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# Data Linkage in Manitoba



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Presented by Marni Brownell, Ph.D., Manitoba Centre for Health Policy and  
Mariette Chartier, Ph.D, Healthy Child Manitoba,  
Early Development Imperative Conference - November 16, 2009 - Winnipeg, Canada



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# Overview of Presentation

- Introduction
- Linking the EDI using the Manitoba Birth Cohort Study (Mariette)
- Data Linkages using Manitoba Centre for Health Policy (MCHP) data (Marni)
- Future Research & Conclusions
- Questions - Discussion



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Why is it so important to link datasets from different sources and over different times to better understand child development?



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# Ecological Model of Child Development



## COMMUNITY

PRESCHOOL  
& SCHOOL

Health Care  
Supports  
Programs  
Parks  
Attitudes

## FAMILY

Quality  
Caregiver  
Education  
Peer Group

## CHILD

Parenting  
Income  
Parental  
Education  
Employment

Gender  
Age  
Temperament

**CHILD-CENTRED  
PUBLIC POLICY**

According to the ecological model, there are many layers of factors that influence child development. These factors continue to influence the individual throughout the life course.

**Pregnancy,  
Birth, and  
Infancy**

*(Prenatal - 3 years)*

**Early  
Childhood Care  
and Learning**

*(3 years - 6 years)*

**Middle  
Childhood Care  
and Learning**

*(6 years - 12 years)*

**Adolescent  
Development**

*(12 years - 18 years)*

**OUTCOMES**

**Physical &  
Emotional Health**

**Social Engagement  
& Responsibility**

**Safety & Security**

**Success at  
Learning**

**HEALTHY LIFE  
TRANSITIONS**

## **APPROACHES AND INITIATIVES**

**Public Health Support to Young Families • Home Visiting for At-Risk Families • Positive Parenting  
Financial Supports • Child Care • Nursery School • Healthy Buddies • Reading Recovery**

## **SOCIAL AND PHYSICAL INFLUENCES**

Socio-economic status • School Readiness • Family Functioning •  
Parent's mental health • Abuse & Neglect • Neighborhood Safety  
Environmental Exposures • School Quality • Nutrition

## **LIFE COURSE APPROACH**

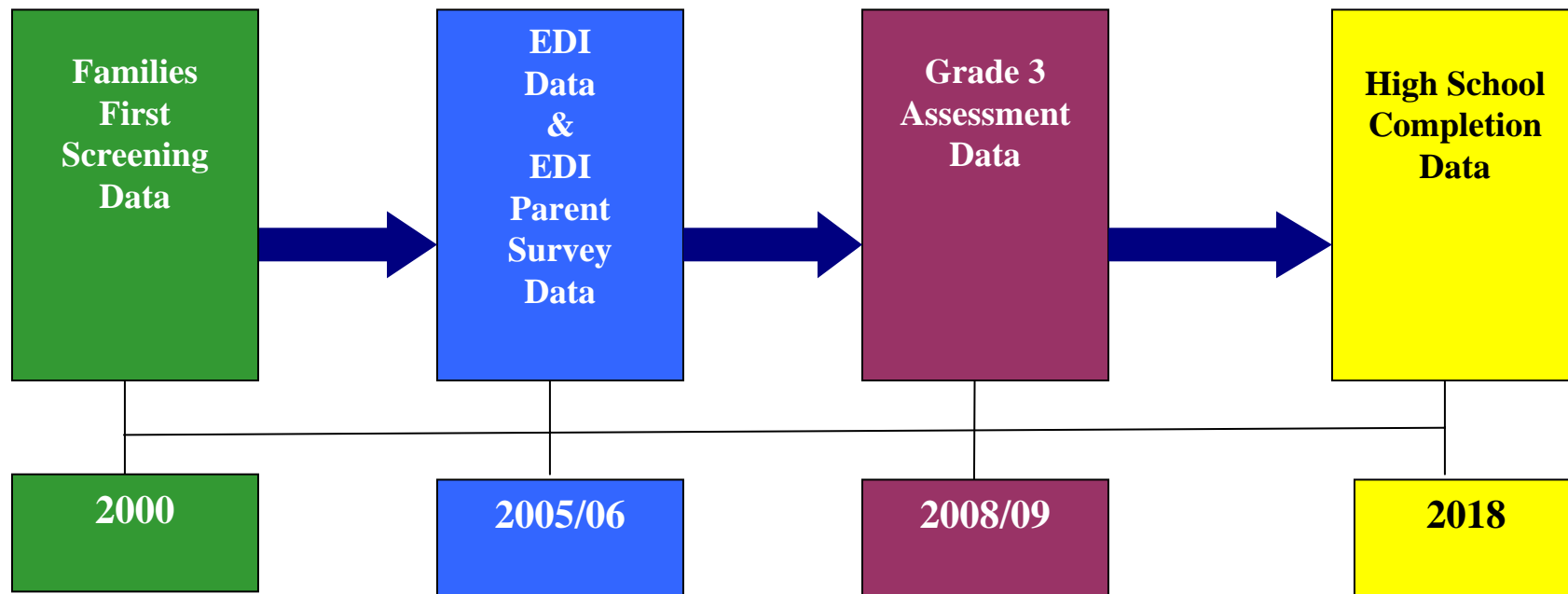
Lifelong impact of influences that occur early in life



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# Putting Together the whole story:

How Manitoba children are doing from birth to adulthood...



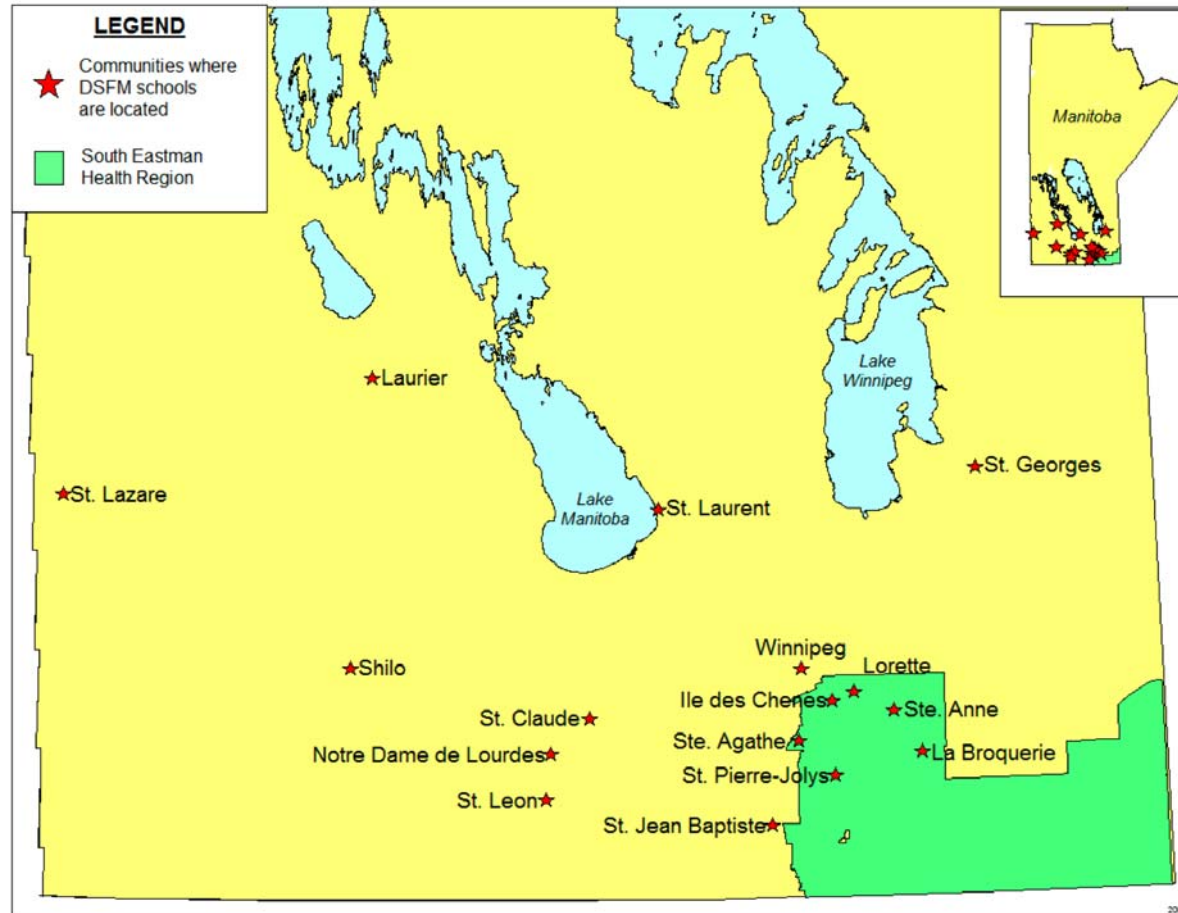
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# South Eastman Health Region and Francophone Community



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- Teresa Mayer (HCMO)
- Healthy Child Manitoba Office Team
- Ministers in the Healthy Child Committee of Cabinet



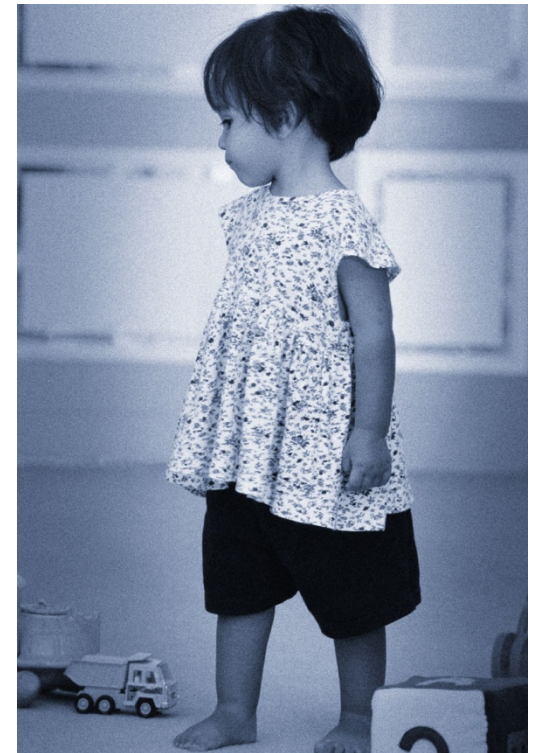
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# Questions #1

- Are children identified as « vulnerable » on the EDI more likely to have academic and socio-emotional difficulties in Grade 3, compared to children who are «not vulnerable»?
- Can we identify factors that explain why some children change trajectories?



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# Socio-emotional outcome

- EDI

- Social competence: gets along with others, accepts responsibility for actions, etc.
- Emotional maturity: eager to explore new items, appears sad, gets into fights
- Lower than Canadian cut-off

- Grade 3

- hyperactive,
- anxious/depressed
- physical aggression
- prosocial behavior
- cut-off was 25%



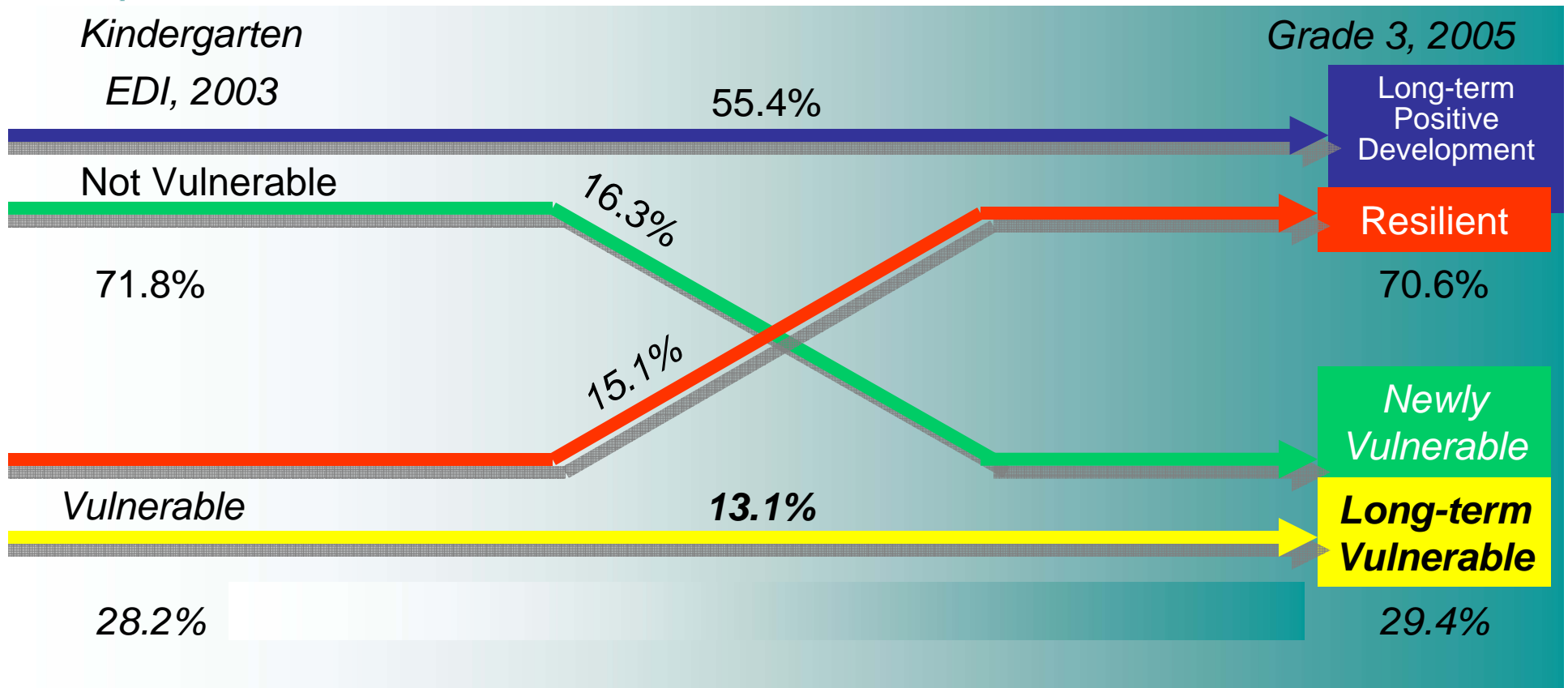
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# Children's *Socio-Emotional* Trajectories

South Eastman Health and DSFM (n=588)



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Source: 1997 Manitoba Birth Cohort Study



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# Academic Outcomes

- EDI

- Language and cognitive development: interested in games involving numbers, writes own name, reads sentences, etc.
- Communication and general knowledge: communicates needs and understands others, shows interest in general knowledge, etc.
- Vulnerable = lower than Canadian cut-off

- Grade 3

- Reading
- Mathematics
- Vulnerable = could not meet expectations



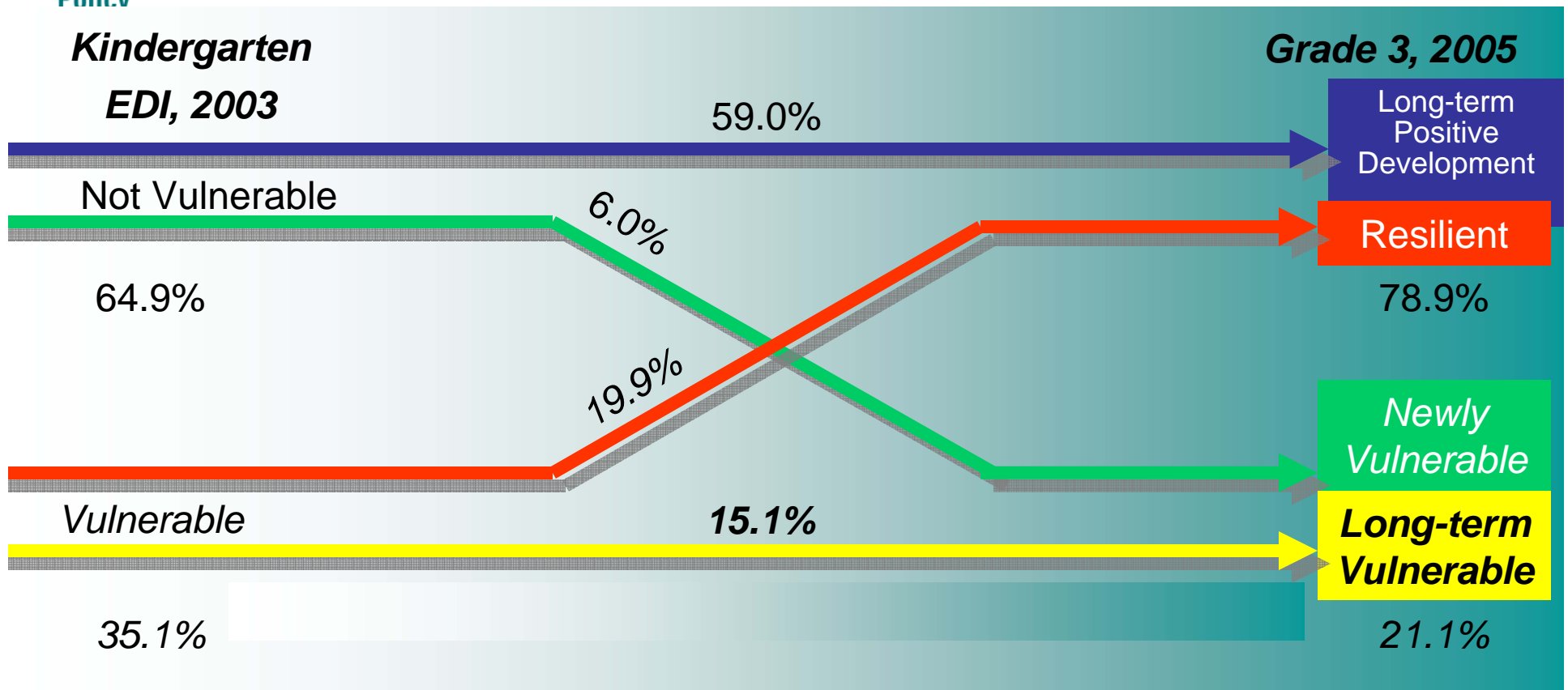
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# Children's *Academic* Trajectories

Division scolaire franco-manitobaine (n=251)



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Source: 1997 Manitoba Birth Cohort Study



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## Question #2

- Is there a link between the preschool linguistic environment and learning in a « français » school?

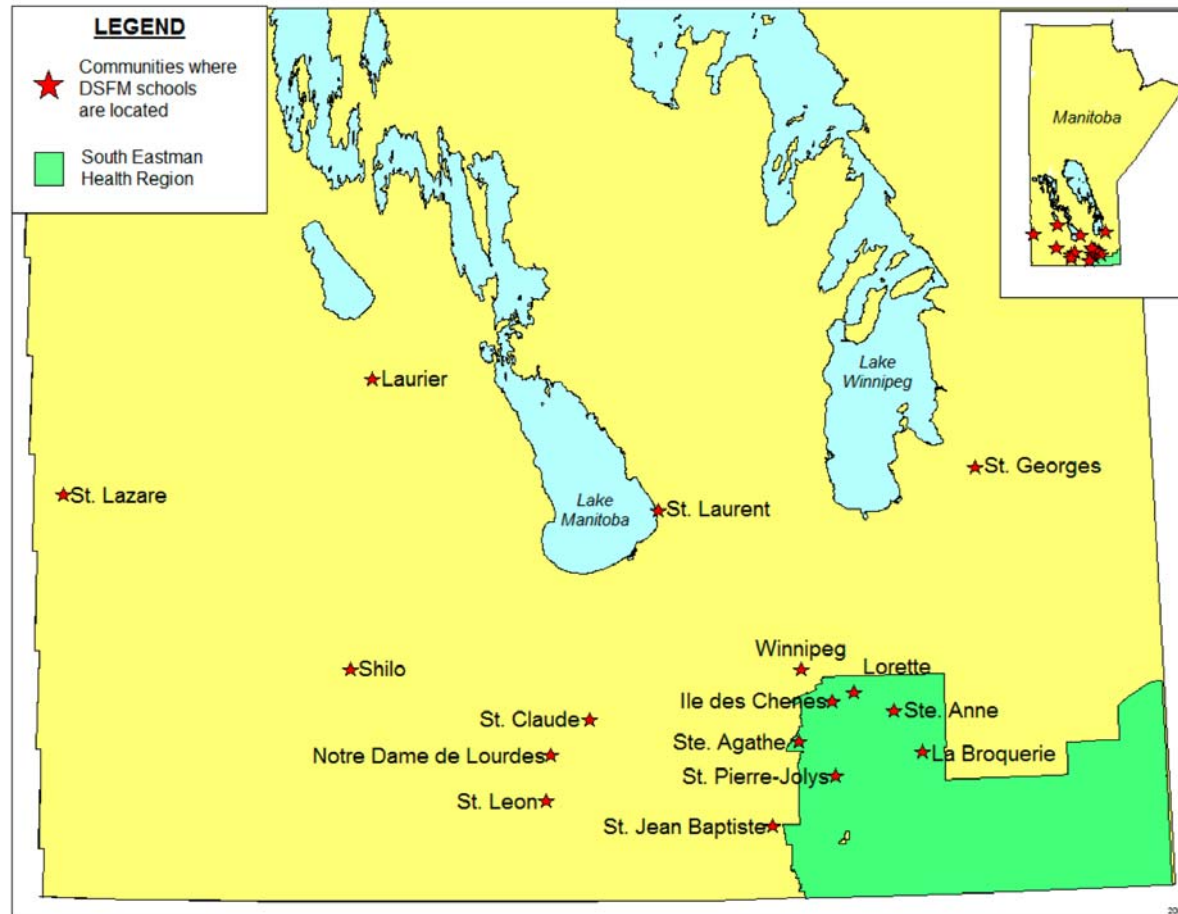


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# South Eastman Health Region and Francophone Community



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# Language in Child Care and Early Development Instrument and Grade 3 Assessments Among Francophone Children



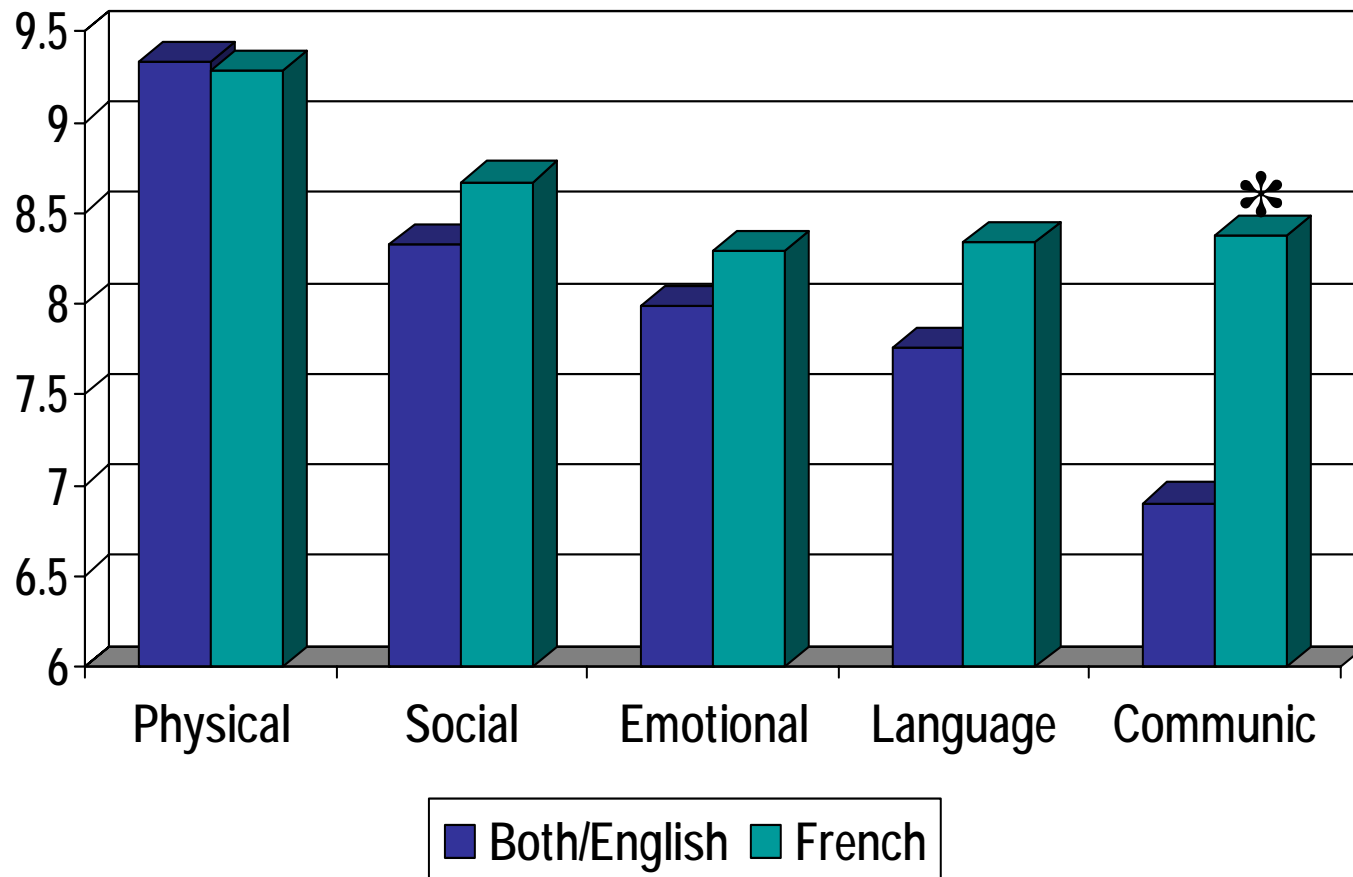
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# Language Spoken in Child Care and EDI Results in Kindergarten

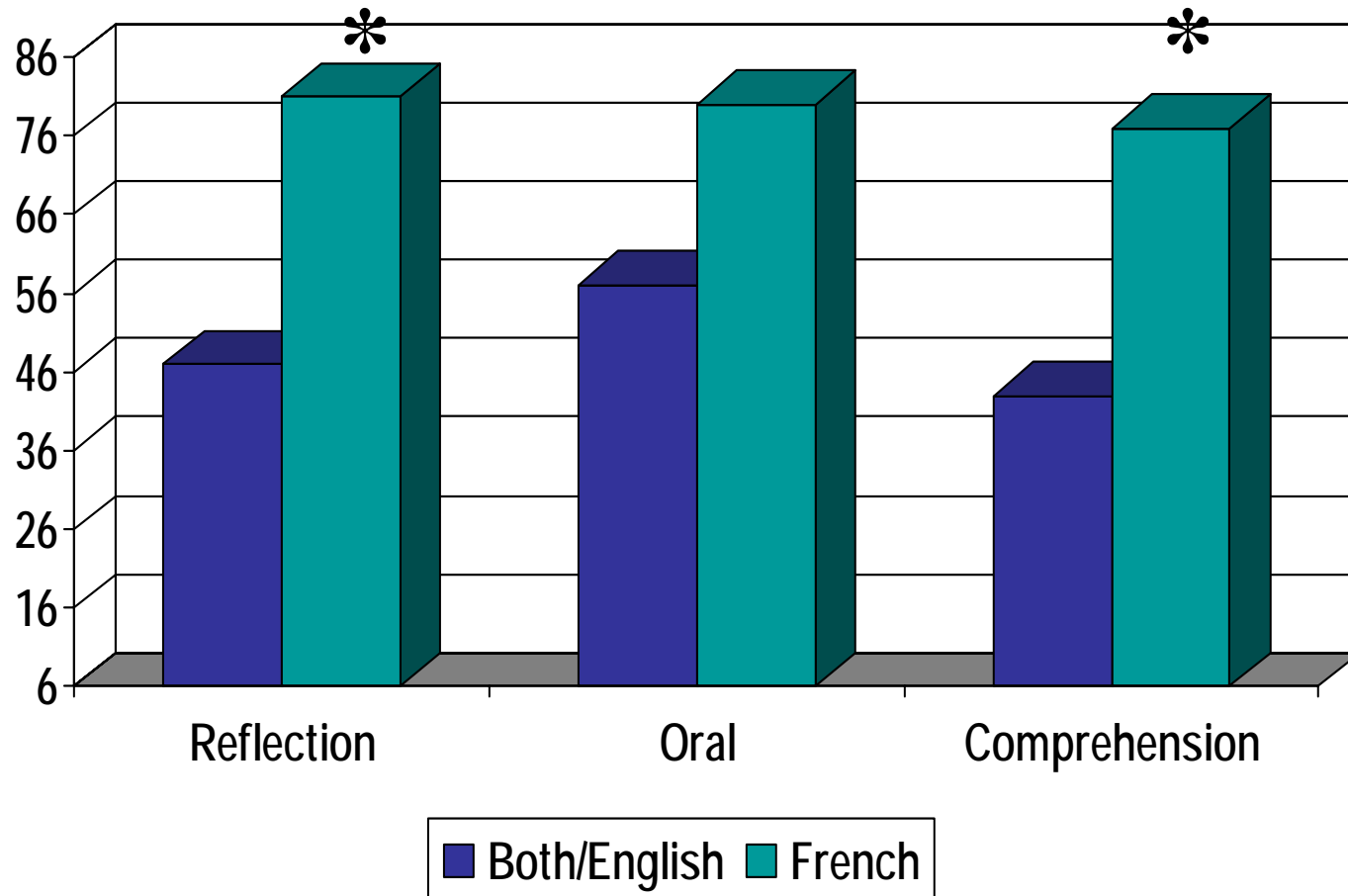


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# Language Spoken in Child Care and Percentage with Good Reading Skills (Grade 3)

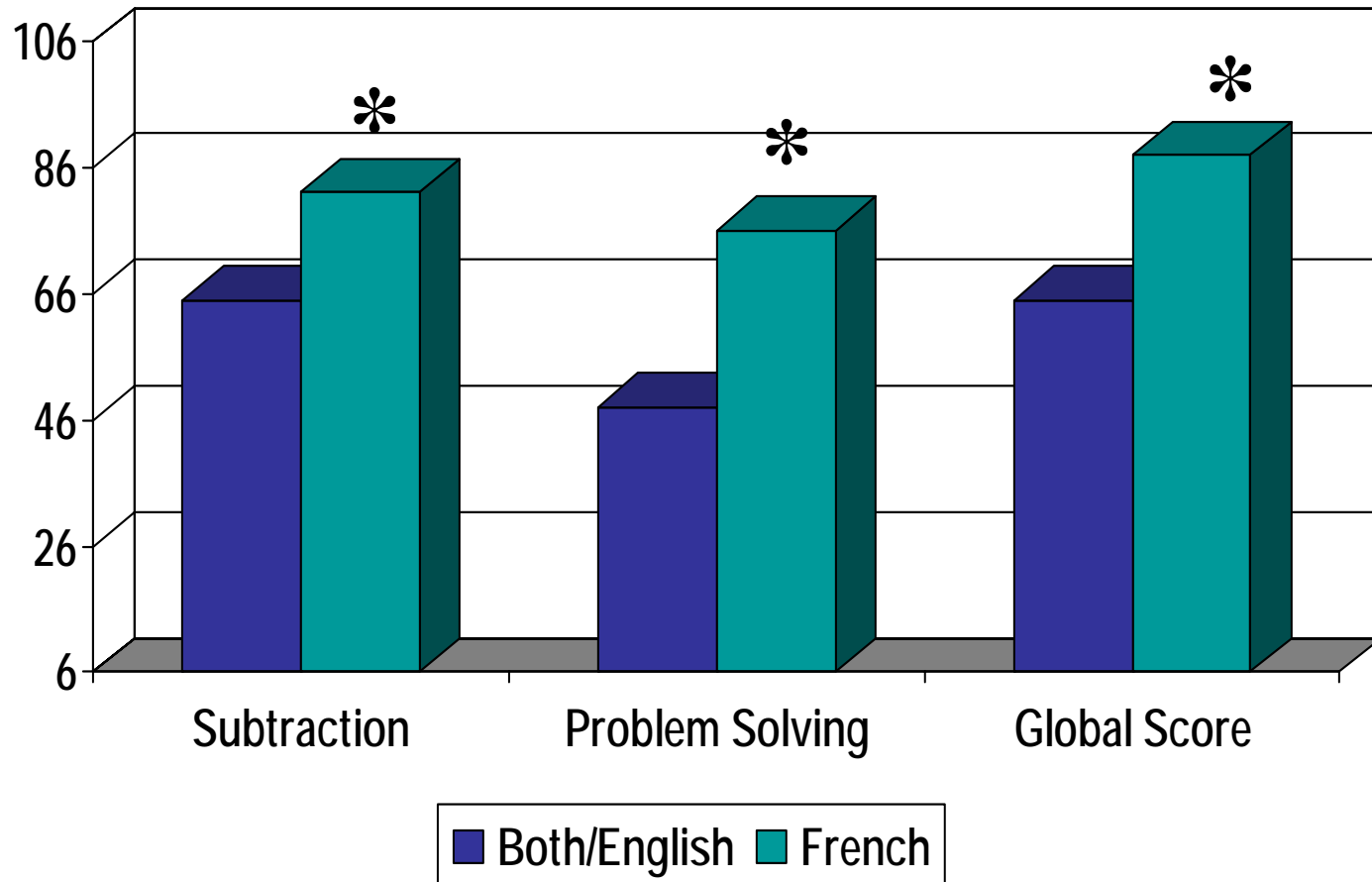


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# Language Spoke in Child Care and Percentage with Good Math Skills (Grade 3)



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# Language Spoken in Home and Early Development Instrument and Grade 3 Assessments Among Francophone Children



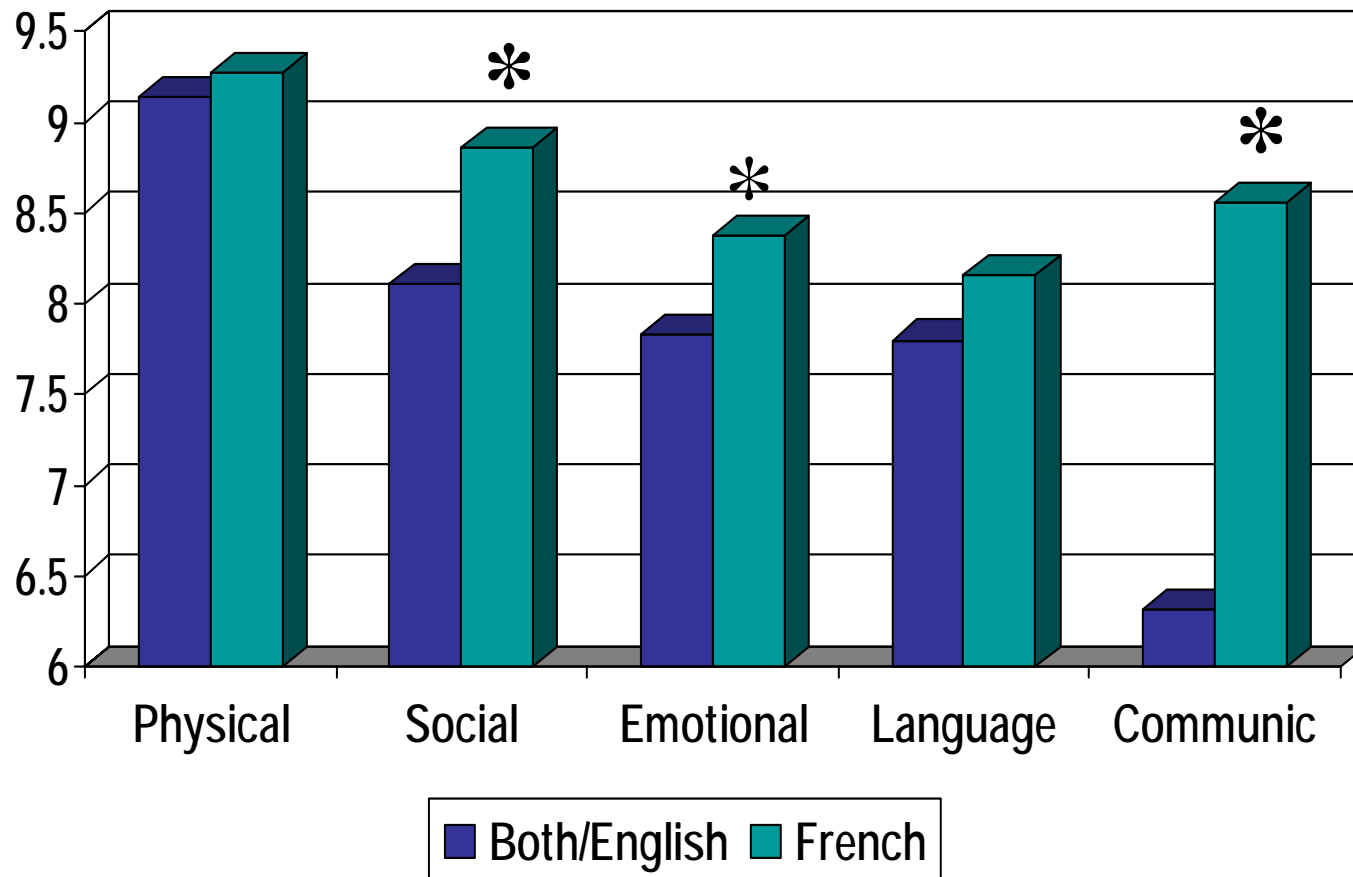
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# Language Spoken at Home and EDI Results in Kindergarten

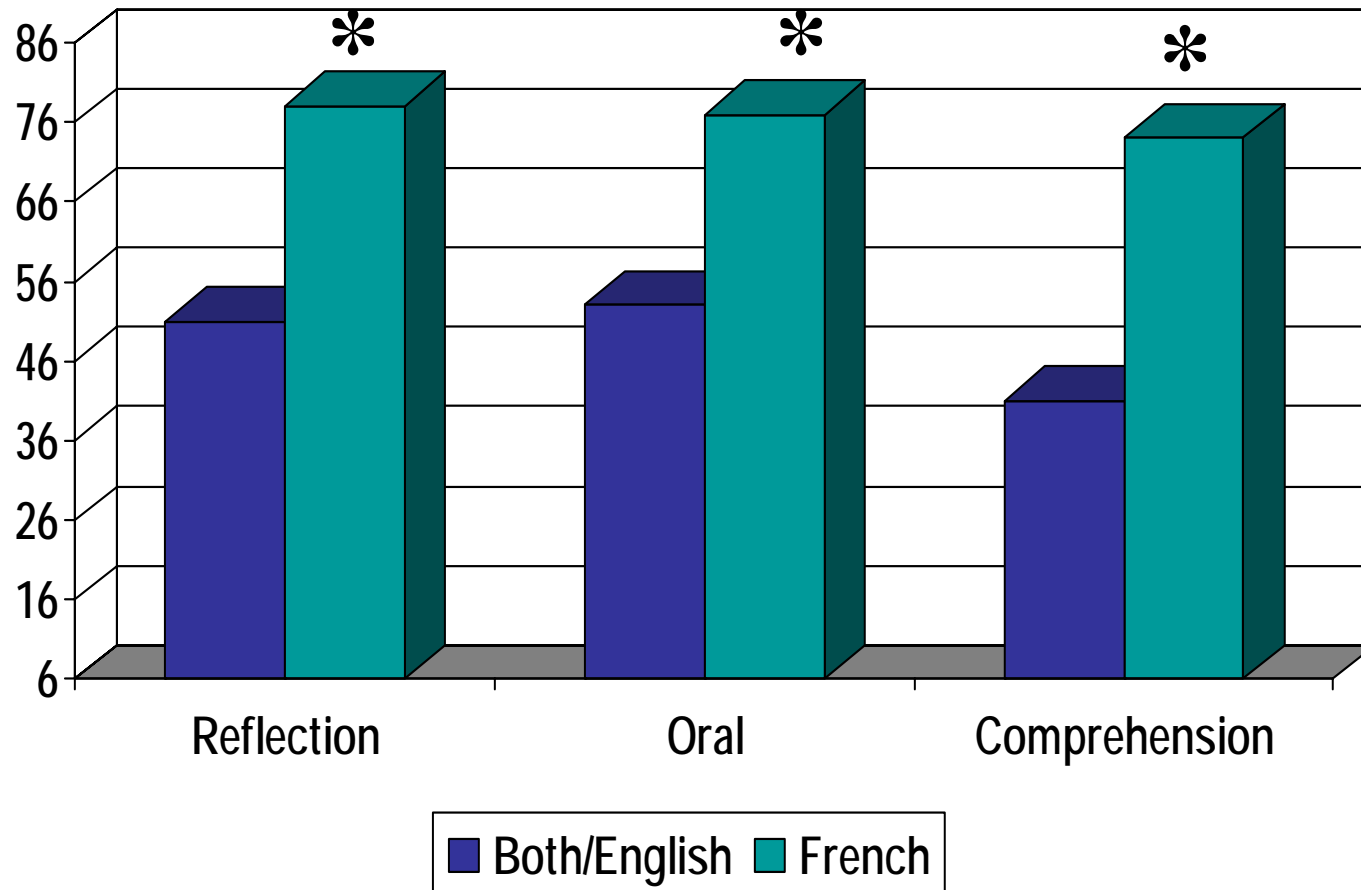


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# Language Spoken at Home and Percentage of Good Reading Skills (Grade 3)

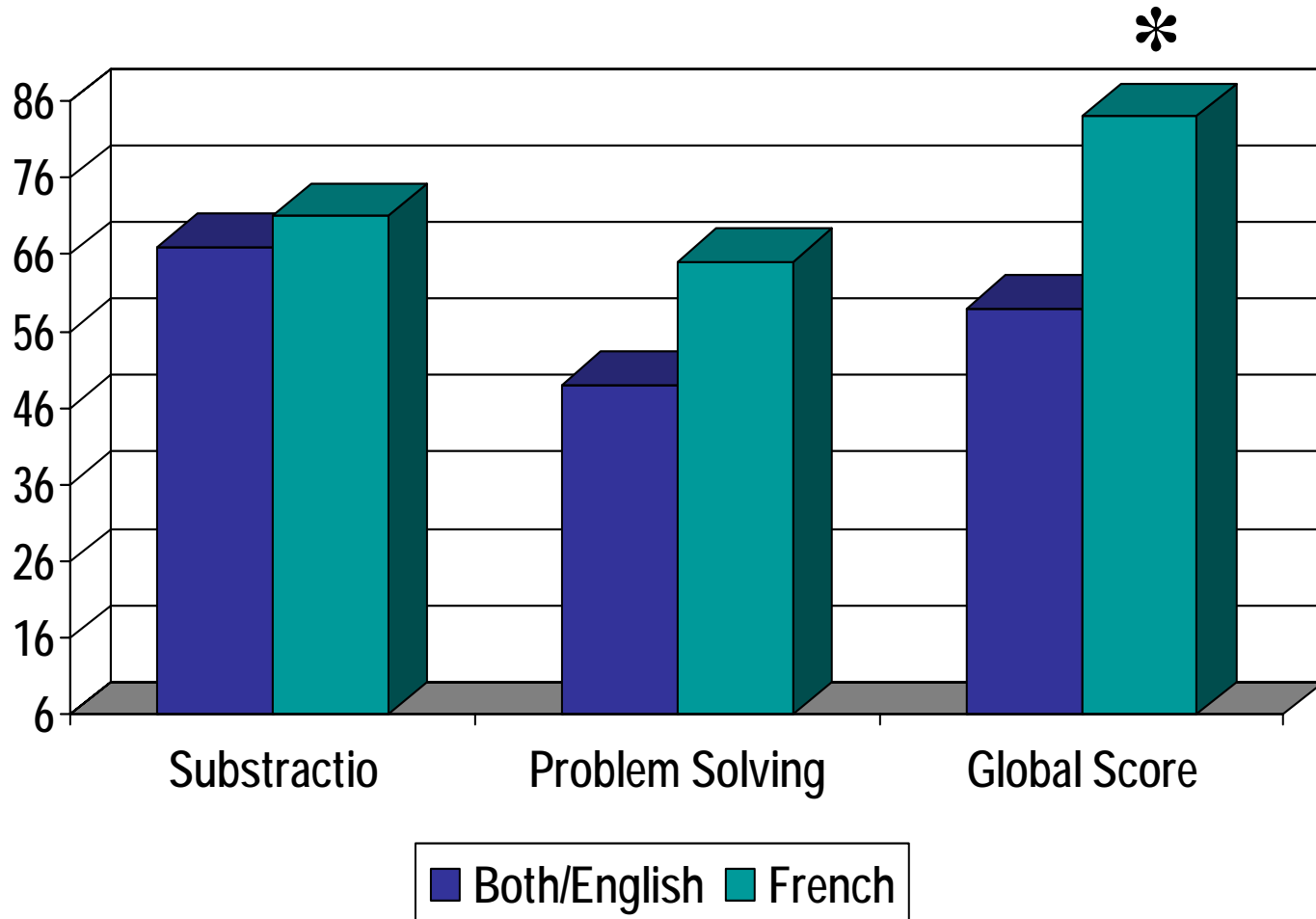


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# Language Spoken at Home and Percentage with Good Math Skills (Grade 3)



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# So what did we learn?

- Linking the EDI to preschool factors and Grade 3 assessments can shed light into what influences children's trajectories
- Can confirm what we suspect – but also give new insights



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# Manitoba Centre for Health Policy

- University of Manitoba
- unit of the Department of Community Health Sciences, Faculty of Medicine
- 1991 ... but a long history pre-dates this
- Five-year contracts with Manitoba Health; 6 deliverables per year
- Independently funded research



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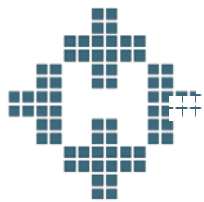


**Birthday Game Disasters**

Making  
decisions  
“in the dark”??  
...  
or using  
population-based  
research evidence

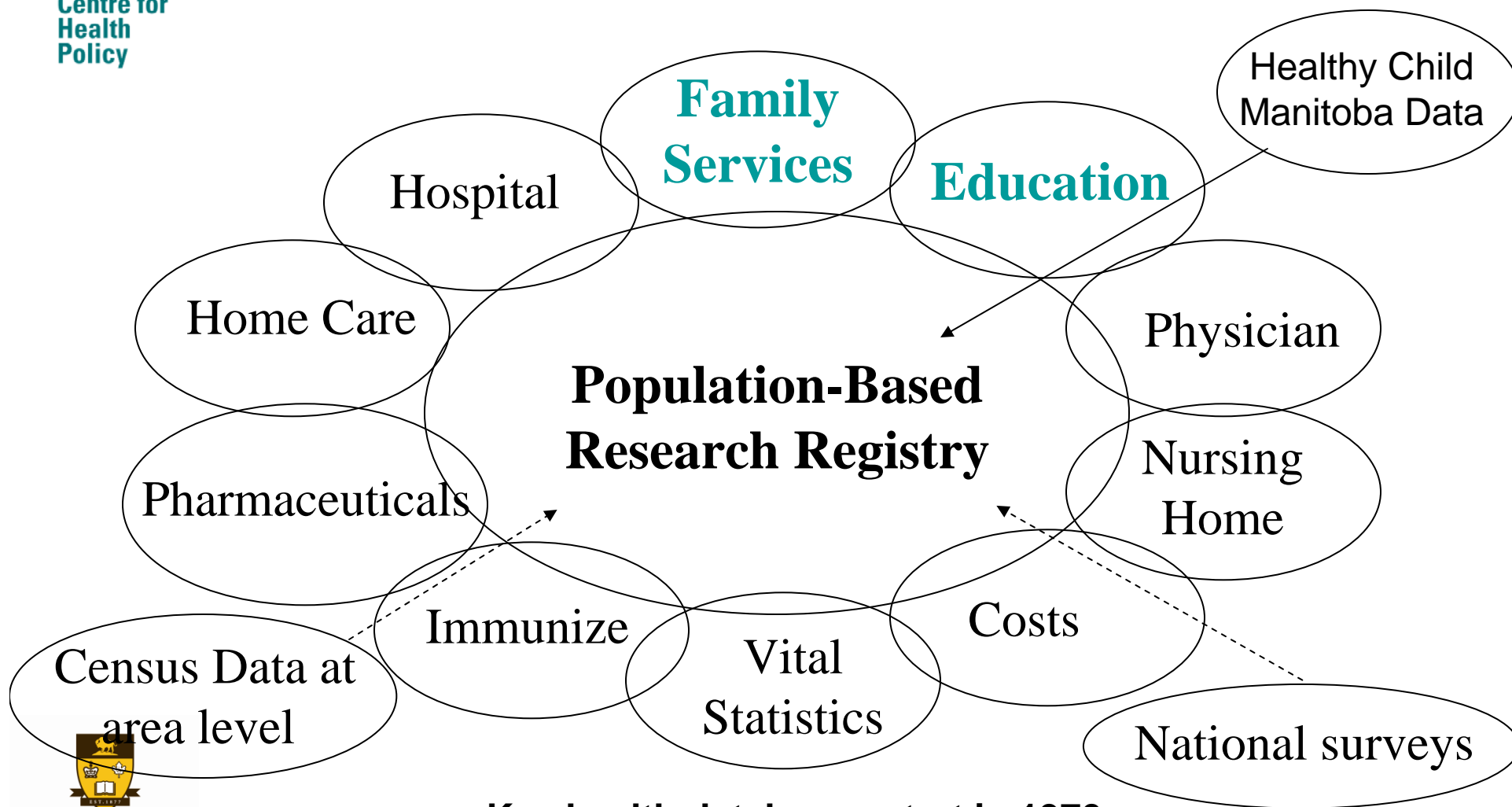


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# Manitoba Population Health Research Data Repository



**Key health databases start in 1970**

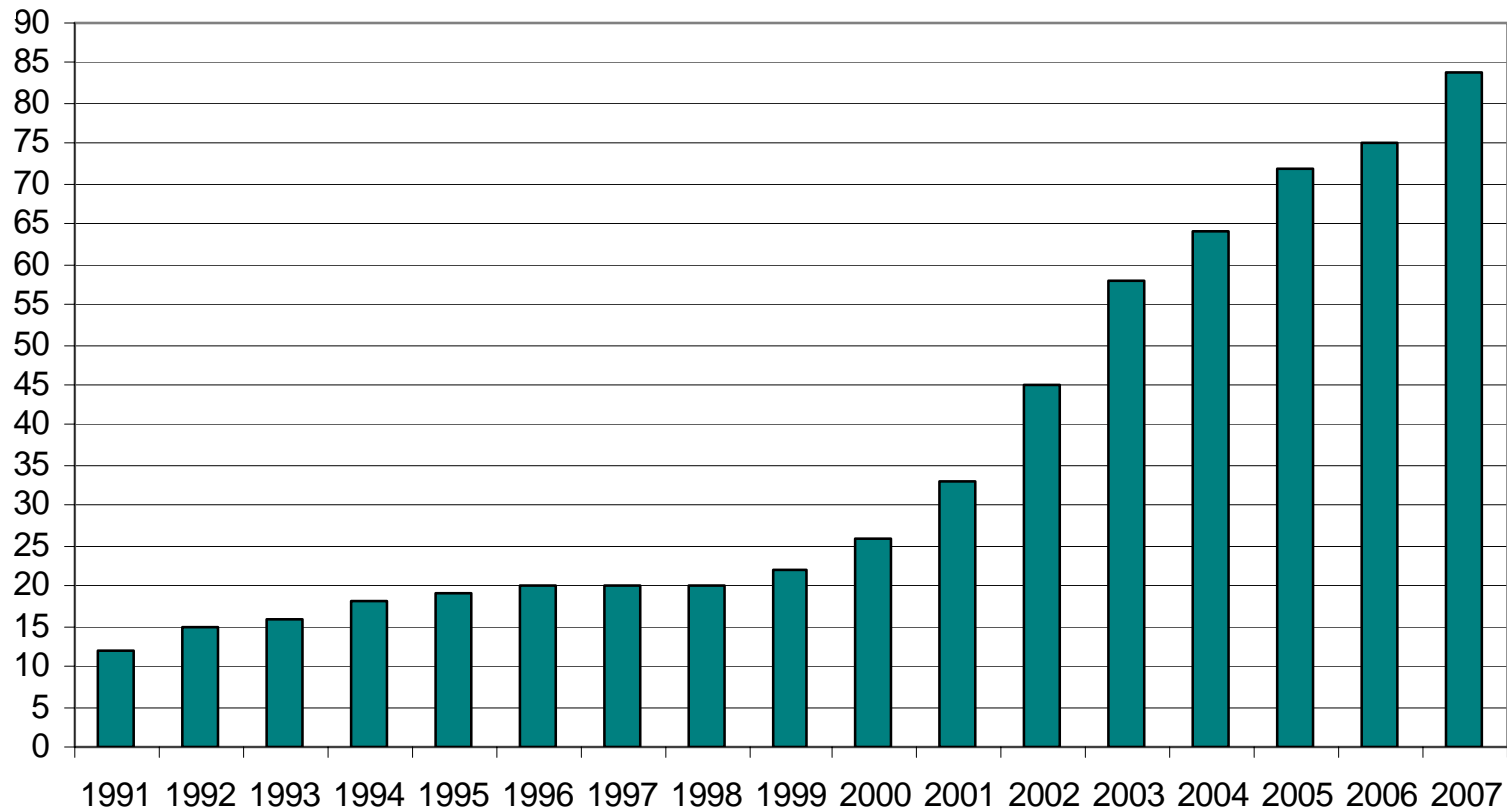


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## Total Number of Data Files in MCHP Repository



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Continual expansion of databases -  
CFI funding 1999-2003 (\$2.7 million)



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# MCHP: Respect for Privacy

- Highest standards of security, privacy & confidentiality of data (PHIA, FIPPA)
  - No names, no addresses; “scrambled” identifier numbers
  - Memorandum/Data Sharing Agreements with data providers
  - Limited access on project-specific basis; data stored in unlinked files
  - Ethics review committee, Health Information Privacy Committee, other stakeholder groups as required
  - Data for research not for administrative use



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# Using linked data to build picture of development throughout childhood

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## Prenatal:

FF screen  
Prenatal care  
Maternal  
serum screen



## At birth:

Birth weight  
Gestational age  
Apgar scores  
Breastfeeding  
Complications  
FF screen



## Early Years:



## School Entry:

EDI  
School enrolment  
Early literacy



## Middle Years (~7-11):

Grade 3 assessment  
School enrolment  
Grade retention



## Middle Years (~12-14):

Grade 7/8 assessments  
School enrolment  
Grade retention



## Youth (~15-19):

Grade 12 assessments  
High school marks  
High school completion



Prenatal

birth

Early years

School entry

Middle years

adolescence

At all stages: health status (hospitalizations, doctor visits, medications prescribed, FASD), residence (area-level income, number of moves), family or youth receipt of income assistance, involvement with child welfare, family composition (marital status, number of siblings)





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# How information in the MCHP data Repository has been linked together to better understand Socioeconomic Gradients in Education Outcomes

- Population registry
- Grade 12 Standards tests



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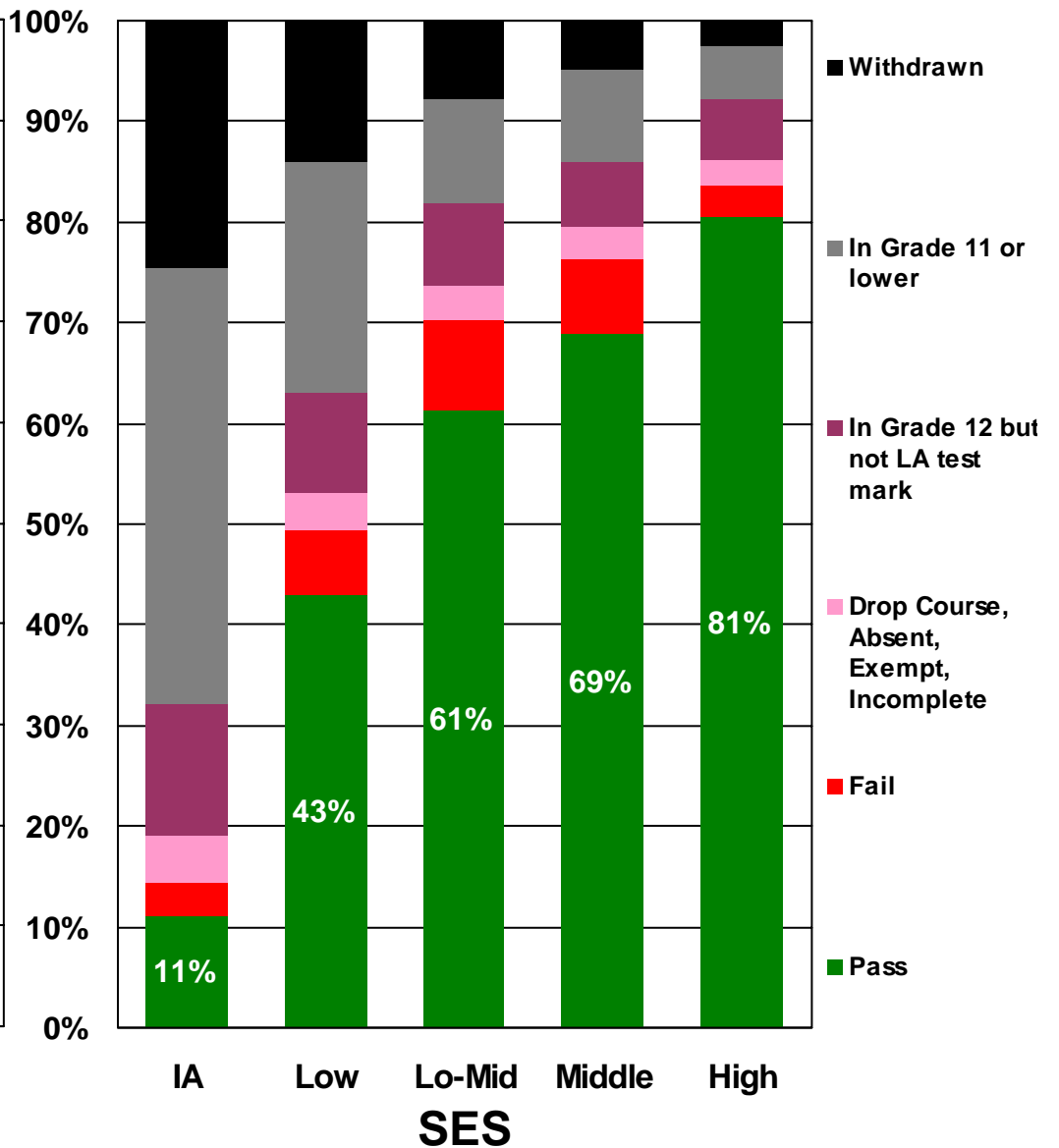
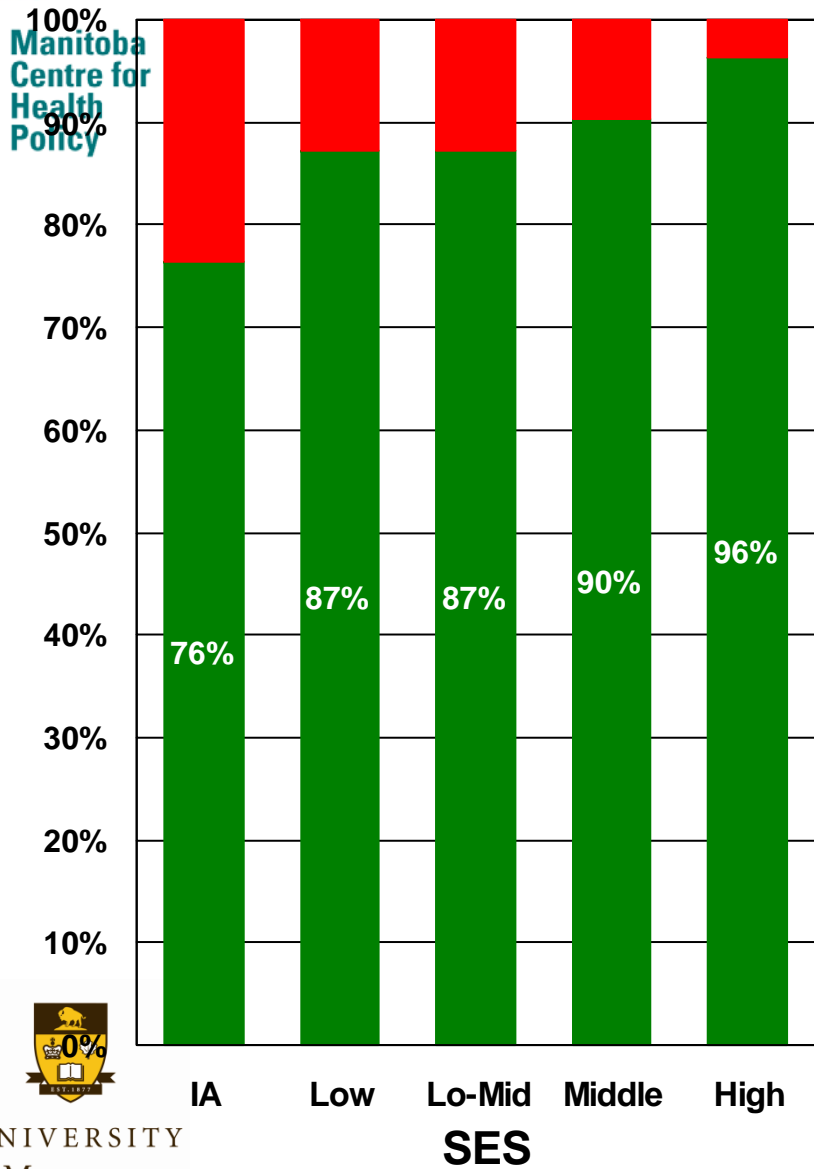


# Getting the "True" Story

## Grade 12 Performance on LA test by SES Group

Pass/Fail rates of test writers

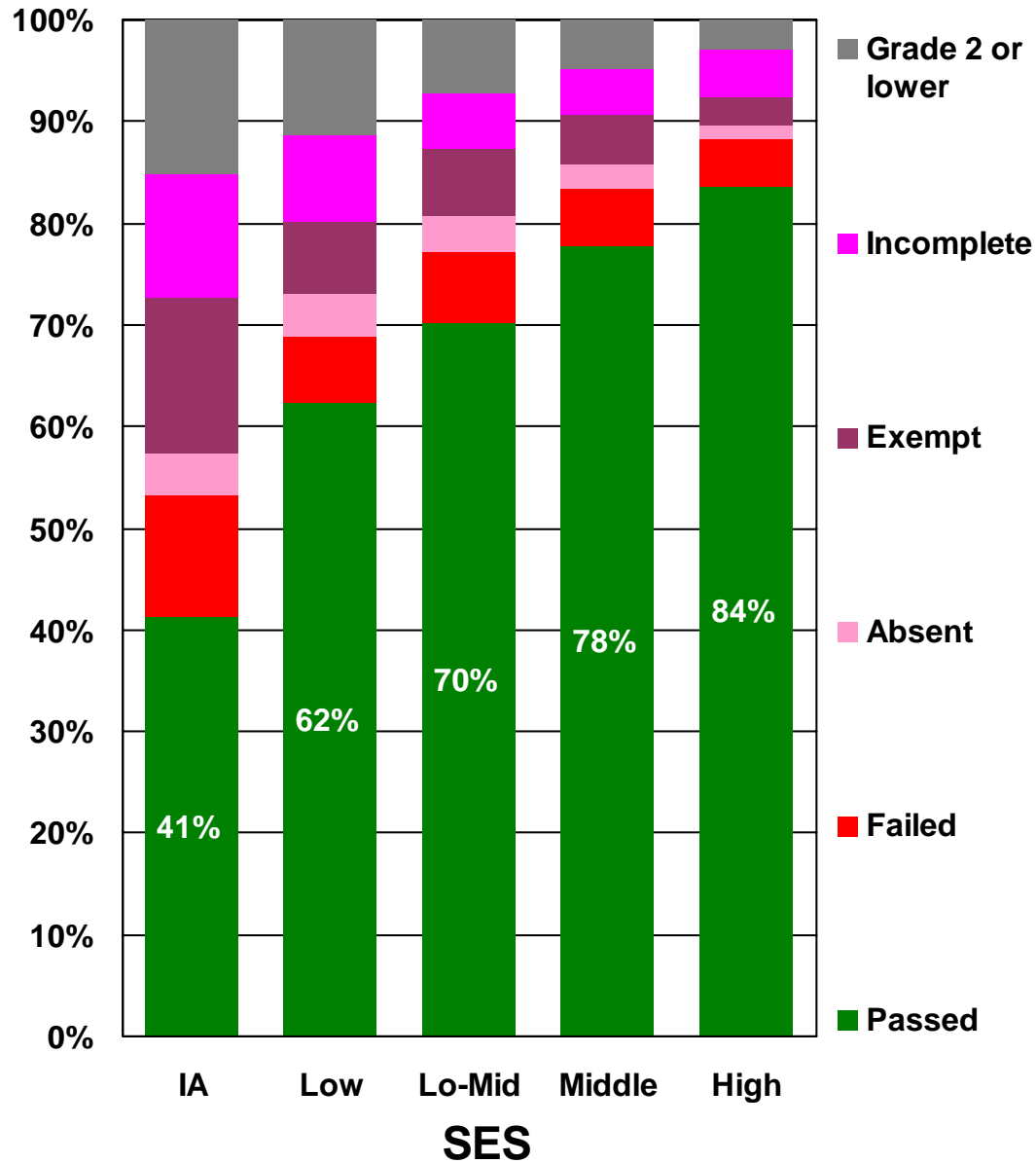
17/18 year olds who should have written





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## Grade 3 Performance by SES Group (Language Arts Standards Test, 1998/99)



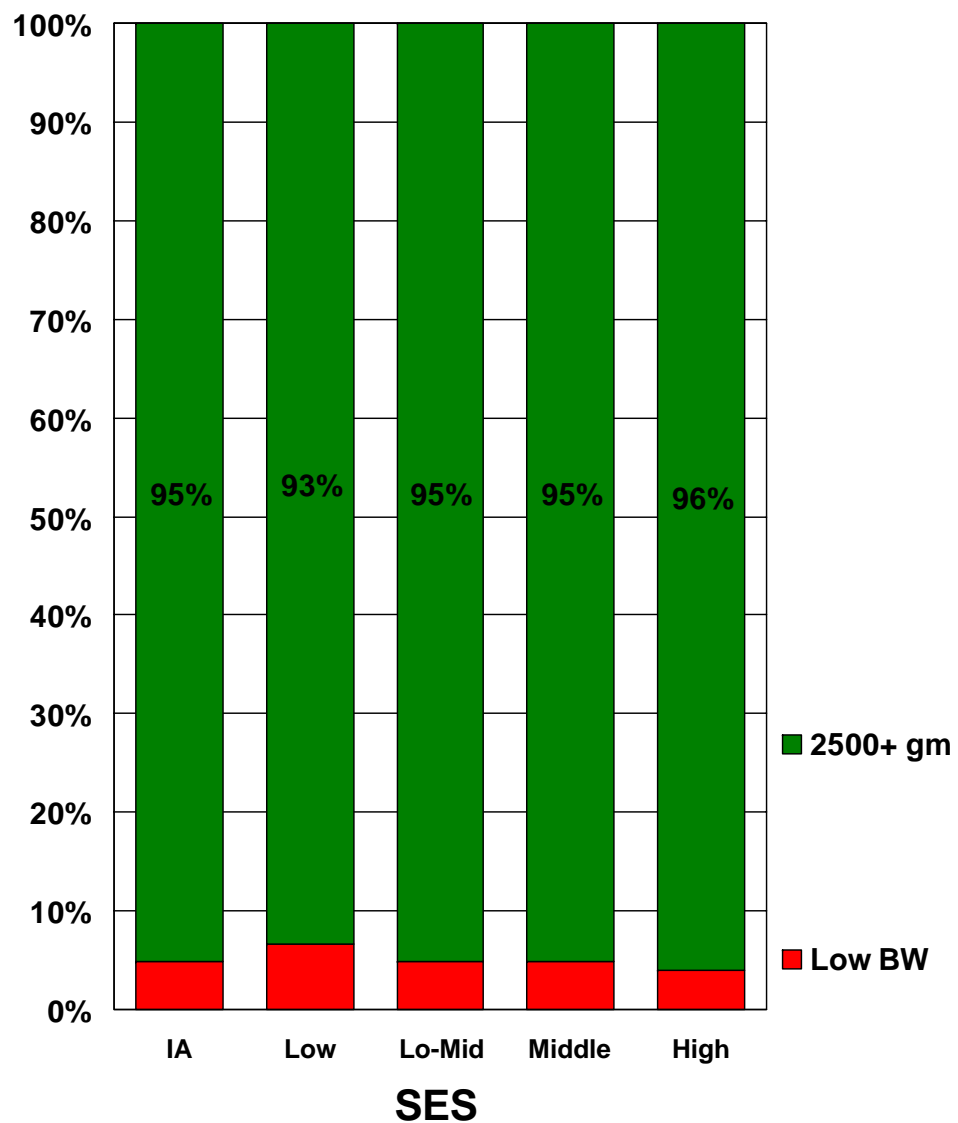
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# Healthiness of Children at Birth

## Birthweights by SES



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## How information in the MCHP data Repository has been used to study kids at risk

- Kids involved in child welfare
- Kids in families receiving income assistance
- Kids born to teen mothers



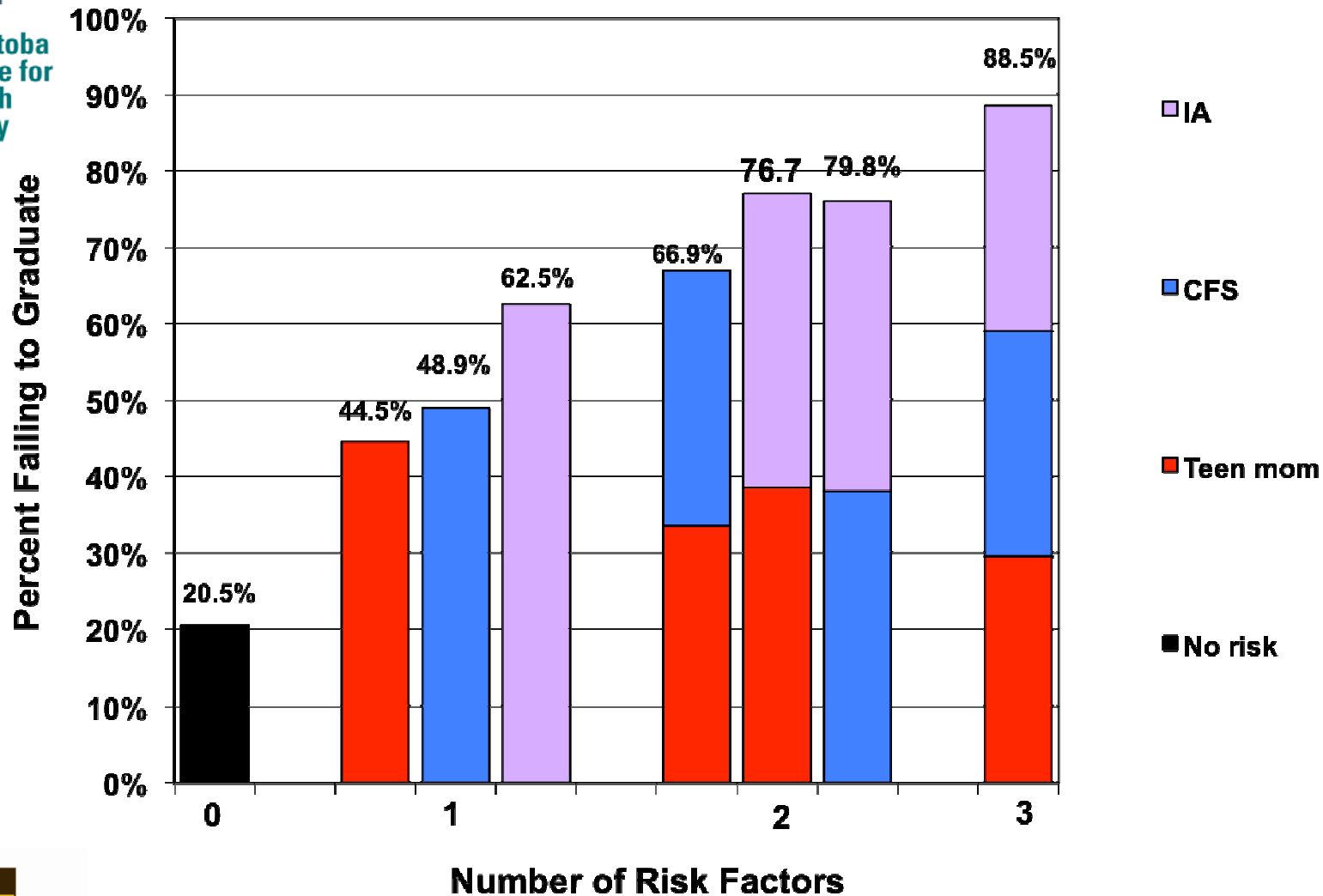
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# Percent of Winnipeg Youth Who Failed to Graduate within Six Years of Entering Grade 9, by Risk Factors

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CFS = in care or receiving services from Child and Family Services

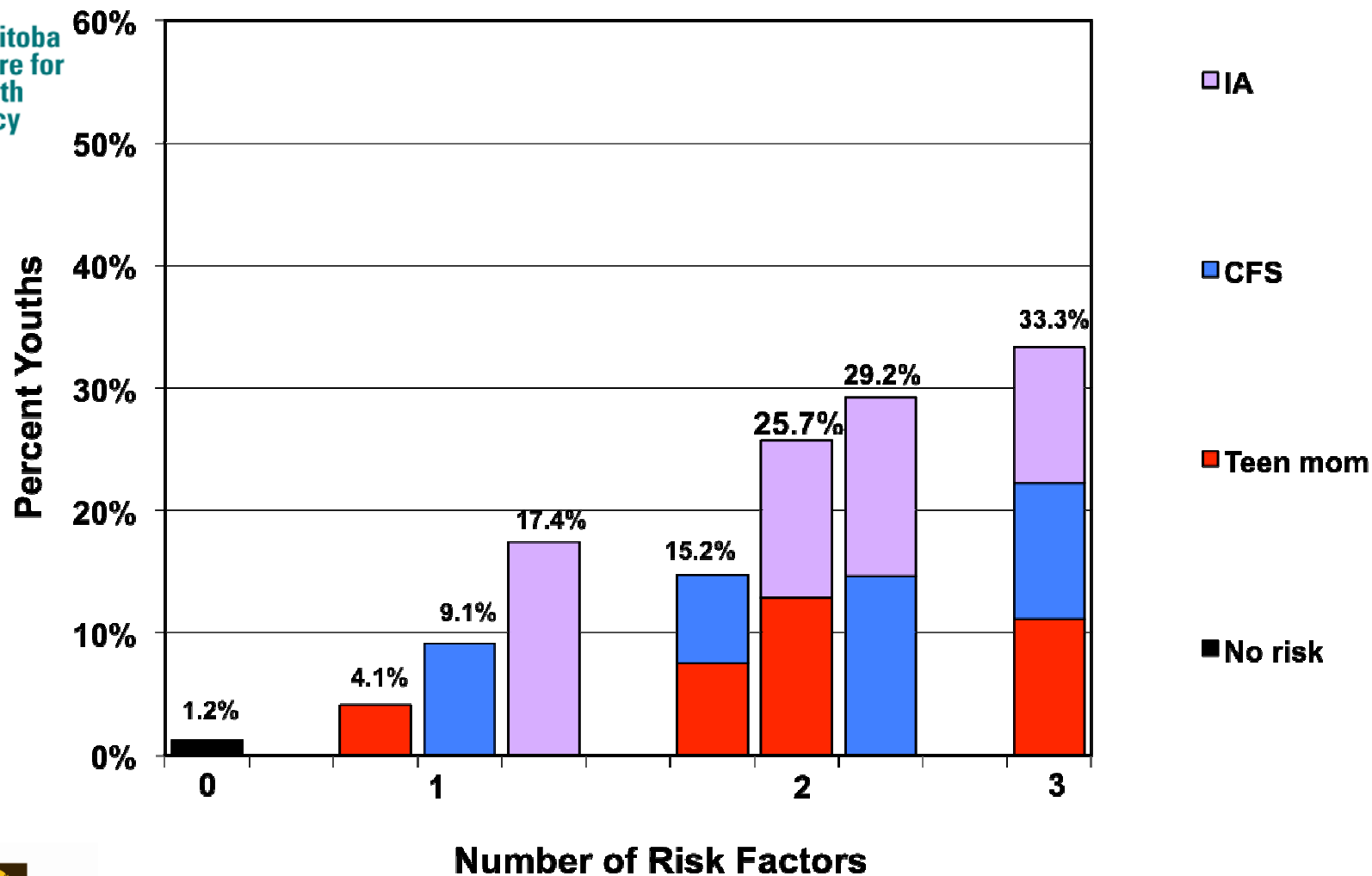
IA = family receipt of income assistance

Source: Manitoba Centre for Health Policy, 2007



# Percent of Young Adults Who Received Income Assistance, by Risk Factors

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CFS = in care or receiving services from Child and Family Services

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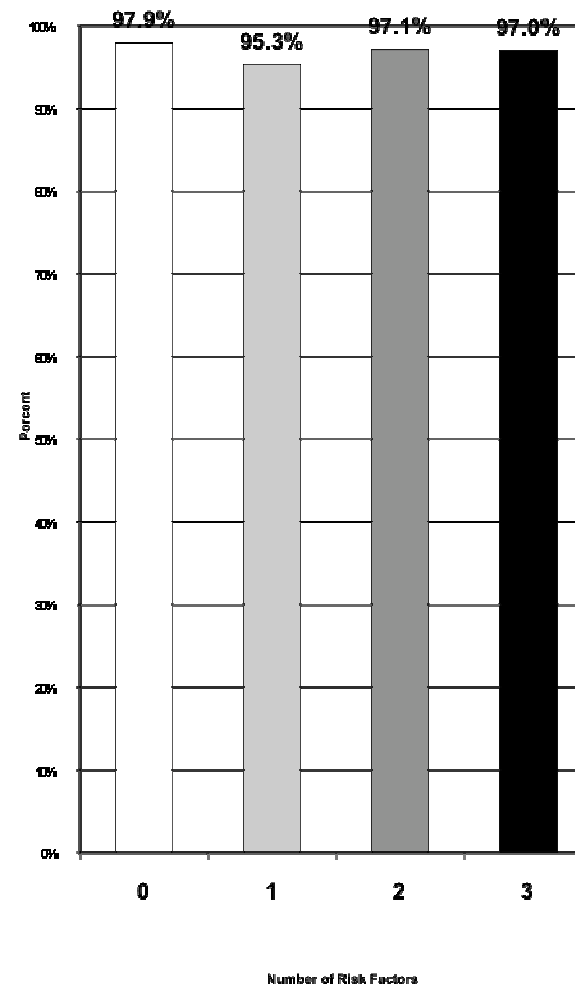
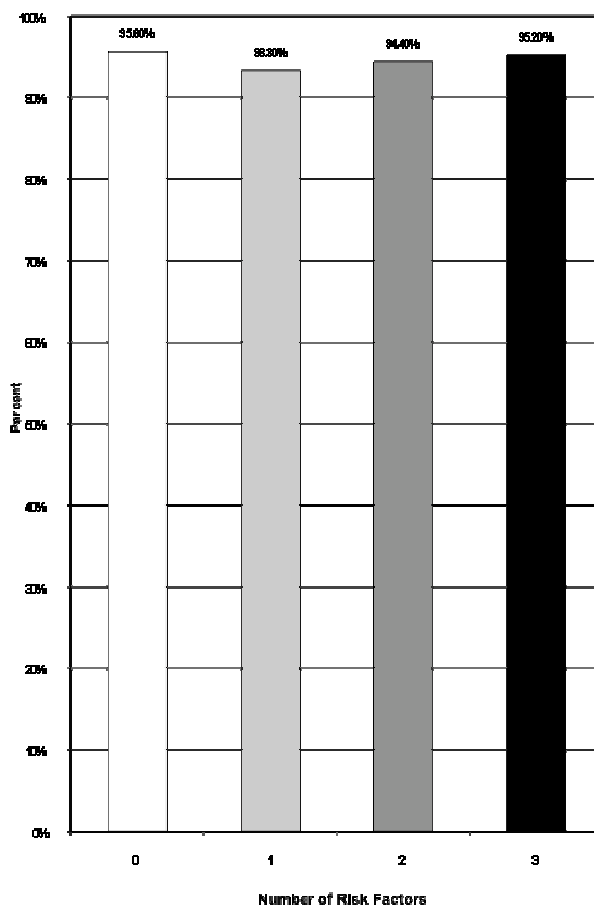
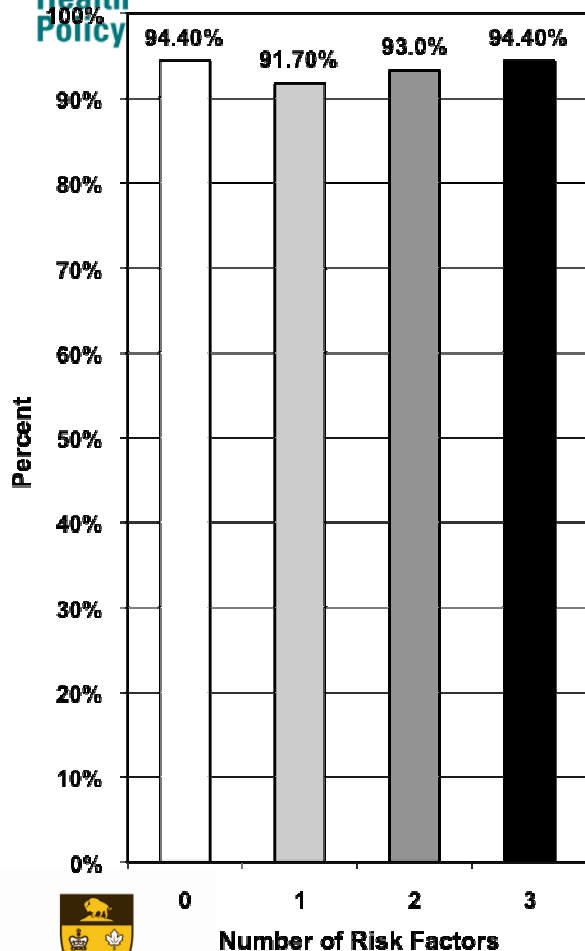
# Percent of Children with Normal Birth Outcomes, by Number of Risk Factors

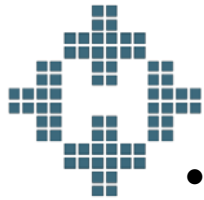
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Birthweight GE 2500 gr

Gestational Age GE 36 weeks

Apgar Score GE 7





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# Future Research

- Santos and others – what factors predict EDI performance?
- Ens and others – what is the association between EDI scores and early literacy programs?
- What can EDI performance tell us about future outcomes?

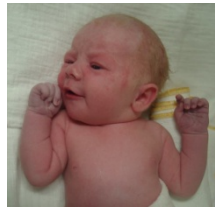
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FF screen  
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Maternal serum screen



## At birth:

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FF screen



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## School Entry:

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Prenatal

birth

Early years

School entry

Middle years

adolescence



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# Concluding thoughts...





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