	1910 (94.7)	1912 (100.0)	2 (0.1)	1910 (99.9)
Age (years)†							
	6.7 ± 0.6	1276 (100.0)	63 (4.9)	1213 (95.1)	986 (100.0)	0 (0.0)	986 (100.0)
	11.9 ± 0.8	741 (100.0)	44 (5.9)	697 (94.1)	926 (100.0)	2 (0.2)	924 (99.8)
Sex							
	Male	1014 (100.0)	60 (5.9)	954 (94.1)	934 (100.0)	0 (0.0)	934 (99.9)
	Female	1003 (100.0)	47 (4.7)	956 (95.3)	978 (100.0)	2 (0.2)	976 (99.8)

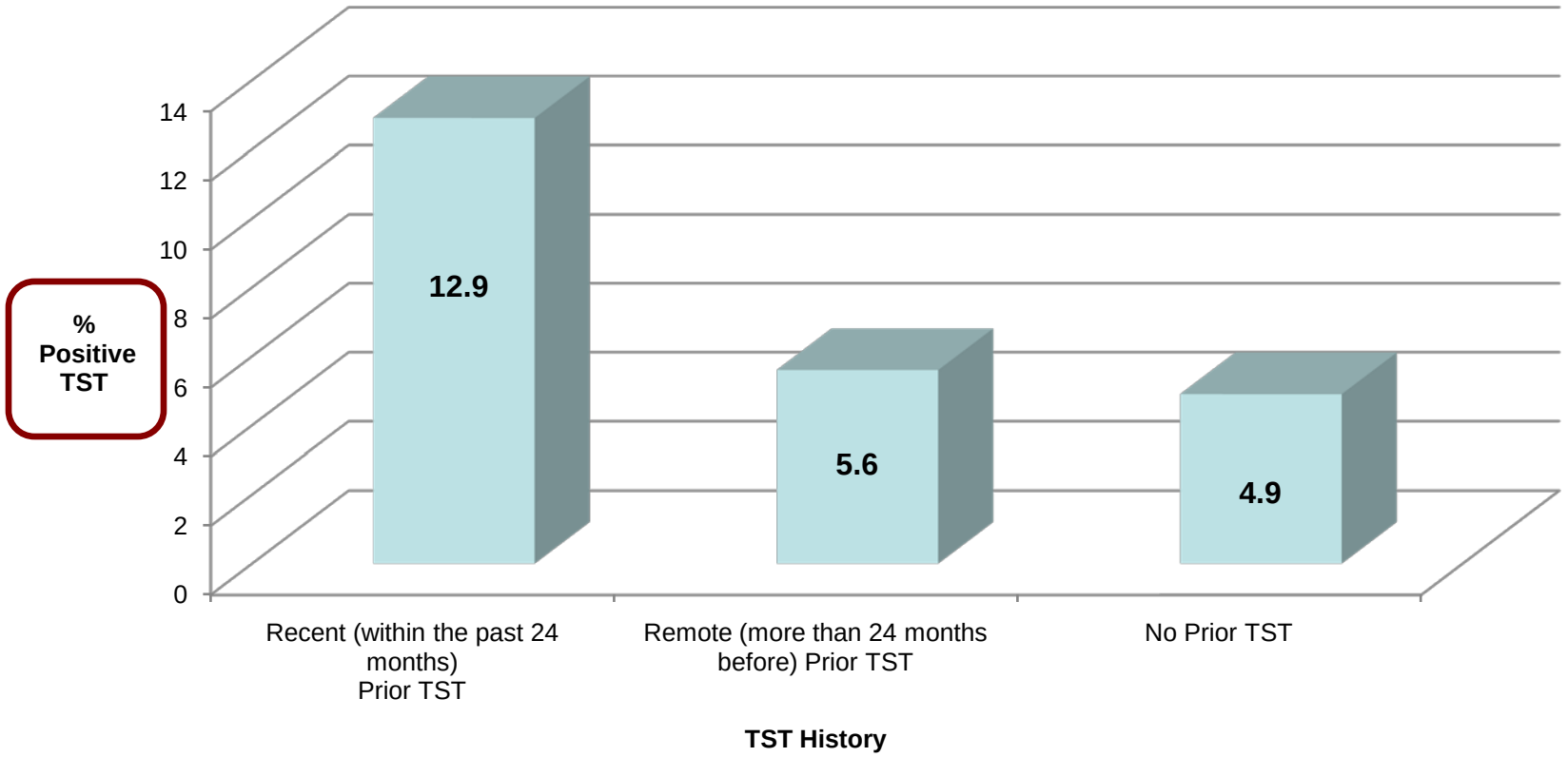
*Abbreviations: TST tuberculin skin test; BCG bacille Calmette-Guérin

† The mean (±SD) age of children who underwent school screening in grade 1 (ages of 5.0 to 9.5 years) and grade 6 (9.5 years to 13.0 years)

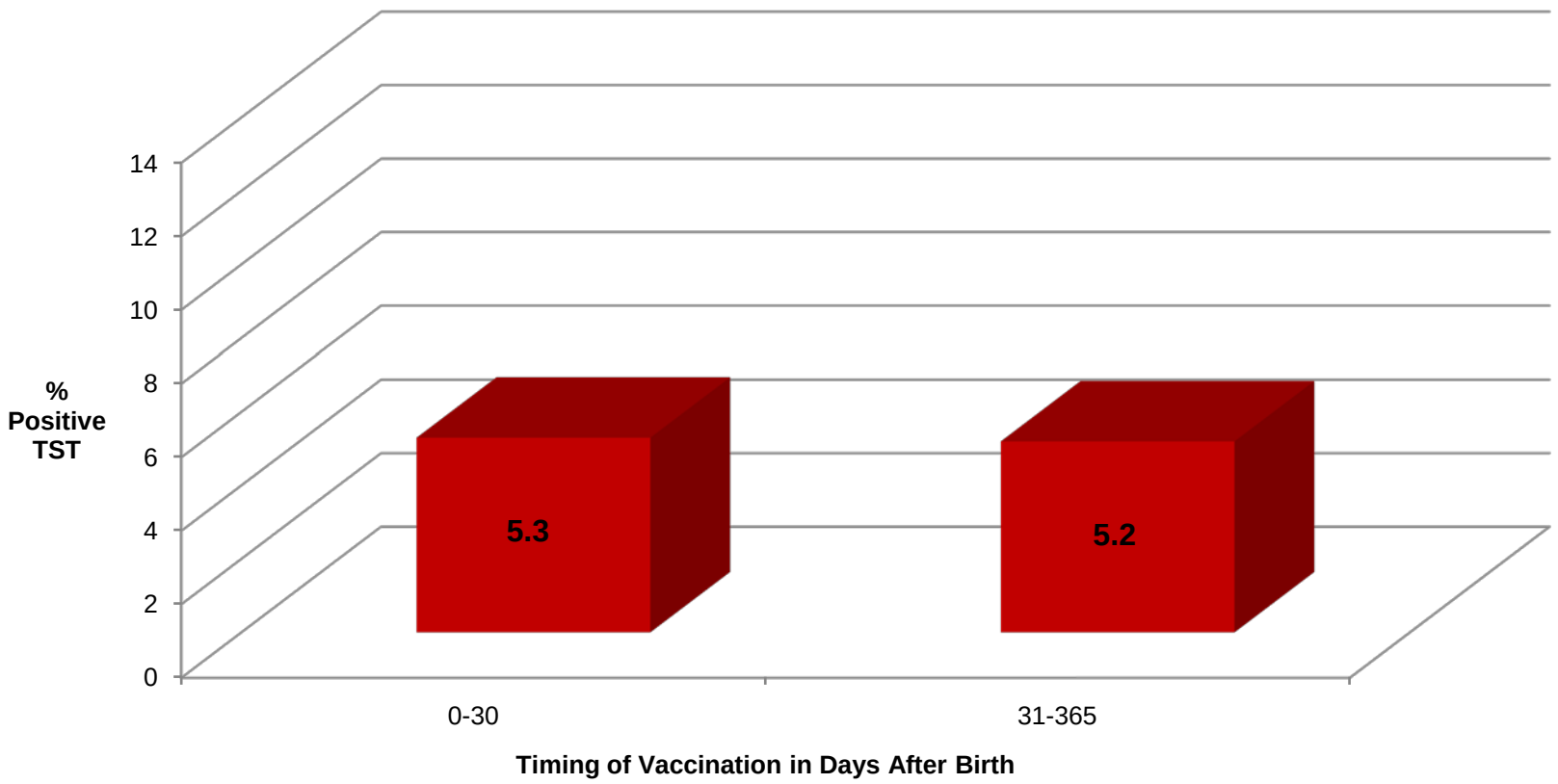
School Screening TST Results in BCG Vaccinated and Non-vaccinated First Nations Children



The Effect of Prior Tuberculin Testing on School Screening TST Positivity



The Effect of Timing of BCG Vaccination on School Screening TST Positivity

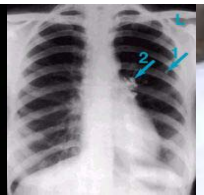


Process: Step Two

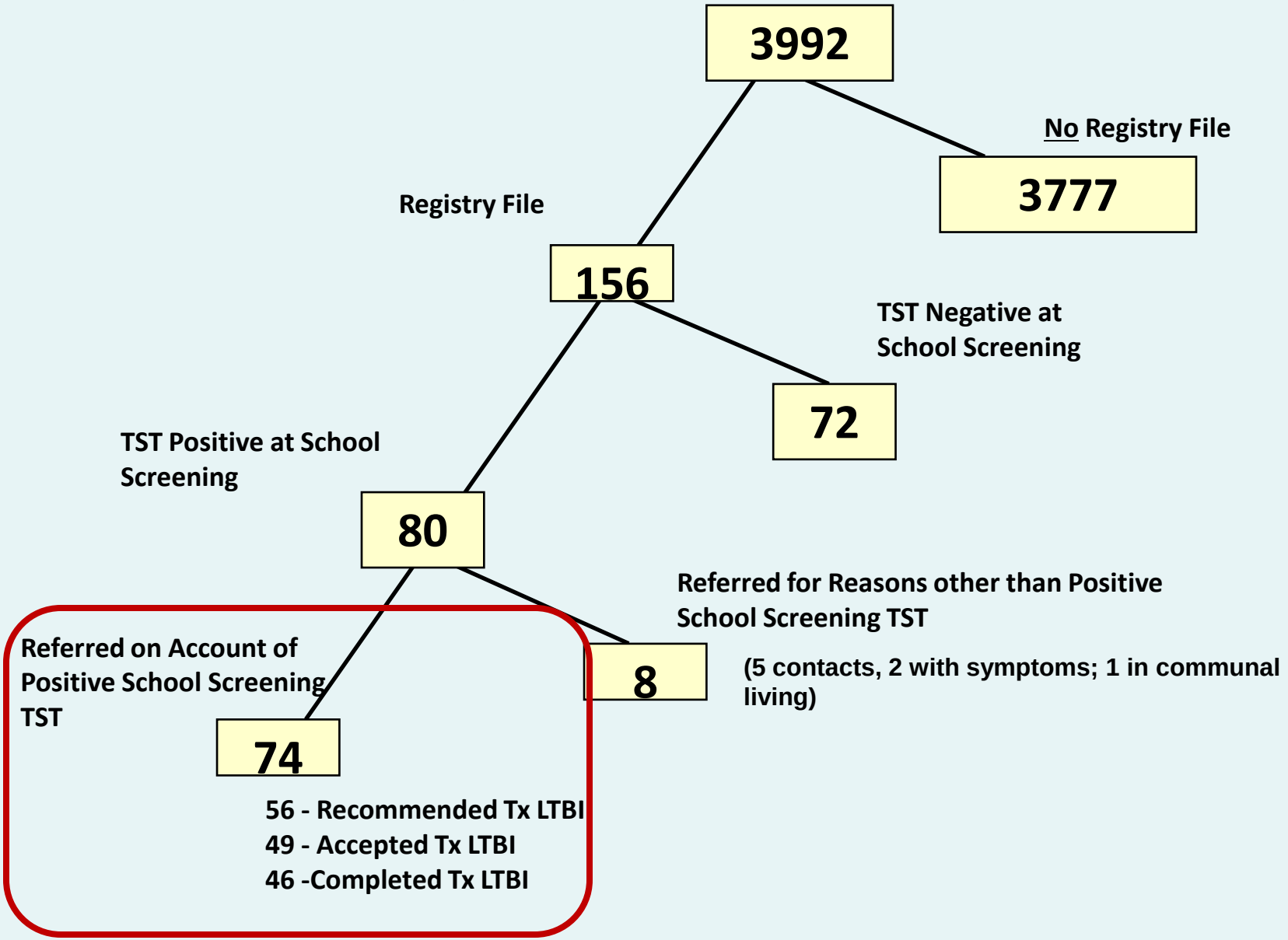
- Cross Match of the School Screening Database with the Provincial TB Registry April 1, 2004 – March 31, 2009

- School screens searched for
  - TB disease
  - Treatment recommendations, acceptance and completion





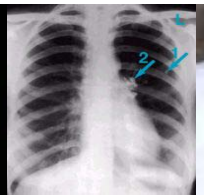

Cross Match of the School Screening Database with the Provincial TB Registry
April 1, 2004 – March 31, 2009



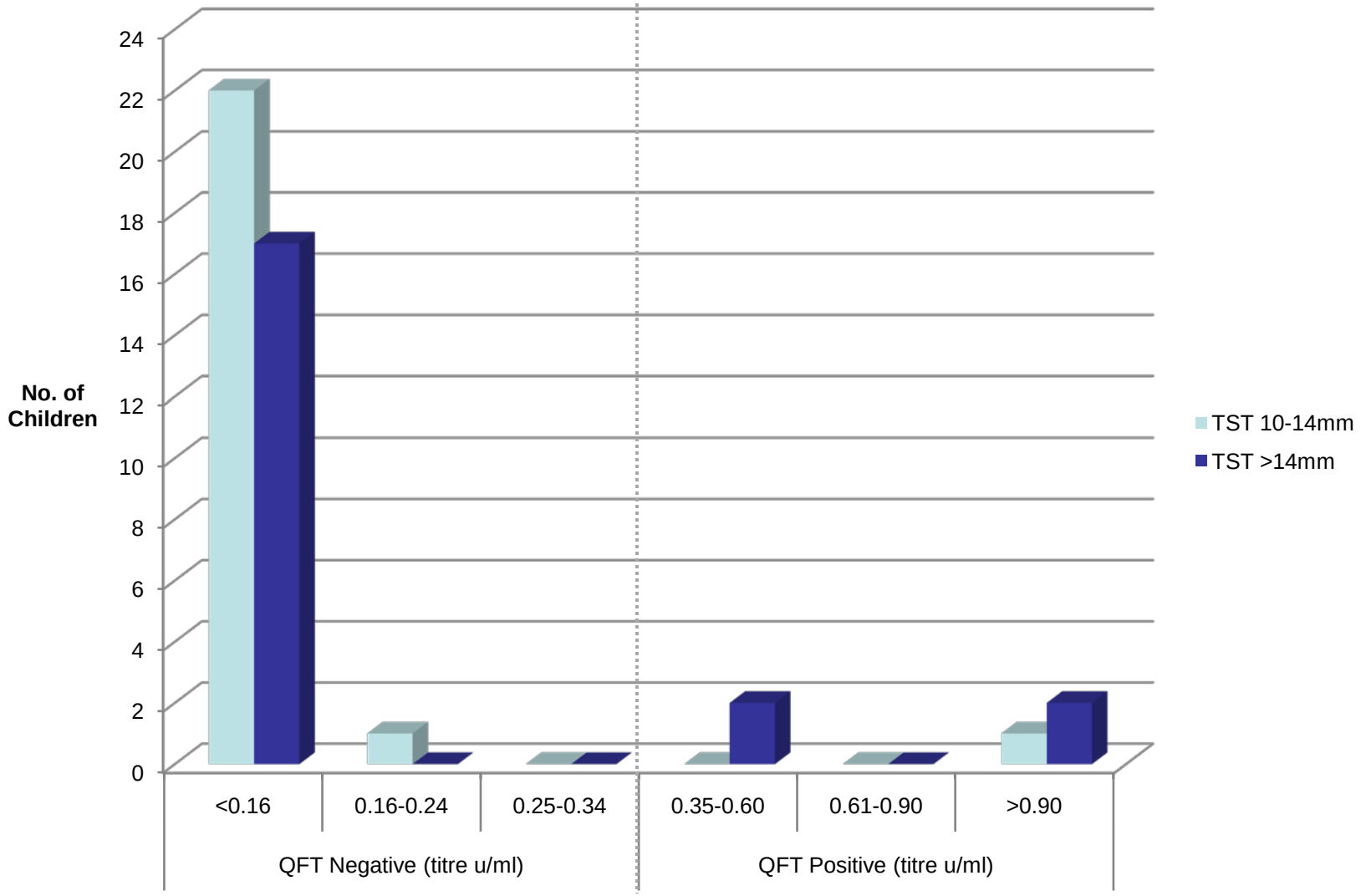
Process: Step 3

- School screened positive reactors identified from Nov 1, 2008 to December 31, 2010 were further screened with an IGRA
  - Prophylaxis was not offered to this group unless IGRA was positive
  - Positive school reactors screened during the April 1, 2004 to Nov 2008 time frame who did not accept or complete adequate treatment for LTBI were also offered IGRA





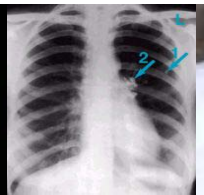

QuantiFERON-TB Gold In-Tube® (QFT) Results in BCG Vaccinated, TST Positive First Nations Children



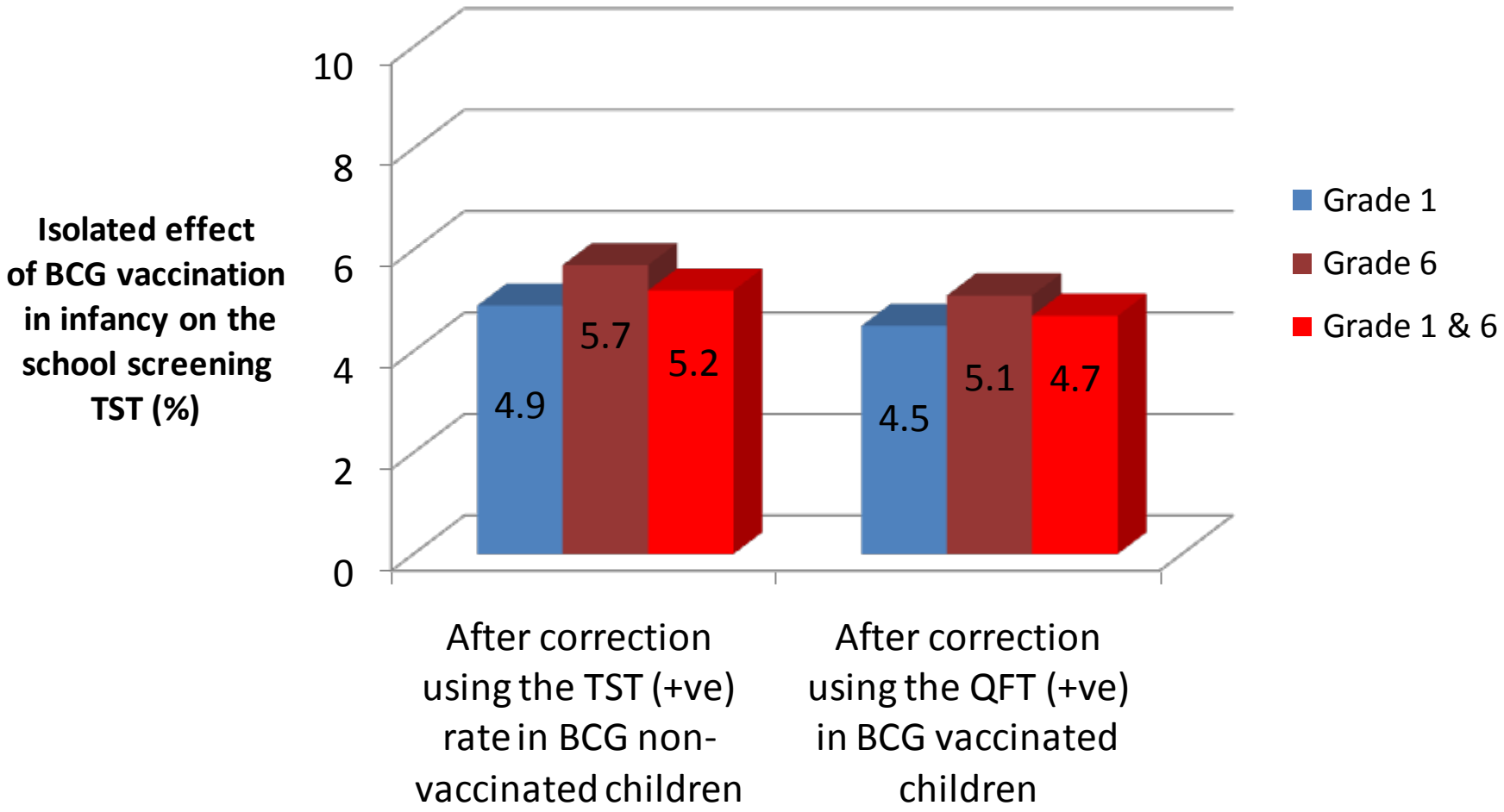
Discussion & Conclusions

- None of the TST positive school screened children developed TB disease
  - BCG vaccinated or non-vaccinated,
  - TST positive treated for LTBI
  - TST positive untreated for LTBI
- No TST negative was diagnosis with active TB





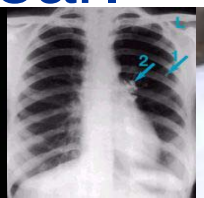

The Isolated Effect of BCG Vaccination in Infancy on the School Screening TST



Discussion & Conclusions

- BCG vaccination in infancy results in a 4.7-5.2% false positive TST rate at school screening.
- The QFT increased the specificity of the school screening TST in BCG vaccinated children.
- Given these findings changes to school screening program will be made in the next school year.






Compelling Evidence for Use of IGRAs

Mycobacterium tuberculosis Infection in First Nations Preschool Children in Alberta

Implications for BCG (bacille Calmette-Guérin) Vaccine Withdrawal

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Use of the QuantiFERON®-TB Gold test to confirm latent tuberculosis infection in a Canadian tuberculosis clinic

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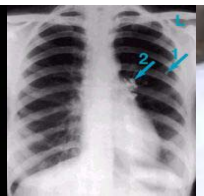


Thank You !!

- **To the Alberta Community Health Nurses for their**
  - performance of the school screening program
  - diligence in data checking
  - hard work in assisting clients complete their IGRAs
- **To the lab and clinic sites for your assistance with IGRAs**
- **To TB Control staff for cross match work**