Canadian Immunization Research Network: Establishing a provincial collaborative research network to study pertussis vaccine effectiveness

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Financial conflicts of interest

- Jeff Kwong has no financial conflicts of interest to declare.

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Objectives

- To describe CIRN's Provincial Collaborative Network (PCN)
- To describe the strengths and challenges to date of PCN, using a multi-provincial evaluation of pertussis vaccine effectiveness as an example

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Canadian Immunization Research Network

- CIHR-funded at $2.2M/year, 2014-2017
- Formal infrastructure for research, collaboration
- Testing safety and effectiveness of vaccines
- Addressing vaccine hesitancy
- Evaluating immunization programs
- Training next generation of researchers
- Rapid response capacity
- Knowledge exchange: researchers, users, and policy makers

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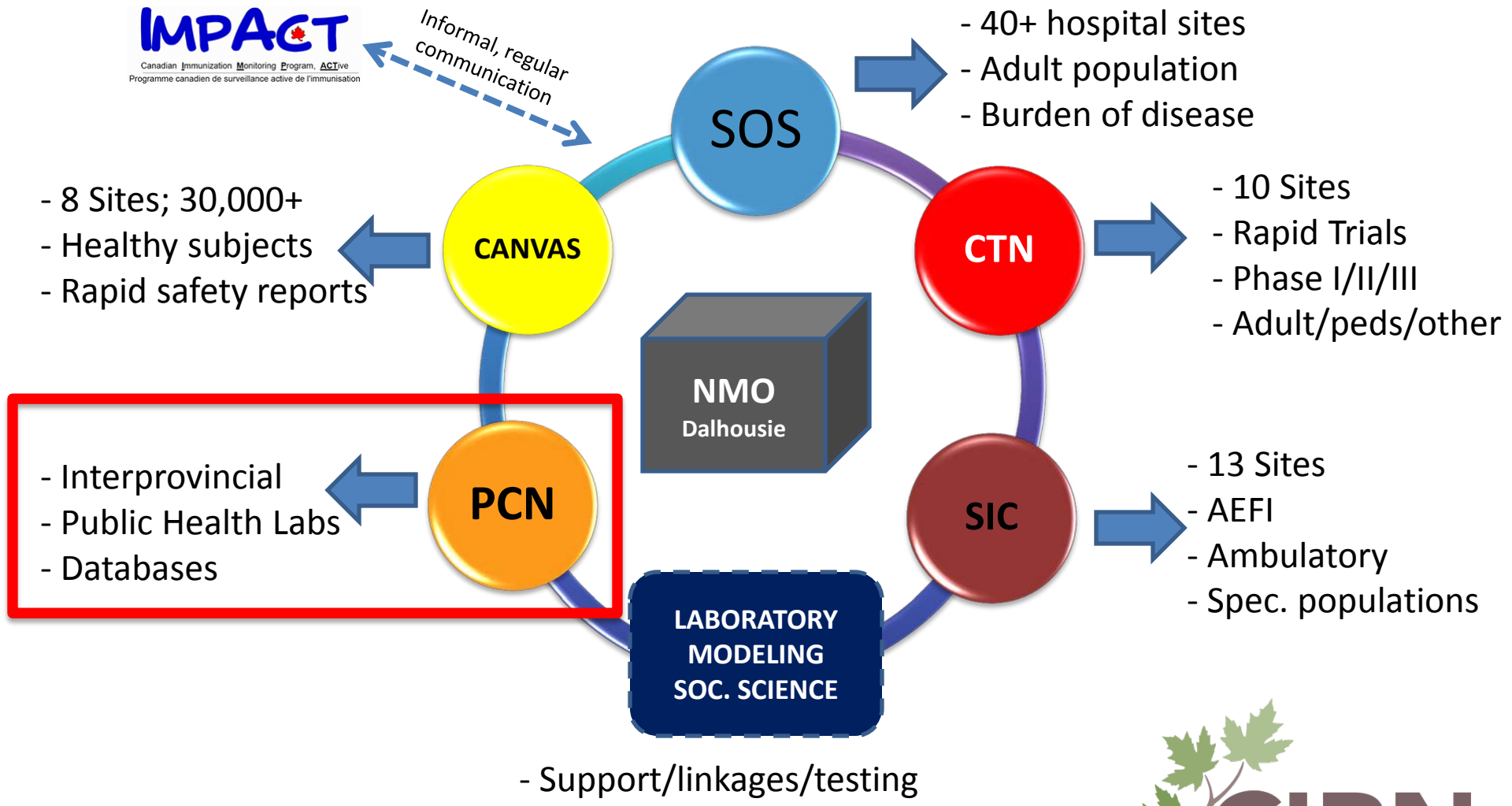
Network structure and capacities



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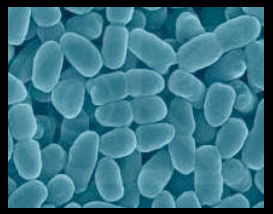
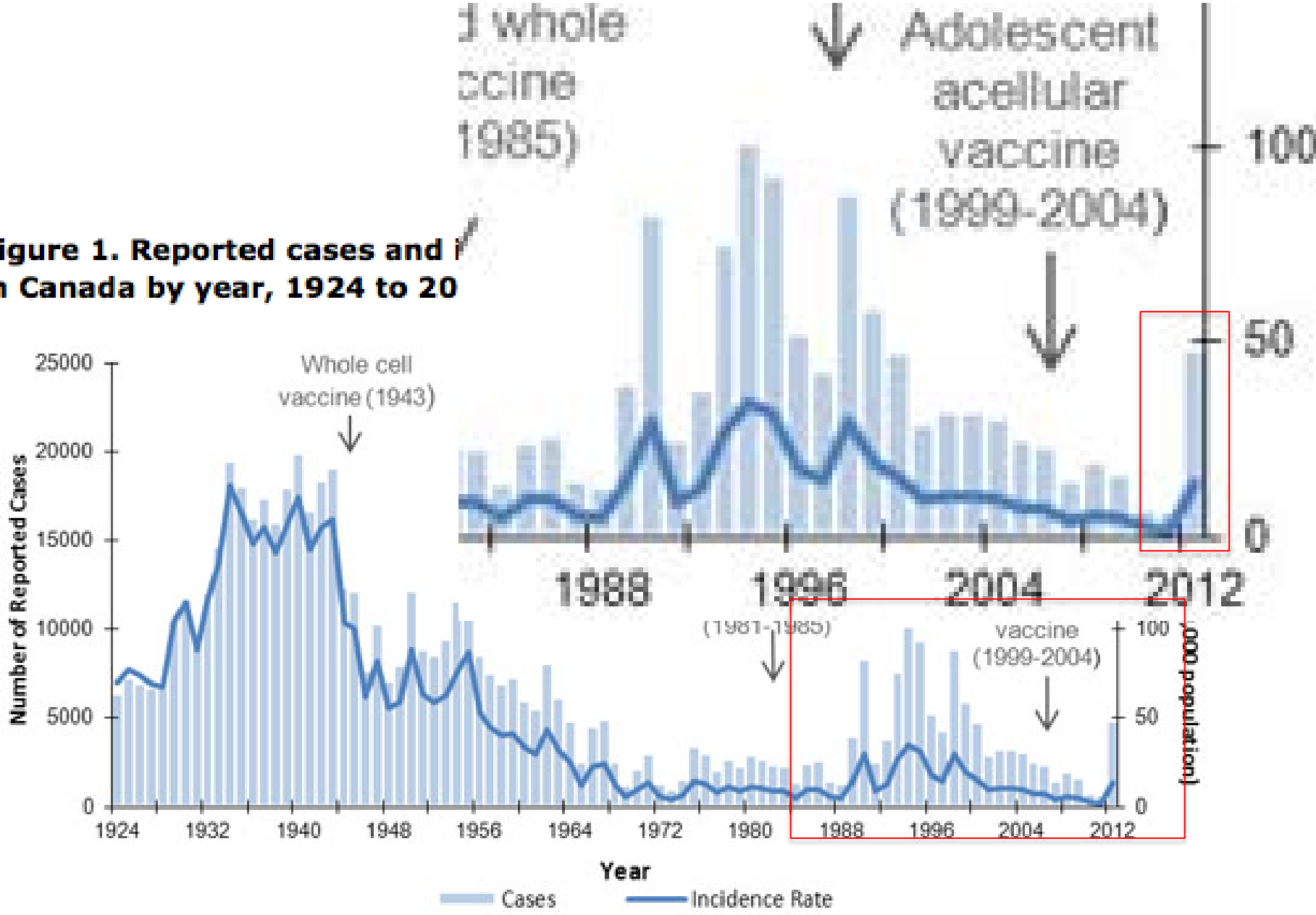
Background - Pertussis



- *Bordetella pertussis*
  - Whooping cough
- 16M cases/year
  - 95% developing countries
- Mortality ~1%
  - 80% <2 months

Slide courtesy of Kevin Schwartz

Figure 1. Reported cases and i
in Canada by year, 1924 to 20



Slide courtesy of Kevin Schwartz

http://www.phac-aspc.gc.ca/im/vpd-mev/pertussis/professionals-professionnels-eng.php

Pertussis vaccine effectiveness study

- Step 1: Identify provinces to participate
- Step 2: Determine study design
- Step 3: Conduct analyses

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Step 1: Identify provinces to participate

- Interested investigators
- Necessary data
  - Outcome: pertussis cases
    - Lab-confirmed (PCR)
    - Reported cases (case definition)
  - Exposure: pertussis immunizations
  - Covariates: age, sex, income quintile, rurality, comorbidities, prior healthcare use
- Ability to link individual-level data

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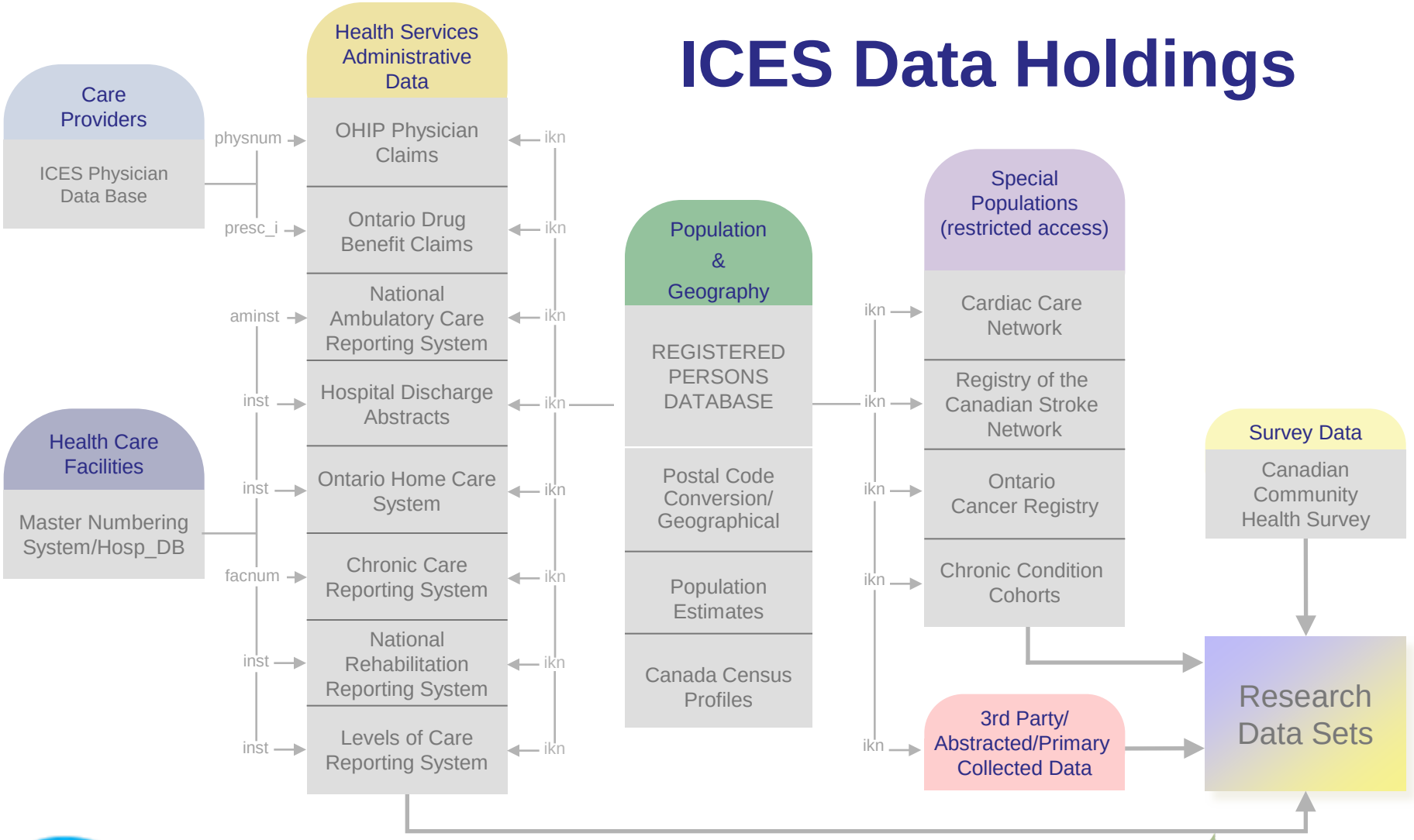
ICES Data Holdings



Data Discovery Better Health

January 30th 2009
Sample of ICES Data Holdings

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Participating provinces

Province	Population (2015)	% of Canada
Ontario	13,792,100	38.5%
Alberta	4,196,500	11.7%
Manitoba	1,293,400	3.6%
Combined	**19,282,000**	**53.8%**

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Pertussis vaccine effectiveness study

- Step 1: Identify provinces to participate
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Step 2: Determine study design

- Option 1: Test-negative design
  - Includes only those lab-tested for pertussis
  - Positives treated as cases
  - Negatives treated as controls
- Option 2: Case-control design with population-based controls
  - Cases reported to public health (e.g., iPHIS)
  - Controls identified from administrative data

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Step 2: Determine study design

- Option 1: Test-negative design (ON, AB)
  - Includes only those lab-tested for pertussis
  - Positives treated as cases
  - Negatives treated as controls
- Option 2: Case-control design with population-based controls (ON, MB)
  - Cases reported to public health (e.g., iPHIS)
  - Controls identified from administrative data

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Pertussis vaccine effectiveness study

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Step 3: Conduct analyses

- To be done by each province separately
  - Estimate vaccine effectiveness
  - Identify presence of waning immunity
  - Compare priming with whole cell vs. acellular vaccine
- Meta-analysis of provincial estimates

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Strengths of PCN

- Ability to share wisdom and other nice things:
  - Ethics applications
  - Study protocols
  - Analytical plans
  - SAS code
- Increase power of analyses to study less common diseases and to bolster stratified/subgroup analyses

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Challenges faced to date

- Inter-provincial differences:
  - Populations
  - Immunization programs
  - Data sources
  - Definitions
  - Timelines for approvals
- Unable to share individual-level data across provinces

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Next steps

- Ontario TND study completed; CC study in progress
- Alberta TND study in progress
- Manitoba CC study pending
- Meta-analysis to be conducted (assuming heterogeneity is not excessive)
- Use PCN to address other vaccine safety and vaccine effectiveness questions

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Other PCN studies

- Assessing intussusception and rotavirus vaccine safety in Canada using health administrative data
- Evaluation and gap analysis of federal and P/T systems and methodologies used to assess immunization coverage
- Household case-control contact study to examine immunological protection of contacts from household transmission of pertussis

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Manitoba	Salah Mahmud

QUESTIONS?

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