

Lessons learnt – data linkage study of Northern Territory children: a to inform policy and practice in health, family services and education

Presented by

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Overview

Question

How do we know whether a specific policy was effective in helping vulnerable (here: Indigenous) children to thrive?

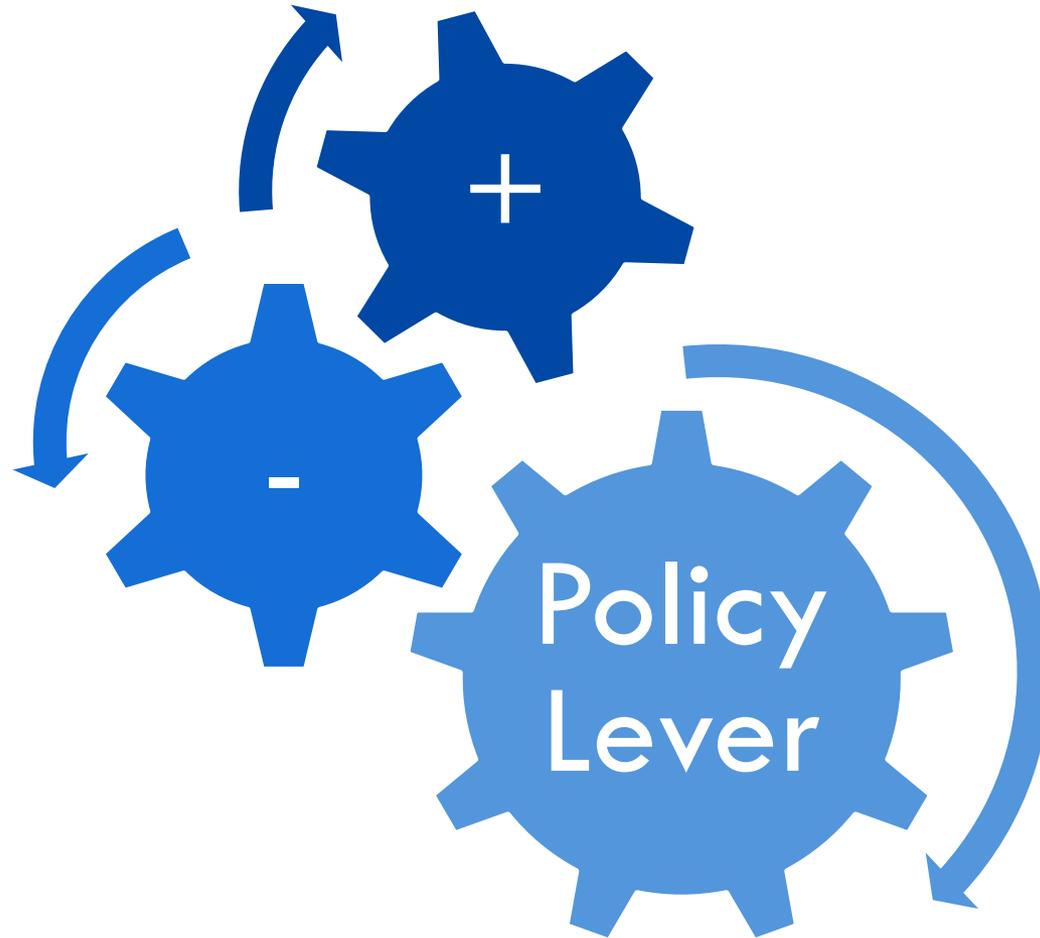
RCTs? Yes-gold standard (JPAL MIT, UChicago Urban Lab)

What if RCTs are not available?

Solution

- 1. Policy Evaluation Methods:** Quasi-experimental methods, natural experiments.
- 2. Data:** Linked administrative data financed through an NHMRC Partnership Project, NHMRC Targeted Call, NHMRC CRE
- 3. Examples**
 - 3.1 Standard early-life health care (special care nursery admission)
 - 3.2 Income management

Policies may have positive and negative spill-over effects



WHAT ARE NATURAL EXPERIMENTS?

© 1995 American Statistical Association

Journal of Business & Economic Statistics, April 1995, Vol. 13, No. 2

Natural and Quasi-Experiments in Economics

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Using research designs patterned after randomized experiments, many recent economic studies examine outcome measures for treatment groups and comparison groups that are not randomly assigned. By using variation in explanatory variables generated by changes in state laws, government draft mechanisms, or other means, these studies obtain variation that is readily examined and is plausibly exogenous. This article describes the advantages of these studies and suggests how they can be improved. It also provides aids in judging the validity of inferences that they draw. Design complications such as multiple treatment and comparison groups and multiple preintervention or postintervention observations are advocated.

KEY WORDS: Comparison groups; Control groups; Difference in differences; Exogeneity; Experimental design; Observational studies.

Major external shocks
Epidemics,
famines, economic crises or
individual-specific shocks to
study causes of disease

Institutional decision rules
Admission to SCN or
An elite school
using a score threshold

Gradual roll-out of a program
Income management
SNAP (US Food Stamps)

Using natural experiments to evaluate population health interventions

**Report of a joint MRC Population Health Sciences Research Network/MRC Methodology Research Panel Workshop
Marlborough Theatre, King's Fund, 11-13 Cavendish Square,
London, 21 January 2010**

Introduction

In many circumstances, randomised controlled trials are the method of choice for evaluating interventions because randomisation, coupled with design features such as blinding and concealment of the allocation sequence, provide the most robust ways of minimising selection, allocation and other common biases. Exceptions are where randomisation is impossible, for example in the case of health protection legislation, or where the risk of bias is very low, for example where the intervention has rapid, large effects that are unlikely to reflect 'confounding by indication' or any other form of bias. But there are situations, such as the evaluation of service re-organisation or area-based public health interventions, in which randomisation is difficult for practical or political reasons, but where the likelihood of bias is high due to the risk of contamination, selection or small effects that take time to emerge. In such cases, observational and quasi-experimental designs are not necessarily an appropriate solution to the problems of planned experimentation, and it is important that the choice between methods is based on a full appreciation of their advantages and disadvantages.

Provocative Question 1

Are neonatal intensive care units
or special care nurseries cost-
effective investments into
Indigenous children's health and
wellbeing?

NICU/SCN Admission (AIHW, 2011)

Table 4.17: Live births, by admission to special care nursery or neonatal intensive care unit and state and territory, 2011

Admission to SCN or NICU	NSW	Vic	Qld	WA ^(a)	SA	Tas	ACT ^(b)	NT	Australia
	Number								
Admitted	14,353	11,718	10,680	3,141	3,308	964	892	668	45,724
Not admitted	81,924	59,803	51,086	28,794	16,886	5,325	4,742	3,231	240,438
Not stated	387	1,662	—	—	—	—	24	—	13,426
Total	96,664	73,183	61,766	31,935	20,194	6,289	5,658	3,899	299,588
	Per cent								
Admitted	14.8	16.0	17.3	9.8	16.4	15.3	15.8	17.1	15.3
Not admitted	84.8	81.7	82.7	90.2	83.6	84.7	83.8	82.9	80.3
Not stated	0.4	2.3	—	—	—	—	0.4	—	4.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

(a) For WA, babies were recorded as being admitted to an SCN or NICU only if the length of stay was 1 day or more and if infant was admitted to an SCN or NICU at the birth site.

(b) 14.6% of women who gave birth in the ACT were non-ACT residents. Care must be taken when interpreting percentages.

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The Price of Life

By BBC

Updated November 8, 2011 11:42:00

Imagine this. A young, healthy woman is 23 weeks pregnant. Then, for a range of reasons, she goes into labour. She is rushed to hospital and gives birth to her child. It cannot breathe unassisted, its skin is so thin it bruises to the touch and there are problems with its heart. Should the doctors apply massive medical intervention and keep the baby alive, or should it simply be made comfortable so that nature can take its course, allowing the newborn to die peacefully? Twenty years ago this would not have been an issue. Modern medicine simply had no way of saving the baby. Now things are very different, and that creates a whole new set of questions that must be addressed.

In this week's Four Corners, BBC science and medical reporter Adam Wishart goes inside a neonatal clinic to tell the story of 23 week gestation babies and what keeping them alive entails.

In the emotion-charged atmosphere of a hospital emergency ward, it's hard to see situations dispassionately. How does a doctor tell a parent that although their baby is alive the odds of it surviving without a major disability, including brain damage and severe heart problems, are close to one in a hundred?

In a situation where a child is born prematurely there are no rules about how much treatment is offered to the infant. Instead, there needs to be a delicate negotiation between doctors and the parents. Few doctors would reject a parent's plea to intervene to keep the baby alive. That means that major decisions about health care priorities are left to the parents caught at the centre of an emotional maelstrom.



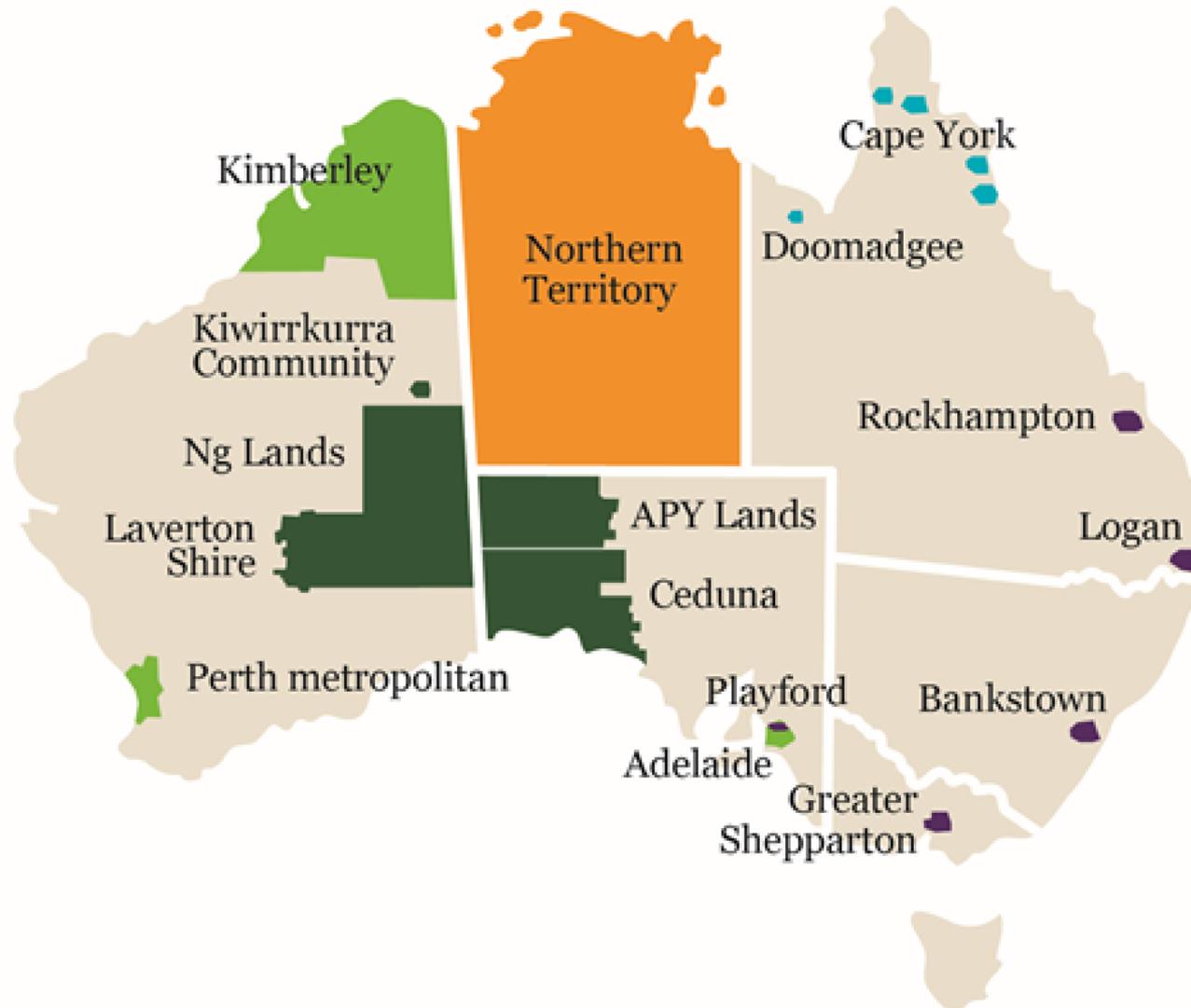
The Price of Life

**SPN 3,000\$-NICU 4,000\$
up to 200,000\$ until the
baby leaves hospital**

Provocative Question 2

Did income management under the NTER (2007-2008) lead to better health, developmental, and education outcomes for Indigenous children?

Income management locations today



Source: Department of Social Services, www.dss.gov.au. Accessed 18 October 2017.

In the media

The Implementation and Performance of the Cashless Debit Card Trial

PUBLISHED Tuesday 17 July 2018



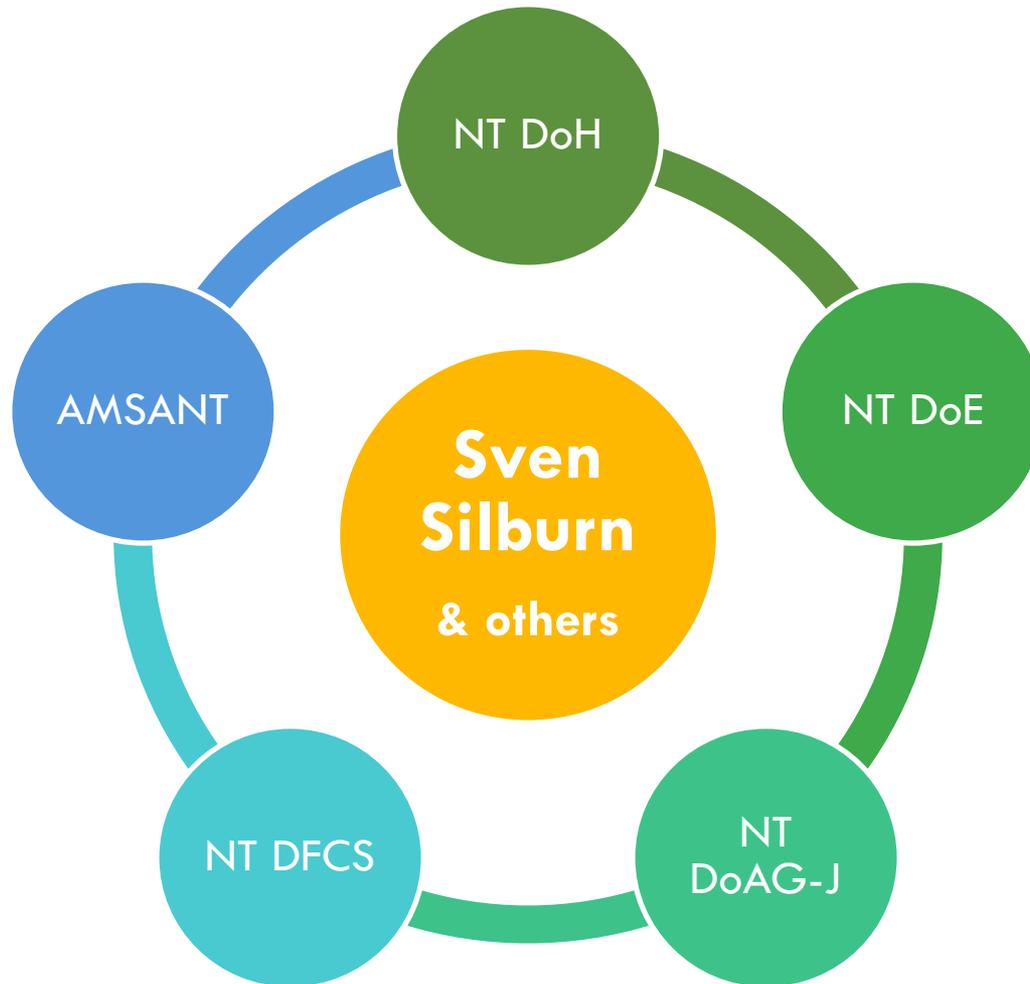
Report number:
1 of 2018-2019

Portfolio:
Social Services

Entity:
Department of Social Services

Contact:
Please direct enquiries through our [contact page](#).

Northern Territory Data Linkage Project



Disclaimer

- Data: Northern Territory (NT) Early Childhood Data Linkage Project, “Improving the developmental outcomes of NT Children: A data linkage study to inform policy and practice across the health, education and family services sectors”, funded through a Partnership Project (2014-2017) between the National Health and Medical Research Council (NHMRC) and the NT Government.
- We follow **NHMRC Values and Ethics: Guidelines for Ethical Conduct in Aboriginal and Torres Strait Islander Health Research (2003)** and the **Australian Institute of Aboriginal and Torres Strait Islander Studies (AIATSIS) Guidelines for Ethical Research in Australian Indigenous Studies (2012)**

**Reciprocity, Respect, Equality, Responsibility,
Survival and Protection, Spirit and Integrity**

- Ethics agreement HREC Reference Number: 2016-2611 Project Title: Improving the developmental outcomes of Northern Territory children: A data linkage study to inform policy and practice in health, family services and education (Human Research Ethics Committee of the Northern Territory Department of Health and Menzies School of Health Research)

Project 1

Special care nursery care

Guthridge, Schnepel and Schurer (2018).

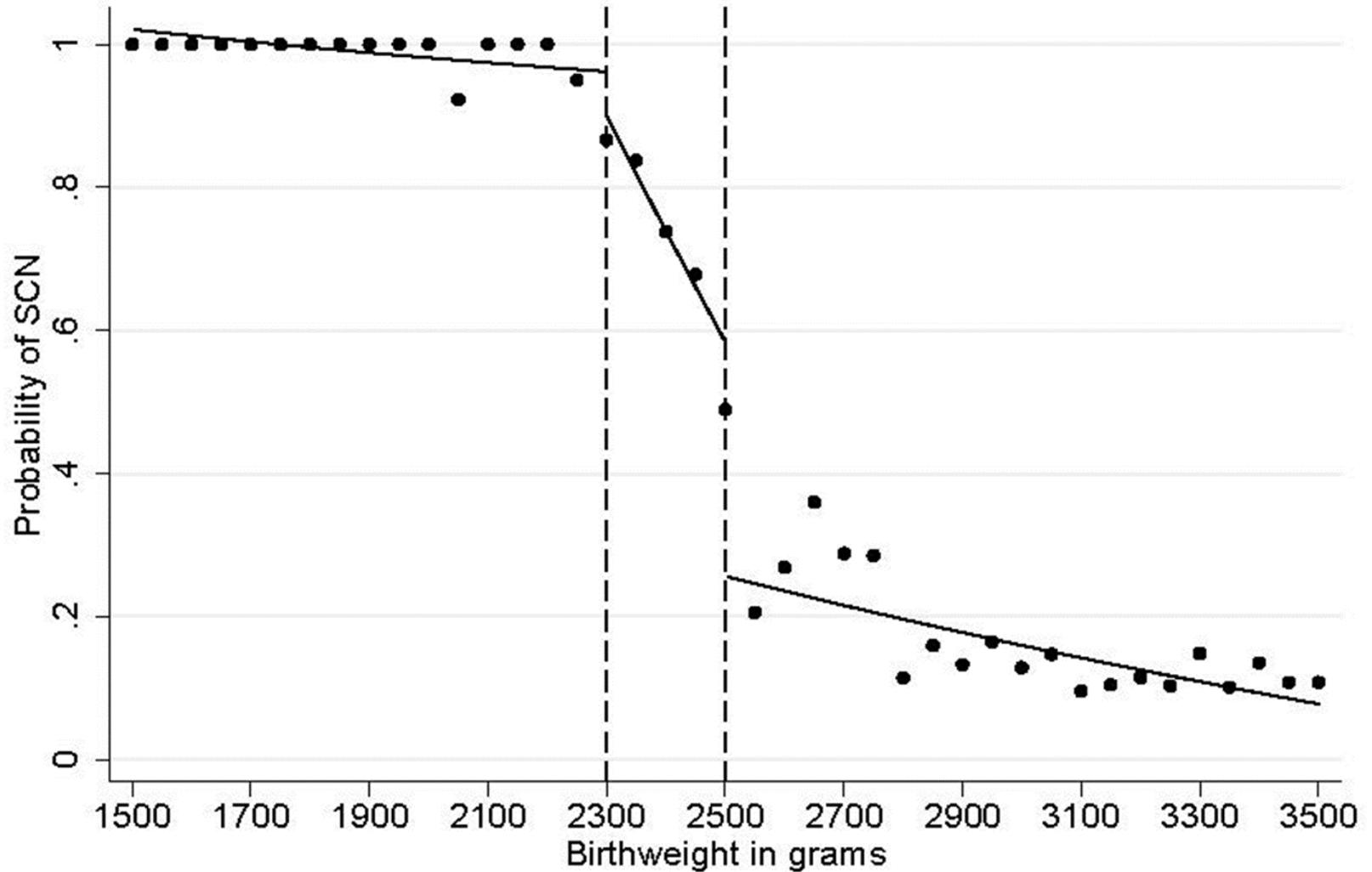
Early Life Health Interventions and
Childhood Development: Evidence from
Special Care Nursery Assignment in
Australia's Northern Territory. In
preparation for submission.

Clinical Decision Rules for SCN admission

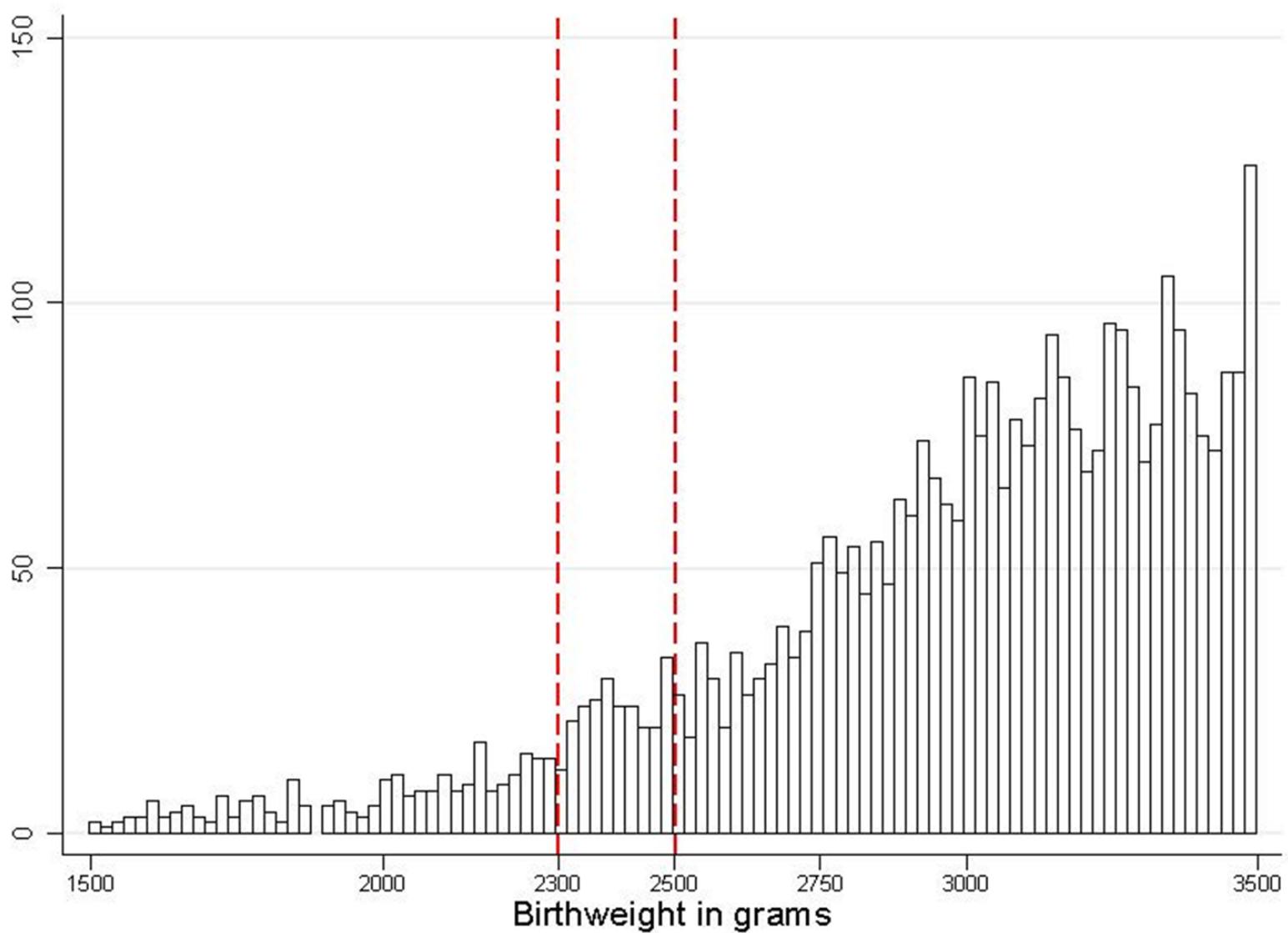
According to the Admission and Discharge Planning For Babies in Neonatal Intensive Care and Maternity Ward RDH Guidelines provided by the NT Department of Health, babies should be admitted to the SCN if:

- They weigh less than 2300g.
- They are born with a birth weight between 2300g and 2500g and if:
 - Prematurity (less than 37 weeks)
 - Did not breast feed successfully at birth (needs to score a BF code of 6 for first feed)
 - Baby is at risk of sepsis (e.g vaginal birth when mother GBS +ve without adequate antibiotic cover in labour, meconium-stained liquor, prolonged ruptured membranes)
 - Low birth weight babies in the Maternity ward where the "Borderline low birth weight babies admitted to the Maternity Unit Breastfeeding Plan" is unsuccessful
- They suffer from apnoea, birth asphyxia, a respiratory distress, or hypoglycaemia

Link between birth weight and SCN admission



No discontinuities across thresholds



Some results

	Male	Female	Indig	Non-Ind	1st Moms
Probability of being developmentally vulnerable					
Any domain	-0.485** (0.189)	-0.113 (0.134)	-0.253** (0.122)	-0.165 (0.172)	-0.197* (0.114)
Sample means	.466	.335	.595	.217	.361
Two domains	-0.353** (0.160)	-0.079 (0.099)	-0.141 (0.116)	-0.043 (0.095)	-0.162 (0.099)
Sample means	.319	.202	.426	.103	.226
Levels of performance (std)					
Physical health and wellbeing	0.686 (0.419)	0.284 (0.259)	0.506* (0.269)	0.084 (0.312)	0.459** (0.226)
Social competence	0.612 (0.408)	0.119 (0.232)	0.581** (0.266)	-0.051 (0.267)	0.225 (0.238)
Emotional maturity	0.520 (0.385)	0.213 (0.222)	0.577** (0.263)	-0.001 (0.278)	0.211 (0.225)
Language and cognitive skills	0.603** (0.297)	-0.105 (0.260)	0.227 (0.210)	-0.131 (0.306)	0.177 (0.187)
Comm. skills and general knowledge	0.437 (0.337)	0.169 (0.242)	0.300 (0.240)	0.106 (0.292)	0.284 (0.219)
Observations	1,719	1,823	1,622	1,821	2,348
First stage F-statistic	13.12	29.22	28.54	12.18	25.44

Back of the envelope cost-calculation

Neonatology is expensive

- In Australia, one day in a SCN costs the public health insurance provider (Medicare) A\$3,000 (US\$2,157)
- In our data, the marginal baby born to an indigenous mother stays on average 9 days in a SCN: \$27,000 (US\$19,416).

Project 2: Income Management

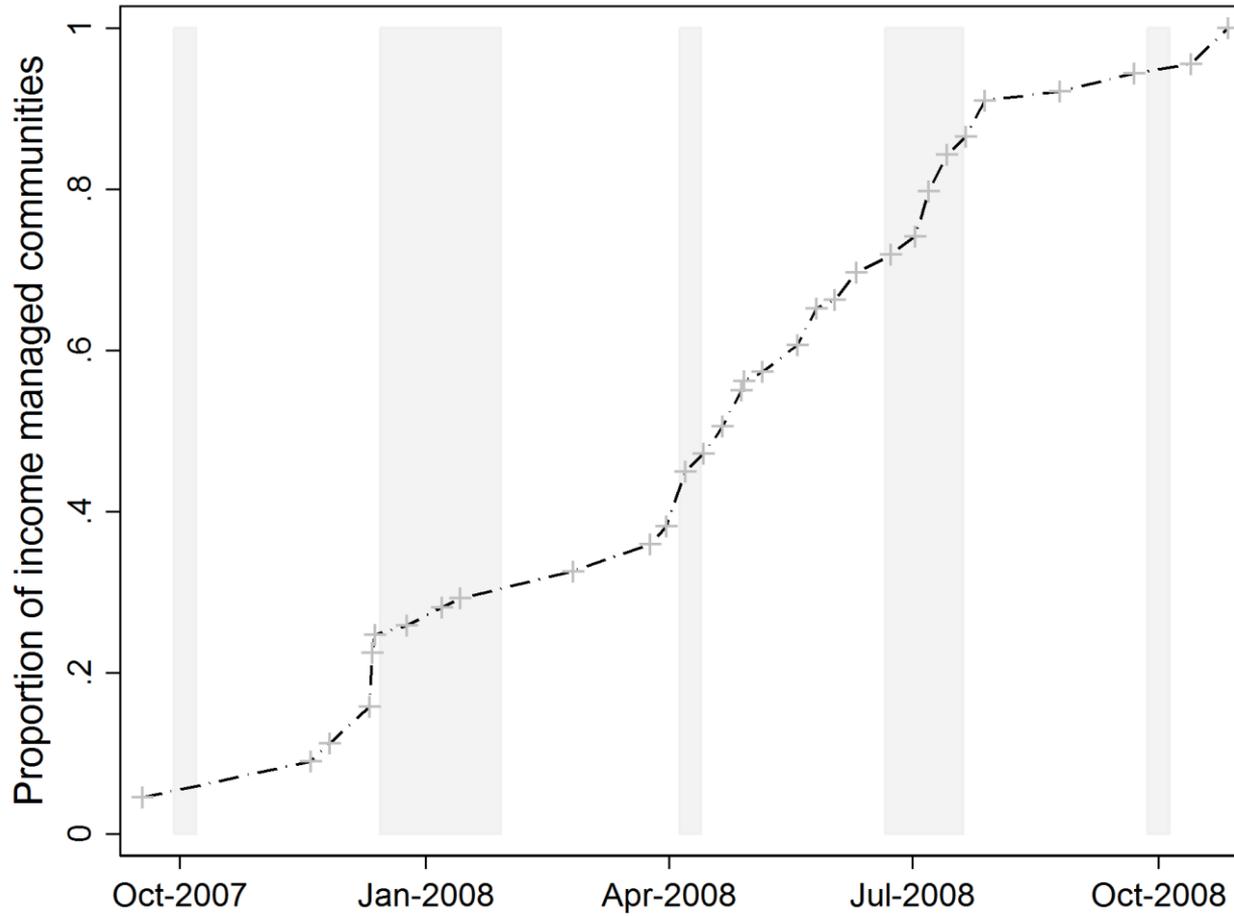
1. Cobb-Clark, Kettlewell, Schurer, and Silburn (2018). The Effect of Quarantining Welfare on School attendance in Indigenous communities. IZA Discussion Paper Nr 11449 (under peer review)
2. Doyle, Schurer, and Silburn (2017). Do welfare restrictions improve child health? Estimating the impact of income management in the Northern Territory. Life Course Centre Working Paper Nr 2017-21. In prep for submission.
3. Schurer, Silburn, Havnen, Doyle, Kettlewell, Cobb-Clark (2018). Descriptive analysis using Longitudinal Study of Indigenous Children (LSIC). In prep for a The Conversation article.

IN THE NEWS: ABC TV News (Sydney, Melbourne, Adelaide, Brisbane), [ABC News Online](#), ABC Radio (National, NewsRadio, triple j, Perth, Sydney), AAP [News Corp Australia's](#), Daily Mail Australia and [Yahoo!7](#); The Wire; [The Guardian](#), NITV; [NT News](#), 8HA Alice Springs, 2MCE Orange and 4K1G Townsville, CAAMA Radio, 2MCE Orange, [Koori Mail](#). Briefing PM&C 4 Dec 2017

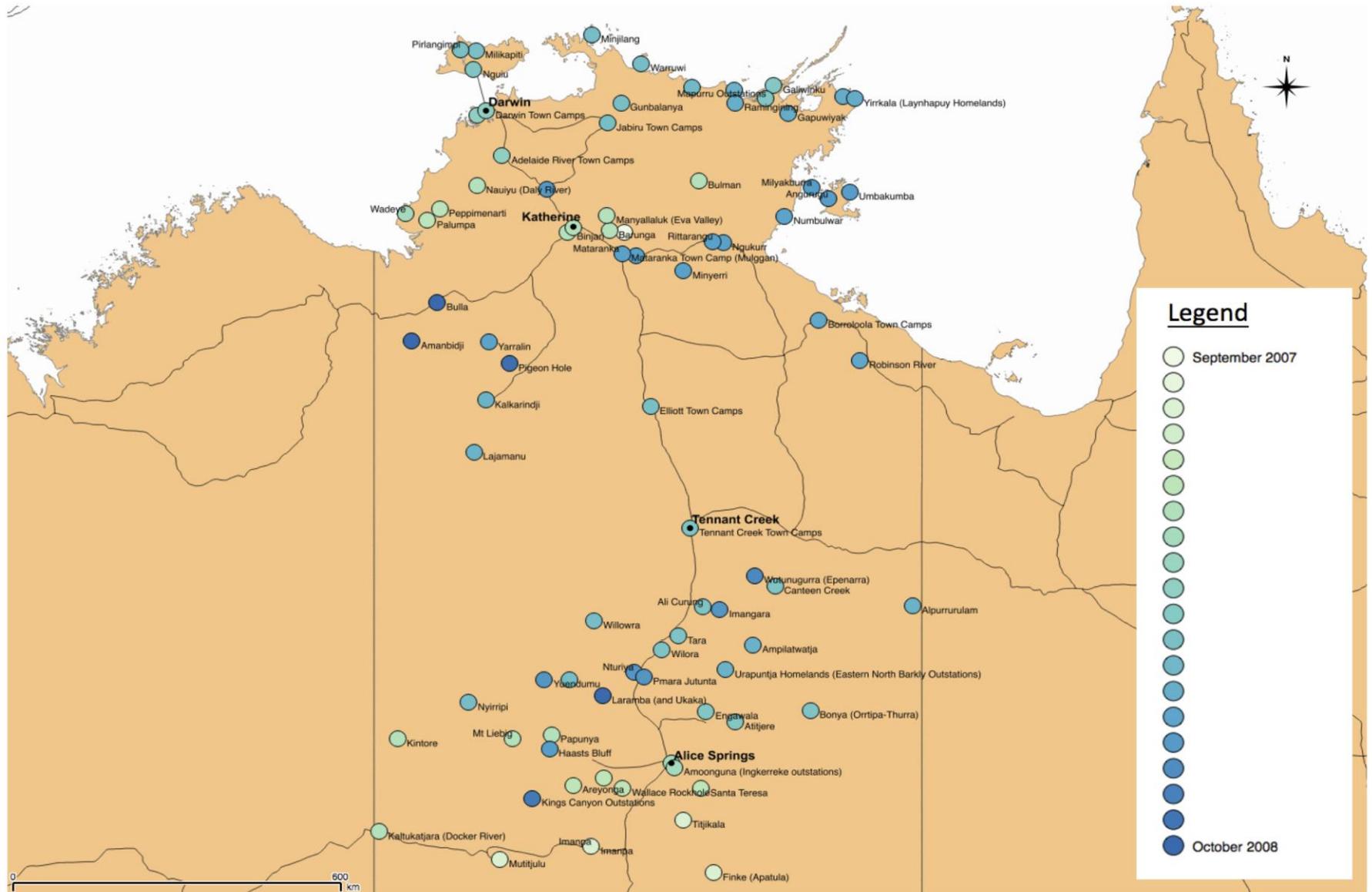
Motivation of IM in 2007: part of the NTER

- 1) “To stem the flow of cash going towards substance abuse and gambling and ensure that funds meant to be for **children's welfare** are used for that purpose” (Brough 2007).
- 1) “To promote socially responsible behaviour, particularly in relation to **the care and education of children**” (Social Security and Other Legislation Amendment (Welfare Payment Reform Act 2007 No. 130, 2007 123TB Objects, Section (a)).
- 3) Reduce humbugging: protect female household members (Howard 2007)

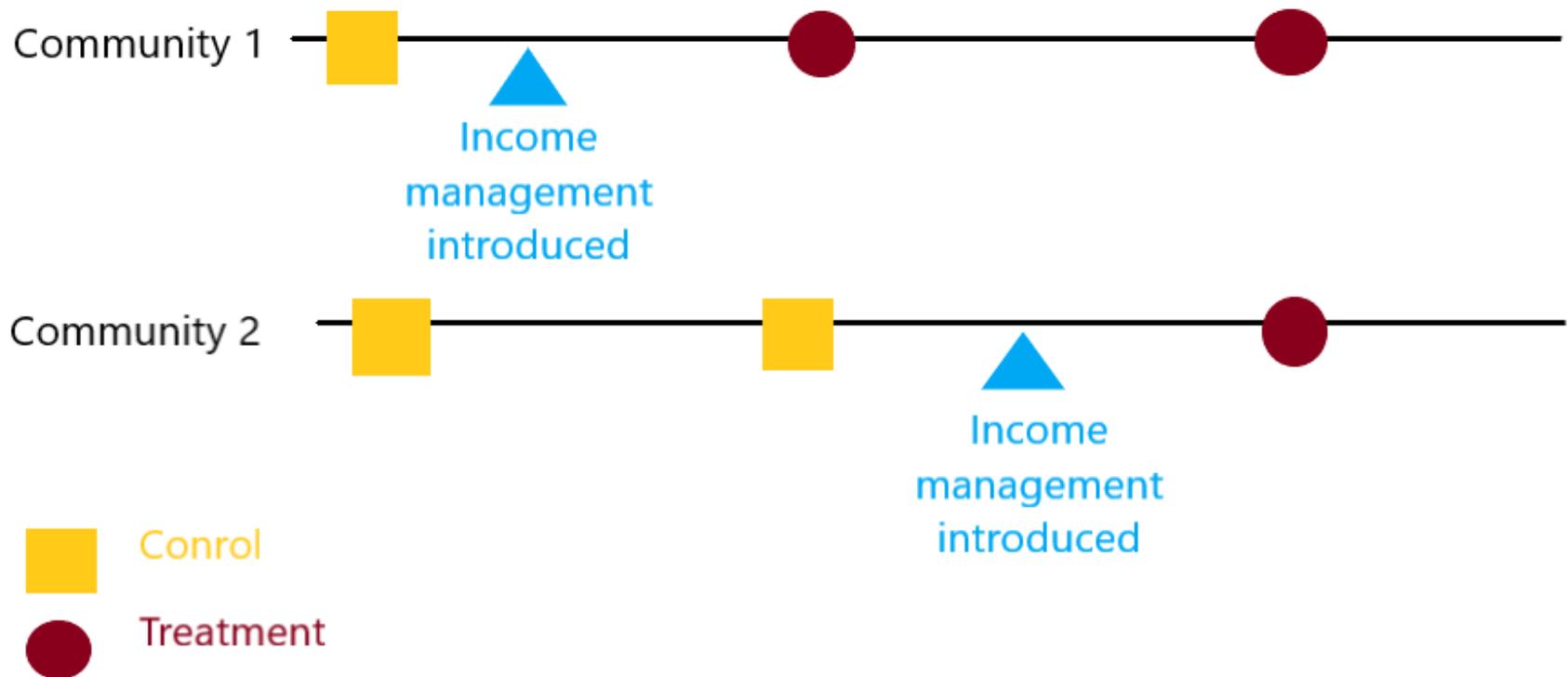
Roll Out of Income Management over Time



Roll Out of Income Management



Methods used to identify a causal impact



High frequency data: methods and assumptions

If data is *high frequency* – eg school attendance (daily measures for all children) - exploit variation in program timing (e.g. Hoynes & Schanzenbach, 2009).

A1: Income management is orthogonal to trends in school attendance
A2: Timing of roll out unrelated to community characteristics

I. Event study

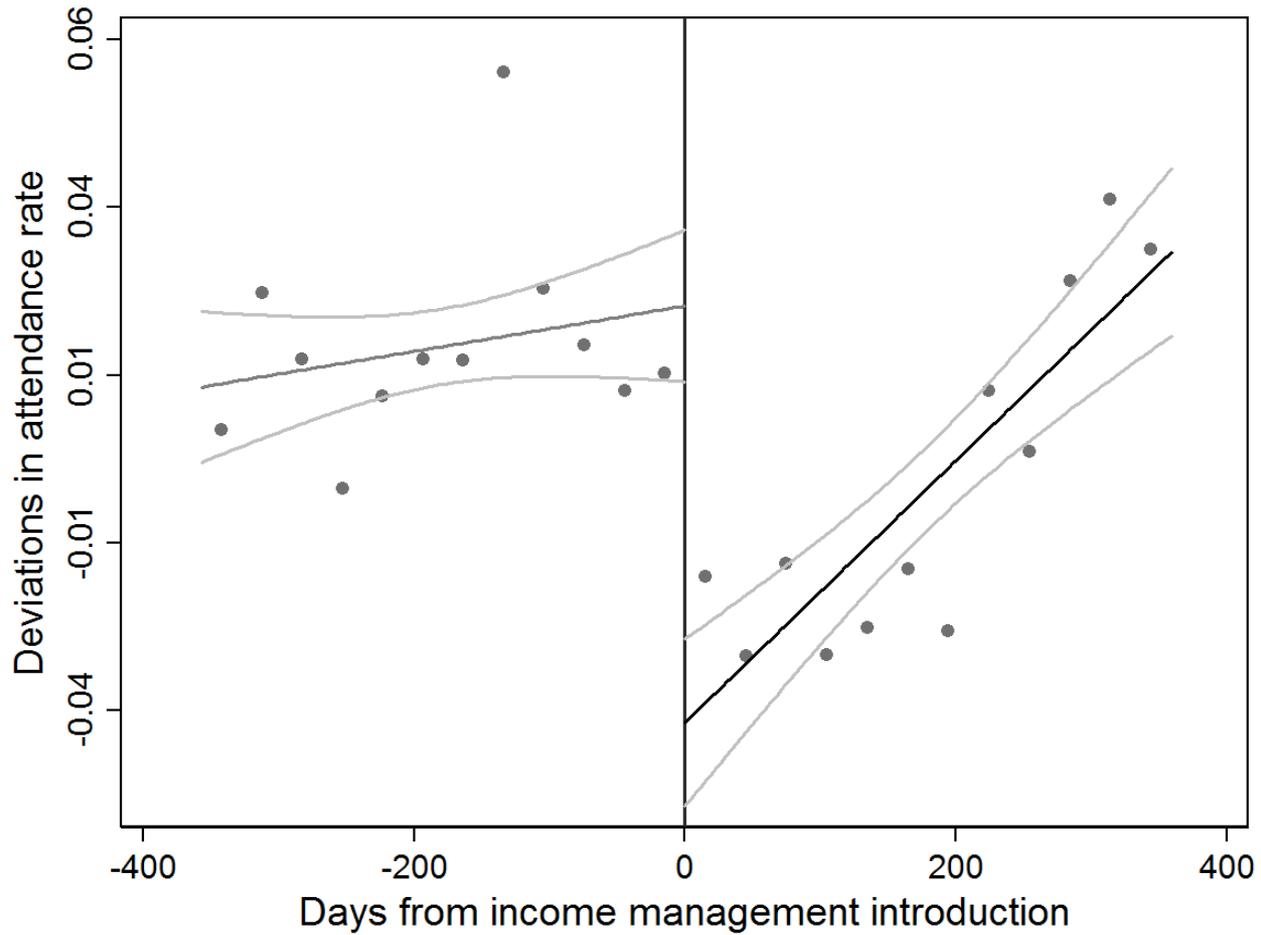
Compare individual school attendance trends before and after the introduction of IM (distance from $t=0$)

II. Difference-in-Difference

Use communities receive IM later as a control group for those receive IM earlier (school FE, time FE, grade level, day of week, qrt., school-specific time FE)

Data: 1.5 years +/- around implementation date: 9,162 students, 130 schools 3.5 million student-day observations

Event study



Low frequency data: Methods and assumptions

If your data is *low frequency* – birth outcomes in communities (each child has only one birth, low number of birth per community) same as Almond, Hoynes and Schanzenbach (2011)

Treatment group:

Children who were in utero ≤ 28 weeks when IM was introduced
(Alternative definitions are tested for)

Control group:

Children who were *not in utero* when IM was introduced, or were in utero in week 29+

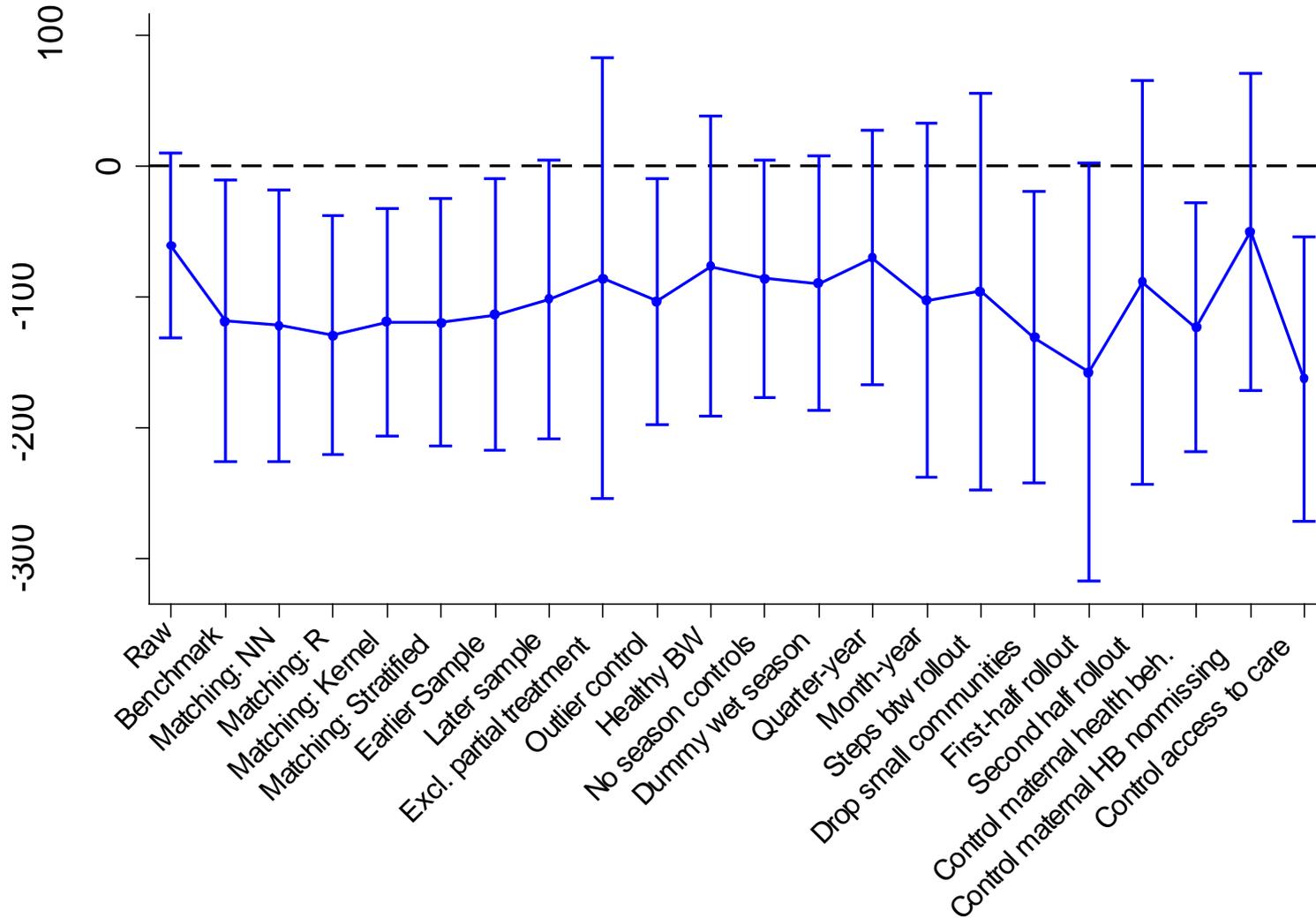
Data: Perinatal data, 1,153 births between Sep 2007 – Jan 2009

Control variables: Community fixed effects, seasonal effects (in extensions: control for maternal behaviour)

A1: communities where IM was introduced earlier versus later do not differ in relevant characteristics

A2: Similar birth outcome trends pre-treatment.

Some results and their robustness



Discussion

- Routine, linked administrative data + detailed knowledge about policies allow to produce *scientific evidence* on policy effectiveness
- Experiments are hiding everywhere, but one needs to know well the institutional framework!
- Building linked admin data sets is hard
- Need for long-term relationships between Government institutions (the data custodians) and researchers (the potential data users)
- **WIN-WIN?**

The future research model



Final words on current research projects

NMHRC Centre of Research Excellence *EMPOWER: Health Systems, Adversity and Child Well Being* (2015-2020), an interdisciplinary collaboration of the BetterStart Research Group at the Adelaide School of Public Health and the Robinson Research Institute. **CIA John Lynch**, CIB Michael Sawyer, CIC Ben Mol, CID Claire Roberts, DIE Gustaaf Decker, CIF Nigel Stocks, CIG Stefanie Schurer, CIH Lyle Gurrin, [CII Naomi Dwyer, CIJ Kerrie Bowering]

NMHRC Targeted Call: *Against the Odds* (2018-2023), *Against the odds: Understanding the factors influencing wellbeing among Indigenous youth in the Northern Territory*. **CIA Stefanie Schurer**, CIB Lisa Cameron, CIC Pat Dudgeon, CID Steve Guthridge, CIE Guyonne Kalb, CIF Olga Havnen, CIG Tanja Hirvonen, CIH Peter Shaw