The South Australia

Early Childhood Data Project (SA ECDP)

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Australian Government
National Health and
Medical Research Council
N H M R C

Government
of South Australia
Department for Education
and Child Development

Government
of South Australia
Department of the
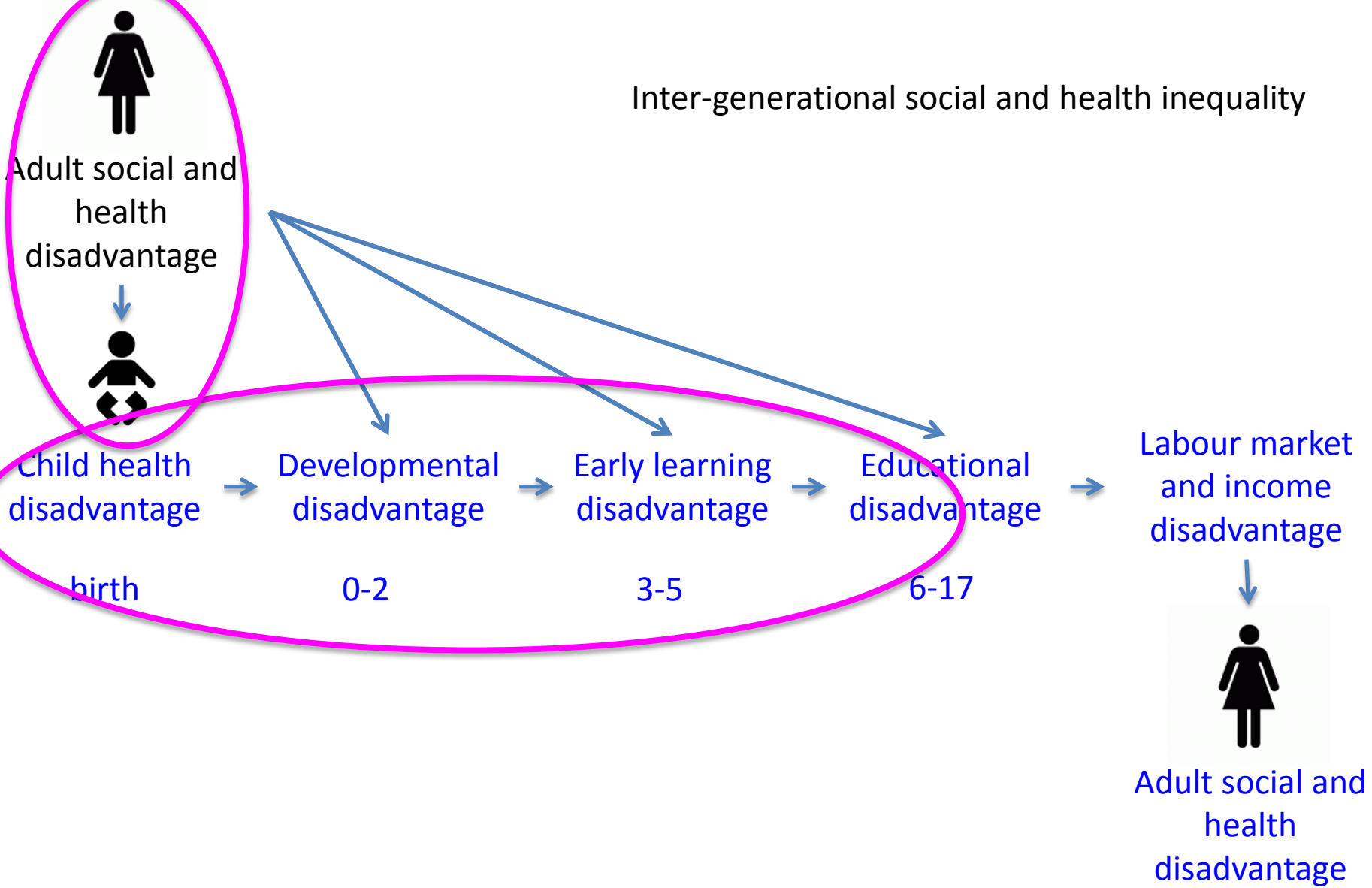Premier and Cabinet

Government
of South Australia
SA Health

Robinson
ResearchInstitute
Healthy children for life.

adelaide.edu.au

seek LIGHT

Inter-generational social and health inequality

Adult social and health disadvantage

Child health disadvantage → Developmental disadvantage → Early learning disadvantage → Educational disadvantage → Labour market and income disadvantage

birth   0-2   3-5   6-17

Adult social and health disadvantage

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https://health.adelaide.edu.au/betterstart/

Every child has the right to develop strong foundations in the early years

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Research Series

THE UNIVERSITY *of* ADELAIDE
SCHOOL OF POPULATION HEALTH

No. 1

SEPT 2014

Synopsis

This report presents an accessible overview of the main concepts behind early child health and development. We summarise the goals of child healthy development in the concept that we call *'Five by Five'*. We describe the 5 basic developmental domains that are achieved in 5 stages.

We describe a child centred system that supports the *Five by Five*, ranging from parenting to the main service support systems (health, schools, child care and early learning, child protection, and non-government organisations).

Finally, we describe different barriers to effective parenting that may be experienced by caregivers, and provide a general introduction to the types of service responses that might better support achieving *Five by Five* for all children.

The *BetterStart* Child Health and Development Research Group is a group of inter-disciplinary researchers from epidemiology, public health, nutrition, paediatrics, biostatistics, and psychology who are trying to better understand how to ensure infants and children have the best start in life that will enhance their health and development over the life course.

Five by Five
A Supporting Systems Framework for Child Health and Development

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UCL

5 development domains

Five by Five

| Domain	Pregnancy (-9 months)	Postnatal (0 – 6 weeks)	Infancy (6 weeks – 12 months)	Toddler (12 – 36 months)	Early childhood (36 – 60 months)
1 Physical	- Mother's physical health (e.g., alcohol, nutrients) - Placental health - Multiple births? - Foetal growth	- Neonatal health check - Weight gain - Feeding - Sleeping	- Hearing and vision - Weight / height gain - Immunisations - No physical stigmata of syndromes	- Weight / height gain - Beginning toilet training - Fine and gross motor skills - Immunisations	- Weight / height (i.e., over or under) - Fine / gross motor skills - Self care skills (e.g., dress self) - Vision and hearing - Immunisations
2 Language	Mother's physical health (e.g., alcohol, nutrients) - Central nervous system development of foetus	- Normal cry - Vocalising	- Babbling - Single words - Imitates speech sounds	- Increasingly name objects/body parts - Increasing vocabulary - Two word sentences - Increased volume of talking	-Speech understandable by others - Expressive language developing - Receptive language developing - Increasing conversation skills
3 Attachment	...ther's social ...umstances (e.g., stressors, supports) - Mother's mental health - Unwanted pregnancy?	- No separation from mother - Responsive parenting	- Secure attachment - No separation > 24 hours from mother - Fear of strangers	- Maintain secure attachment - Anxiety on separating from mother	- Forming a secure attachment with other caregivers - Able to be away from mother for several hours without distress
4 Social emotional	Mother's social ...ircumstances ...g., stressors, supports)	- Regards face - Smiles spontaneously	- Interact with others (e.g., responsive smile) - Increasingly able to indicate wants	- Learning to share / 'take turns' - Imitates others actions - Parallel play with others - Increasing need for independence - Developing conscience	- Cope with change in routine - Emotional regulation - Interactive and pretend play - Understanding other's emotions - Knows "right from wrong"
5 Cognitive	Mother's physical health (e.g., alcohol, nutrients) - Central nervous system development of foetus	- Reflexes - Neonatal hearing test	- Fine and gross motor skills - Interest in objects - Turns to voice	- Follow two simple orders - Curiosity about and exploration of environment - Developing literacy/numeracy skills	- Drawing (e.g., circle, cross, face) - Concentrate for one minute per age - Follow more complex orders from authority figures - Developing literacy/numeracy skills

Across 5 stages

Five by Five

	1 Pregnancy	**2** Postnatal	**3** Infancy	**4** Toddler	**5** Early childhood
	-9 months	0 6 weeks		12 months 24 months	36 months 60 months
Physical	- Mother's physical health (e.g., alcohol, nutrients) - Placental health - Multiple births? - Foetal growth	- Neonatal health check - Weight gain - Feeding - Sleeping	- Hearing and vision - Weight / height gain - Immunisations - No physical stigmata of syndromes	- Weight / height gain - Beginning toilet training - Fine and gross motor skills - Immunisations	- Weight / height (i.e., over or under) - Fine / gross motor skills - Self care skills (e.g., dres... - Vision and hearin... - Immunisati...
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Overall system goal is to achieve the Five by Five for all children

Early Childhood Systems

The Early Childhood Government 'System'
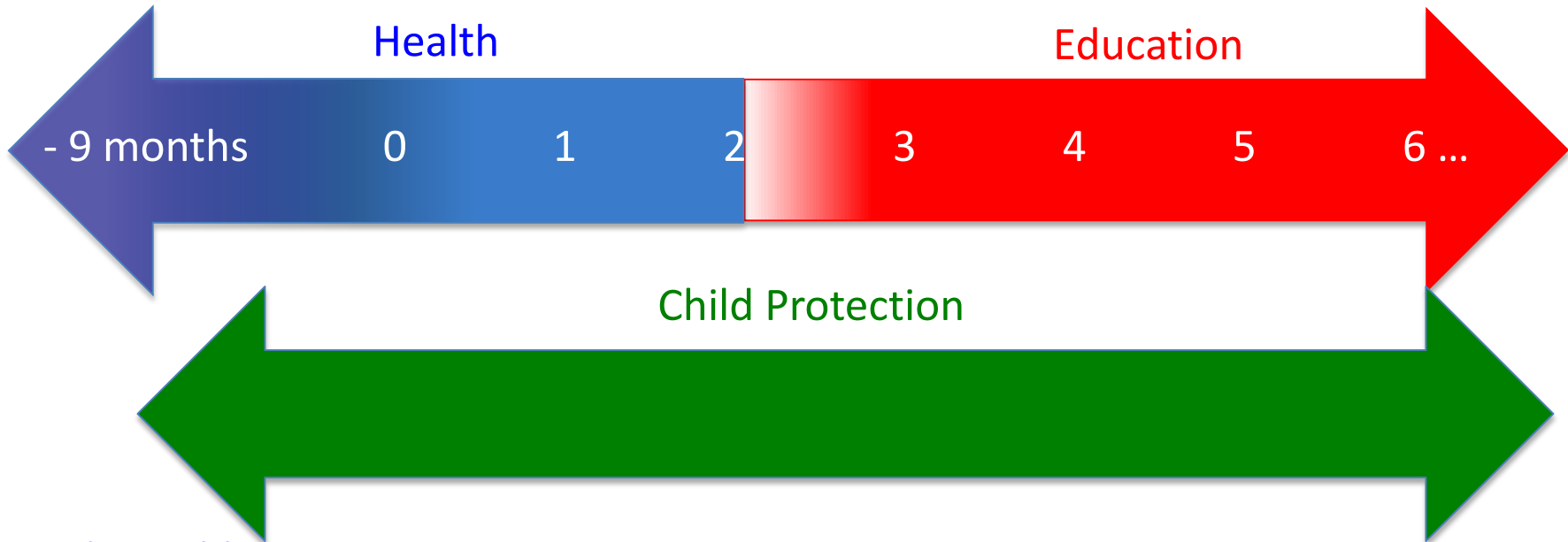
Self Learning Healthy Child Development Systems

in South Australia

EMPOWER CRE
Health systems, disadvantage and child well-being

CIA Lynch	Epidemiology	Public Health
CIB Sawyer	Child psychiatry	RRI
CIC Mol	OBGYN	RRI
CID Roberts	Placental physiology	RRI
CIE Dekker	OBGYN	RRI
CIF Stocks	GP	Medicine
CIG Schurer	Economics	U Sydney
CIH Gurrin	Biostatstics	U Melbourne
CII Dwyer	CE, SA Women's and Children's Health Network	
CIJ	Director, SA Child and Family Health Service	

Interventional Epidemiology

Platform 1: Pragmatic RCTs and Natural Experiments
in pregnancy, postnatal and community-based care

4. Methodology Core

2. Follow-up & scale up via data linkage

1. Pragmatic RCTs embedded in health systems

3. Rapid long-term follow-up via simulated RCTs

Platform 4: Methodology Core
Risk Stratification
Simulation of RCTs in observational data
Causal mediation analysis
Human capability production function
Cost:Benefit analysis
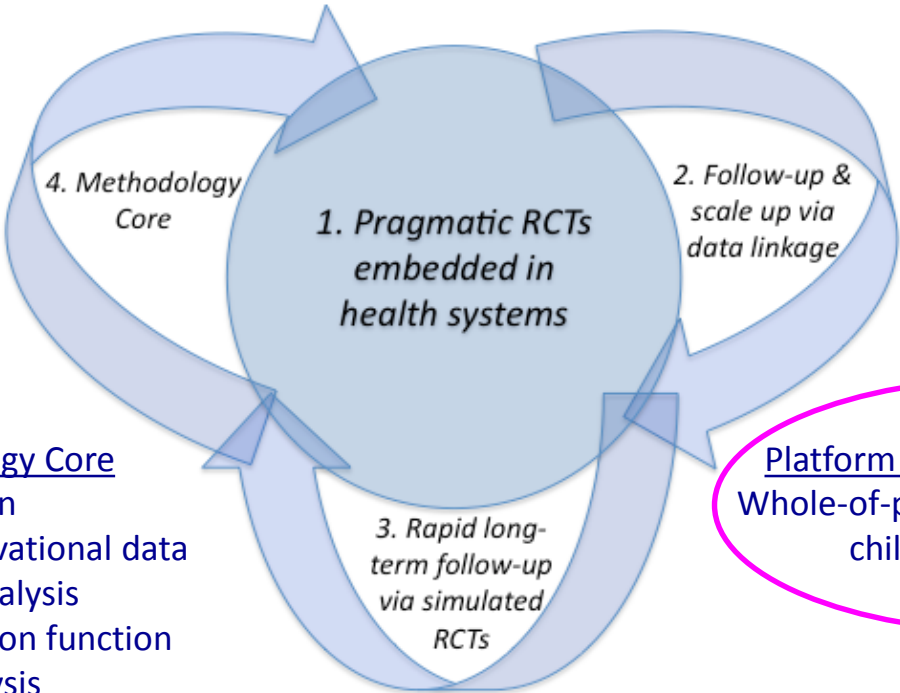
Platform 2: Follow-up & Scale-up
Whole-of-population linked data for
children in SA and NT
N~ 300,000

Platform 3: Cohort Simulation of RCTs & Risk Stratification
Cohorts include - SCOPE; LSAC; LSIC; HILDA (Aus)
ALSPAC, MCS (UK)

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Platform 2

Data Linkage

SA Early Childhood Data Project

SA Police

- Every complete birth cohort
- Born 1999-2014
- N = ~ 300,000 children
- N = ~ 12,000 Aboriginal children
- Over 7 million records
- ~ 20 different government sources
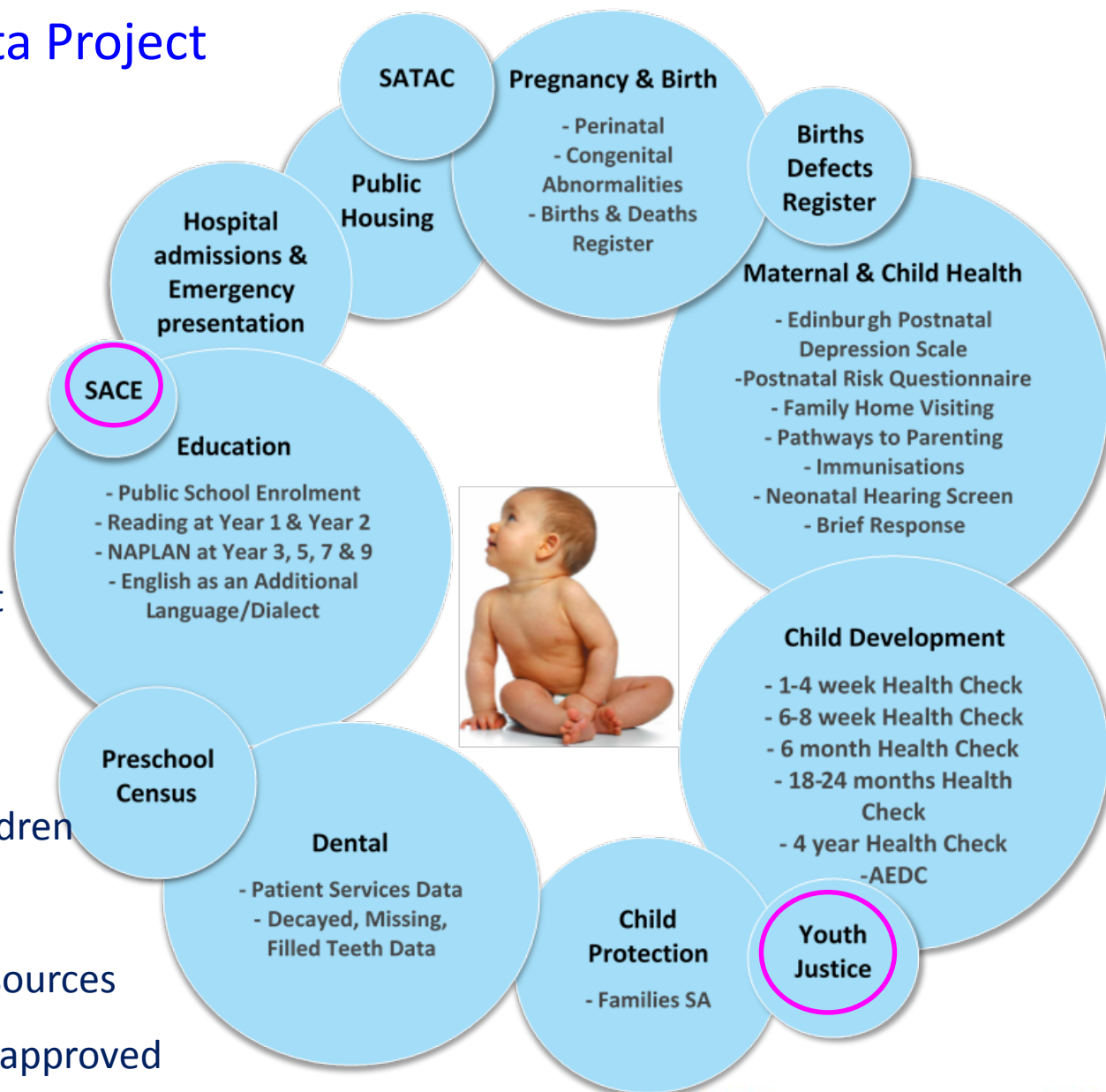- Public good resource - ~ 20 approved researchers including within government

SATAC

Pregnancy & Birth

- Perinatal
- Congenital Abnormalities
- Births & Deaths Register

Births Defects Register

Public Housing

Hospital admissions & Emergency presentation

Maternal & Child Health

- Edinburgh Postnatal Depression Scale
- Postnatal Risk Questionnaire
- Family Home Visiting
- Pathways to Parenting
- Immunisations
- Neonatal Hearing Screen
- Brief Response

SACE

Education

- Public School Enrolment
- Reading at Year 1 & Year 2
- NAPLAN at Year 3, 5, 7 & 9
- English as an Additional Language/Dialect

Child Development

- 1-4 week Health Check
- 6-8 week Health Check
- 6 month Health Check
- 18-24 months Health Check
- 4 year Health Check
- AEDC

Preschool Census

Dental

- Patient Services Data
- Decayed, Missing, Filled Teeth Data

Child Protection

- Families SA

Youth Justice

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Anemia in Pregnancy and AEDI Vulnerability (N = 13,654 imputed)
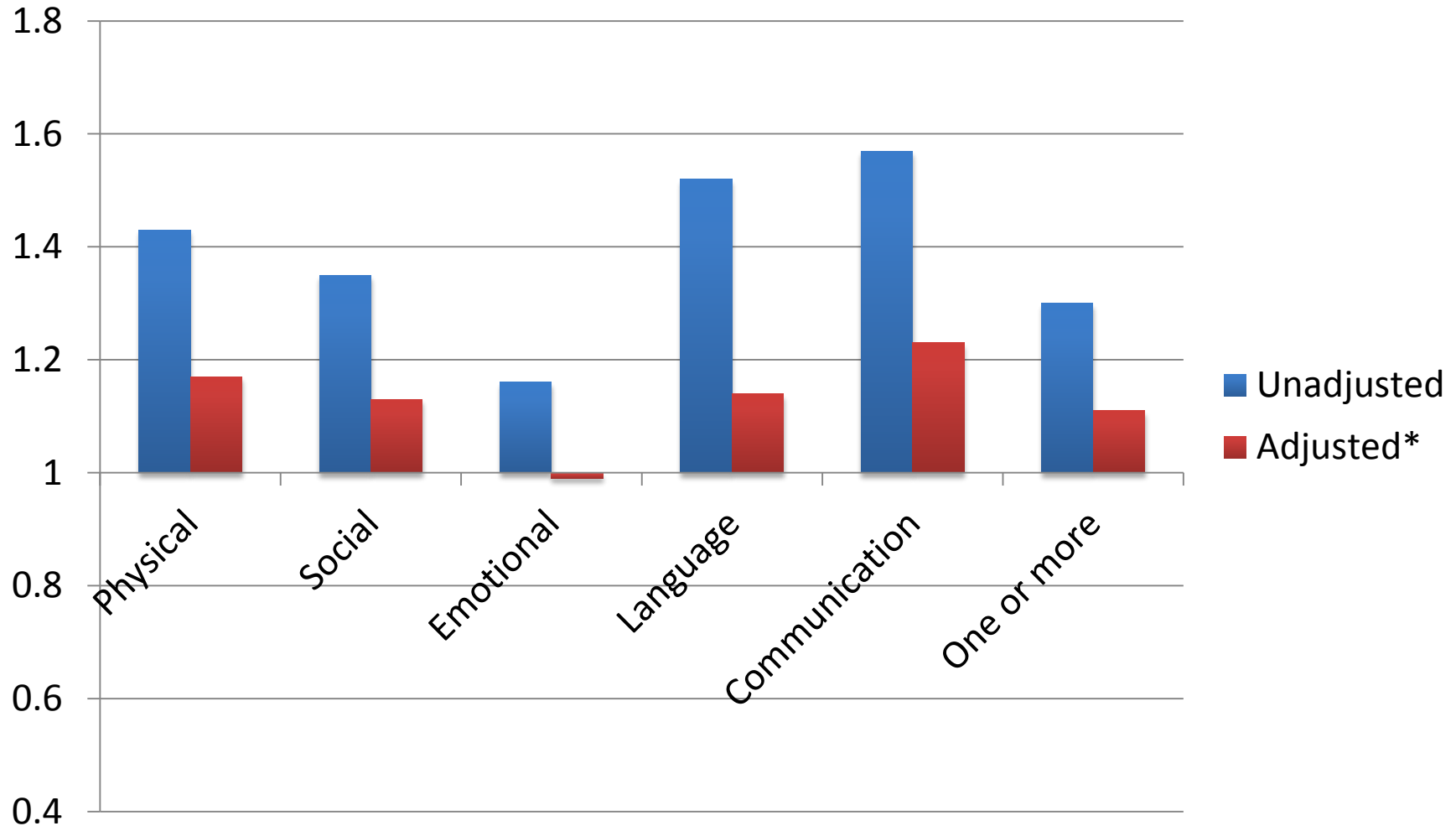
* Adjusted for twin, maternal age, smoking in pregnancy, no. antenatal visits, parity, inter-pregnancy interval, maternal occupation, paternal occupation, Aboriginal or Torres Strait Islander status, remoteness, SEIFA-IRSD.

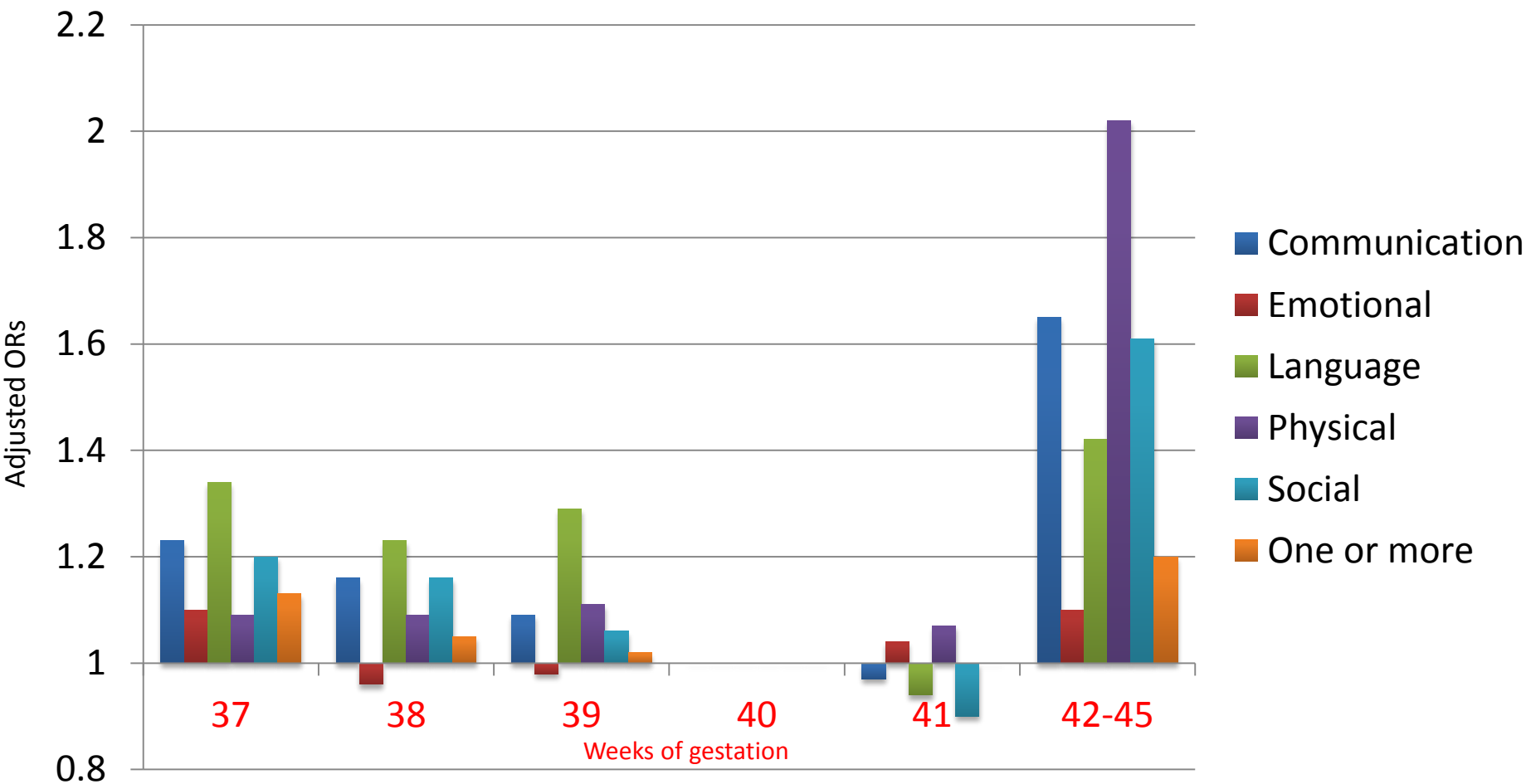Smithers et al. *Pediatric and Perinatal Epidemiology (*2014)

Gestational Age (weeks) and AEDI vulnerability at age 5 (N = 12,601)

Adjusted ORs

Weeks of gestation

- Communication
- Emotional
- Language
- Physical
- Social
- One or more

37 weeks: 7%
38 weeks: 20%
39 weeks: 23%
40 weeks: 37%
41 weeks: 13%
42-45 weeks: 0.7%

Smithers et al. *BJOG* (2015)

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Infographic that accompanied release of the Nyland Commission Report

BetterStart Research Report
Dec 2016

Contact with the child protection system in South Australia 1999-2015

From 1999 to 2005 there were approximately 18,500 children born each year in South Australia.

In each birth cohort by age 10, there was ...

13,800 children - no contact with child protection

4,700 children- at least one notification

850 children- at least one substantiation

350 children- at least one Out-of-Home Care episode

1 in 4 children - at least one child protection notification

1 in 20 children - at least one substantiation

1 in 50 children - at least one Out-of-Home-Care episode
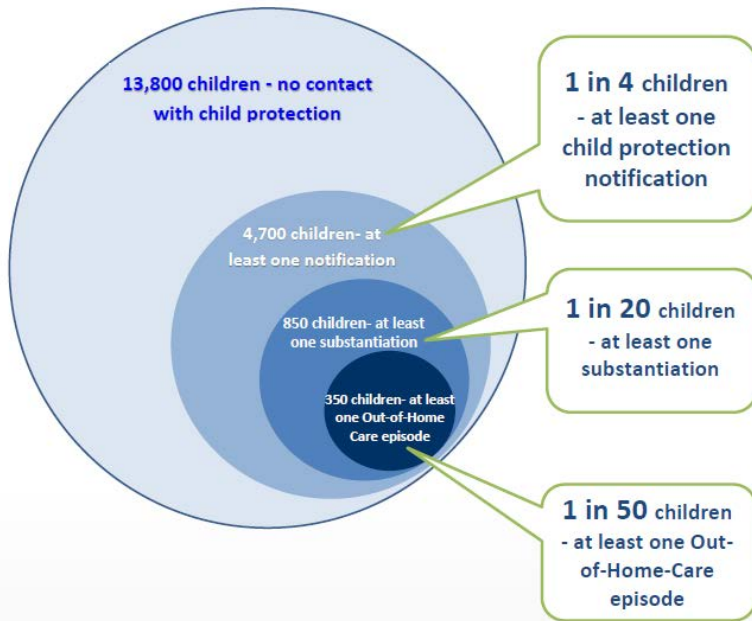
Interpretation
These numbers display the child protection experience of ~127,000 South Australian children born from 1999 to 2005, and followed up until age 10.

The data show that 1 in 4 or 25% of all children were subject to at least one child protection notification. 1 in 20 or 5% of all children were subject to at least one substantiation, and 1 in 50 or 2% were subject to at least one Out-of-Home care episode.

Child Protection in South Australia

The increase in child protection notifications and system involvement is a global concern. In recognition of this, the State government in South Australia established a Child Protection Systems Royal Commission led by The Hon Margaret Nyland AM in August 2014, to examine the child

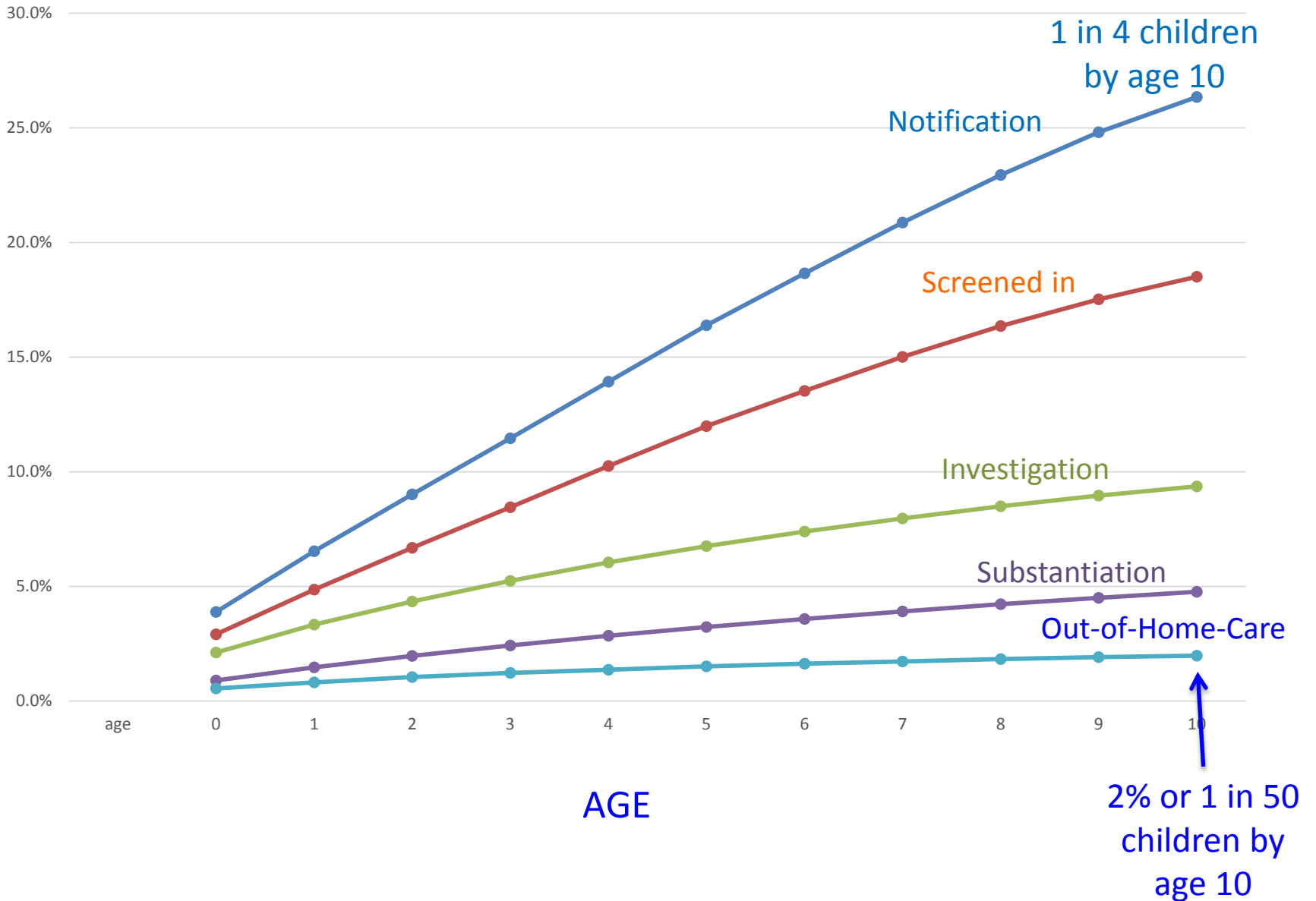One focus of the project is to help the government respond to this report. The 'joining-up' of child protection data with perinatal, hospital, child and family health, education, public housing, and youth justice data has never been done in South Australia.

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Cumulative Incidence of Child Protection Contact Types (1999 – 2015)
Denominator = Total Population of SA Children (~128,000)

1 in 4 children by age 10

Notification

Screened in

Investigation

Substantiation

Out-of-Home-Care

2% or 1 in 50 children by age 10

AGE

Cumulative Incidence of Child Protection Contact Types (1999 – 2015)
Denominator = Number of Children Notified to Child Protection (n=33,235)
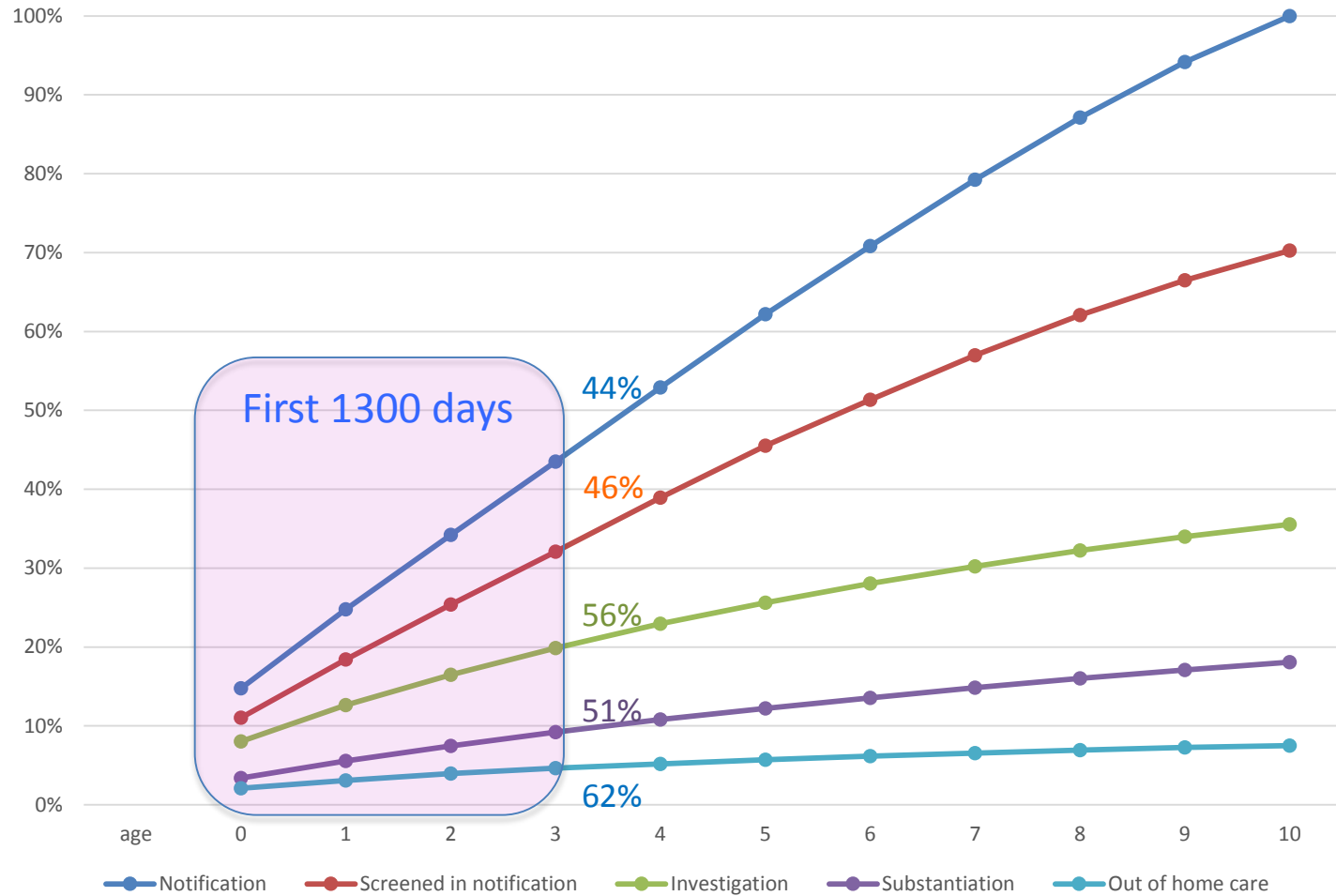
A Public Health Approach

To Early Intervention

SA Population by age 10
(20,000 births per year)

3,842 children per birth cohort (~80%) no further action by child protection agency

At least 1 Notification
4,700 children in every birth cohort

~25% of children

1,364 children not screened in

Screened in Notification
3,336 children in every birth cohort

~19% of children

1,649 children not investigated

Investigated
1,687 children in every birth cohort

~10% of children

829 children not substantiated

Substantiated
858 children in every birth cohort

~5% of children

Out-of-home Care
355 children in every birth cohort
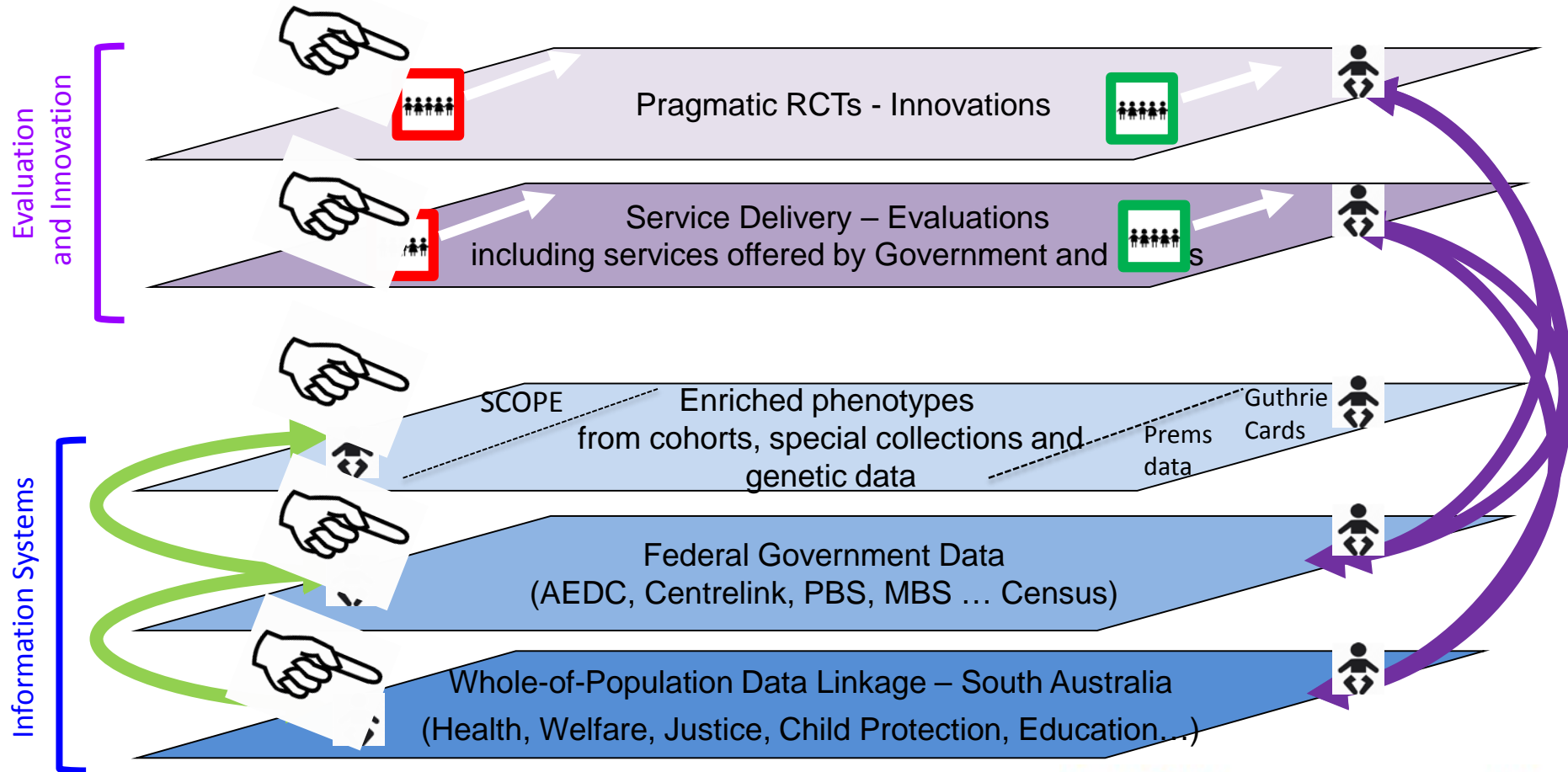
~1.8% of children

SA Early Childhood Data Project – Information, Evaluation, and Innovation

Integrated research information system + government 'business intelligence' system – combines linked administrative data, cohorts, service delivery evaluations and RCTs

Evaluation and Innovation

Pragmatic RCTs - Innovations

Service Delivery – Evaluations
including services offered by Government and ...

Information Systems

SCOPE Enriched phenotypes
from cohorts, special collections and
genetic data

Guthrie
Cards

Prems
data

Federal Government Data
(AEDC, Centrelink, PBS, MBS … Census)

Whole-of-Population Data Linkage – South Australia
(Health, Welfare, Justice, Child Protection, Education…)

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Data Linkage and Routine Evaluation Studies

Use linked administrative data to routinely and cost effectively evaluate programs

and service delivery innovations

- using RCTs for medium term follow-up in school

- propensity score matched comparison groups

- regression discontinuity designs

- instrumental variables

Information Systems and Improving Effectiveness of Services

- IF we knew who was in and not in the systems – coverage in the population

- IF we knew which services children and parents accessed

- and IF we were able to regularly, routinely collect relevant outcomes like child development, mental health, physical health, …

- and we were able to create, document and measure changes in service provision, e.g., "integration" such as Children's Centres

- Then a population-wide data linkage information system could be used to help quantitatively evaluate service innovations on a routine, cost-effective and sustainable basis

- And potentially in close to real time to provide clinical and practice feedback to improve service quality

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The science of the "bleeding obvious" …?

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