



Big Data in Early Childhood: Using Integrated Data to Guide Impact

Rob Fischer, Ph.D. & Beth Anthony, Ph.D.
*Center on Urban Poverty
& Community Development*

*Rebekah Dorman, Ph.D.
Cuyahoga County Office of Early
Childhood/Invest in Children*



JACK, JOSEPH AND MORTON MANDEL
SCHOOL OF APPLIED SOCIAL SCIENCES
CASE WESTERN RESERVE
UNIVERSITY



Zero to Three
National Training Institute
December 11, 2014

Overview

- Early childhood period as crucial opportunity
- Understanding childhood influences in communities
- Creating an integrated child data system as a community resources
- Using integrated data to inform policy and practice



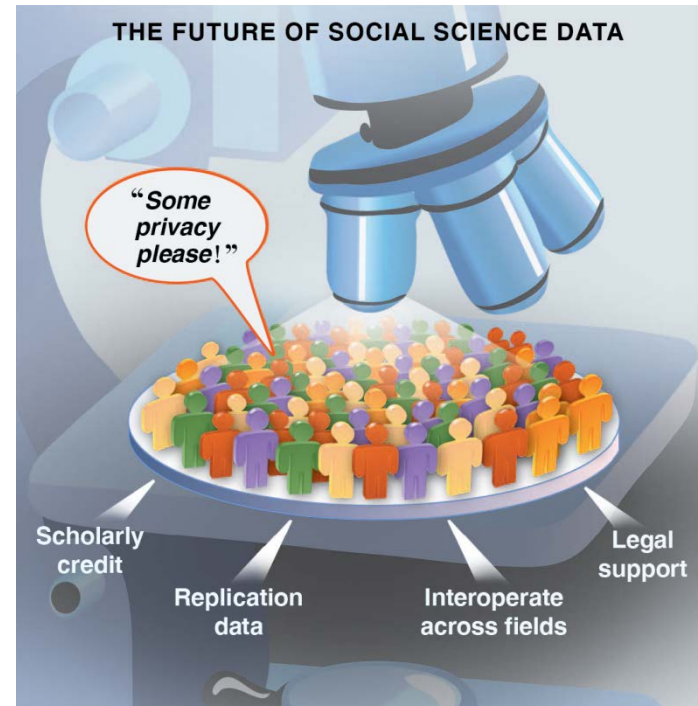
JACK, JOSEPH AND MORTON MANDEL
SCHOOL OF APPLIED SOCIAL SCIENCES

CASE WESTERN RESERVE
UNIVERSITY

Big data presents tremendous opportunities and challenges

“Analogous to what it must have been like when they first handed out microscopes to microbiologists, social scientists are getting to the point in many areas at which enough information exists to understand and address major previously intractable problems that affect human society.” *Gary King, MIT*

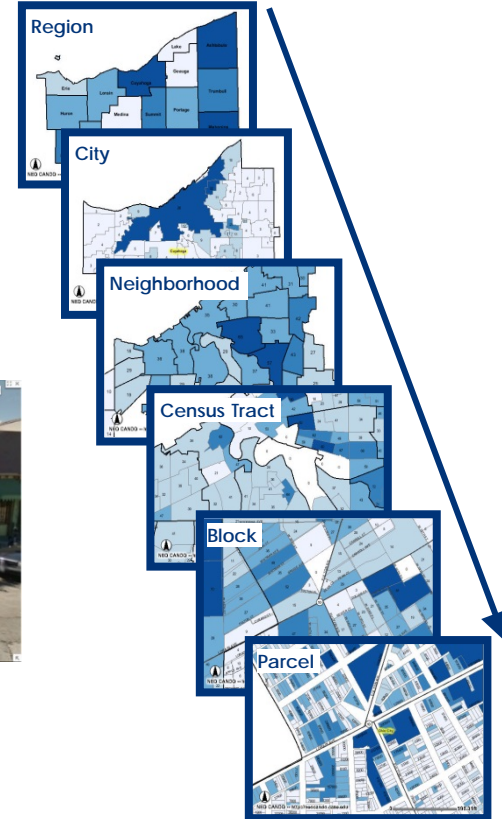
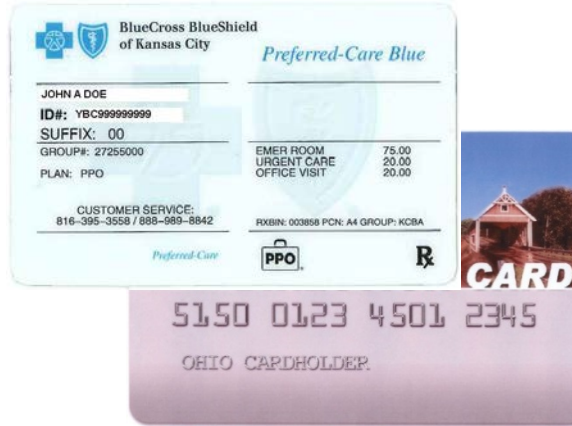
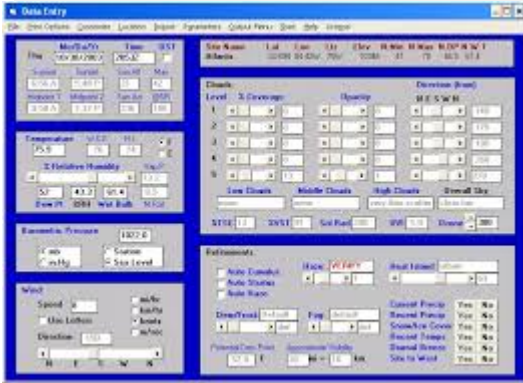
Science, 331, 11 February, 2014, 719



JACK, JOSEPH AND MORTON MANDEL
SCHOOL OF APPLIED SOCIAL SCIENCES

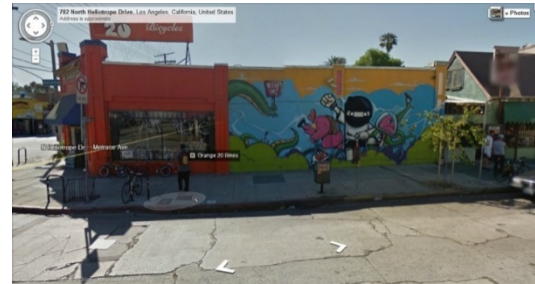
CASE WESTERN RESERVE
UNIVERSITY

Digital processes generate social data: E-Records, E-transactions, digital media, E-government



Multi-disciplinary team	Single discipline code	Describe the Analytical problem	UNCLASSIFIED BY
1487004	1487004	Care Package will be...	OK
1487004	1487004	Old Call from Case Agency stating they need more time to complete location. Only 1 shower available from 10:00-11:00 PM. Personnel are either out instead of 10 showers.	OK
1487004	1487004	2016/04/10 14:20:00 (no pictures reported)	
1487004	1487004	Telephone call from Sally. She reports that the camera operators had set up but that some of them are struggling with her other shooting and equipment and helping her with location. She says they are almost in a hurry and don't have time to be and collect and a heating fan. There is no case to provide that she does not want back in the house as she feels she is very close with her.	OK
1487004	1487004	1487004 (no pictures reported)	
1487004	1487004	Question to CF regarding the very worried about her mother. She is now unable to care and needs to go into her home. She has a full history to go to court at night.	OK
1487004	1487004	CF contact for and requests assistance to care.	
1487004	1487004	Call was for multiple people. They did a very close and doesn't have the same problem. They also the look of her transportation luggage and bags to be on someone. Doesn't get out and any her mother. When needs the help of night after the camera team goes. For the night ago, they to get to take a light. Camera is not always in a hurry and part of availability for her because it is being.	
1487004	1487004	Case opened case - Call down to getting to be with the case and becoming increasingly demanding on open. Issues there for sign at the end of a window and for analysis to be done. They think she can make things and using the camera or camera. They can be up to additional half hour in that situation for each visit. Can manage of members and start behavior only with assistance of her.	

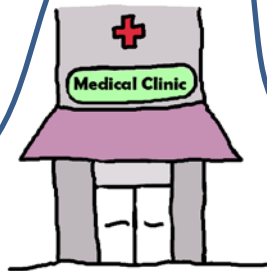
 **Susan LaMotte**
@SusanLaMotte



Everyone's talking about #bigdata in #HR.
Everyone! read.bi/ZE8SZR

← Reply ↻ Retweet ★ Favorite ⋮ More

In early childhood...many systems at work



JACK, JOSEPH AND MORTON MANDEL
SCHOOL OF APPLIED SOCIAL SCIENCES

CASE WESTERN RESERVE
UNIVERSITY

But Big Data can be a heavy lift

- Ownership and access
- Transmission
- Data quality
- Data management and storage
- Analytic tools and models
- Visualization
- Applications



<http://www.nytimes.com/2014/08/18/technology/for-big-data-scientists-hurdle-to-insights-is-janitor-work.html>



JACK, JOSEPH AND MORTON MANDEL
SCHOOL OF APPLIED SOCIAL SCIENCES

CASE WESTERN RESERVE
UNIVERSITY

A growing field

- Actionable Intelligence for Social Policy (AISP) Network (11 sites) – U. Pennsylvania
 - States: MI, SC, WA, WI, FL*
 - Counties: Los Angeles, CA; Allegheny, PA; Cuyahoga, OH
 - Cities: Chicago, NYC, Philly
- Site hosts vary
 - Government, University, Nonprofits
- Children's Data Network
 - <http://www.datanetwork.org/about-us/>



JACK, JOSEPH AND MORTON MANDEL
SCHOOL OF APPLIED SOCIAL SCIENCES

CASE WESTERN RESERVE
UNIVERSITY

Building a data infrastructure in Cuyahoga County

Since 1999, Cuyahoga County has developed and launched a continuum of supports for young children and their families

- Proven strategies
 - High quality and targeted home visiting
 - High quality early childhood education + educator supports
 - Medical insurance outreach and medical home strategies
- Promising strategies
 - Early childhood mental health services
 - Early literacy services
 - Low cost lead abatement & parent education



JACK, JOSEPH AND MORTON MANDEL
SCHOOL OF APPLIED SOCIAL SCIENCES

CASE WESTERN RESERVE
UNIVERSITY

Origination of CHILD System - CHILD Integrated Longitudinal Data (CHILD) System



- Began with child registry of all children born in Cuyahoga County since 1992
- Draws on routinely available administrative data to monitor program delivery and outcomes
- Brings together data at the child level for longitudinal analyses
- Now expanding data to reflect experiences throughout childhood



JACK, JOSEPH AND MORTON MANDEL
SCHOOL OF APPLIED SOCIAL SCIENCES

CASE WESTERN RESERVE
UNIVERSITY

CHILD System Data Sources

- 400,000 children and counting

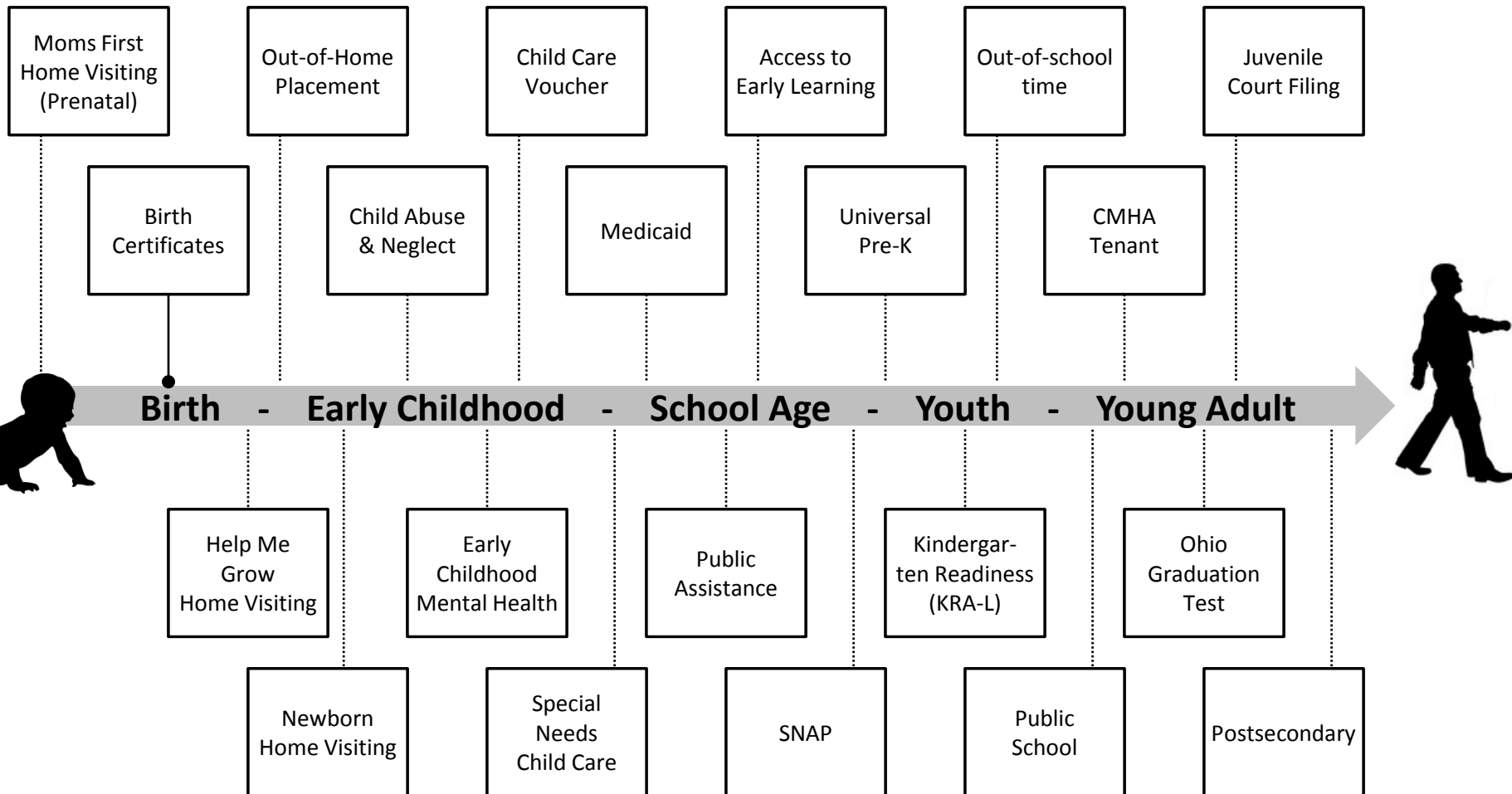
- Birth certificates
 - Maternal health
 - Low birth weight births
- Death certificates
 - Infant mortality
- Child welfare
 - Abuse/neglect investigations
 - Placements and services
- Public school data
 - Attendance
 - Kindergarten readiness
 - Proficiency tests
 - Graduation
- Homeless Services
- Public Assistance Receipt
 - Medicaid receipt
 - Food Stamp receipt
 - TANF receipt
 - Child care voucher receipt
- IIC program participation
 - Home visiting services
 - Special needs child care
 - Early mental health
 - Universal pre-k
- Juvenile Justice
 - Delinquency Filings
- Geo-data
 - Neighborhood and environmental conditions



JACK, JOSEPH AND MORTON MANDEL
SCHOOL OF APPLIED SOCIAL SCIENCES

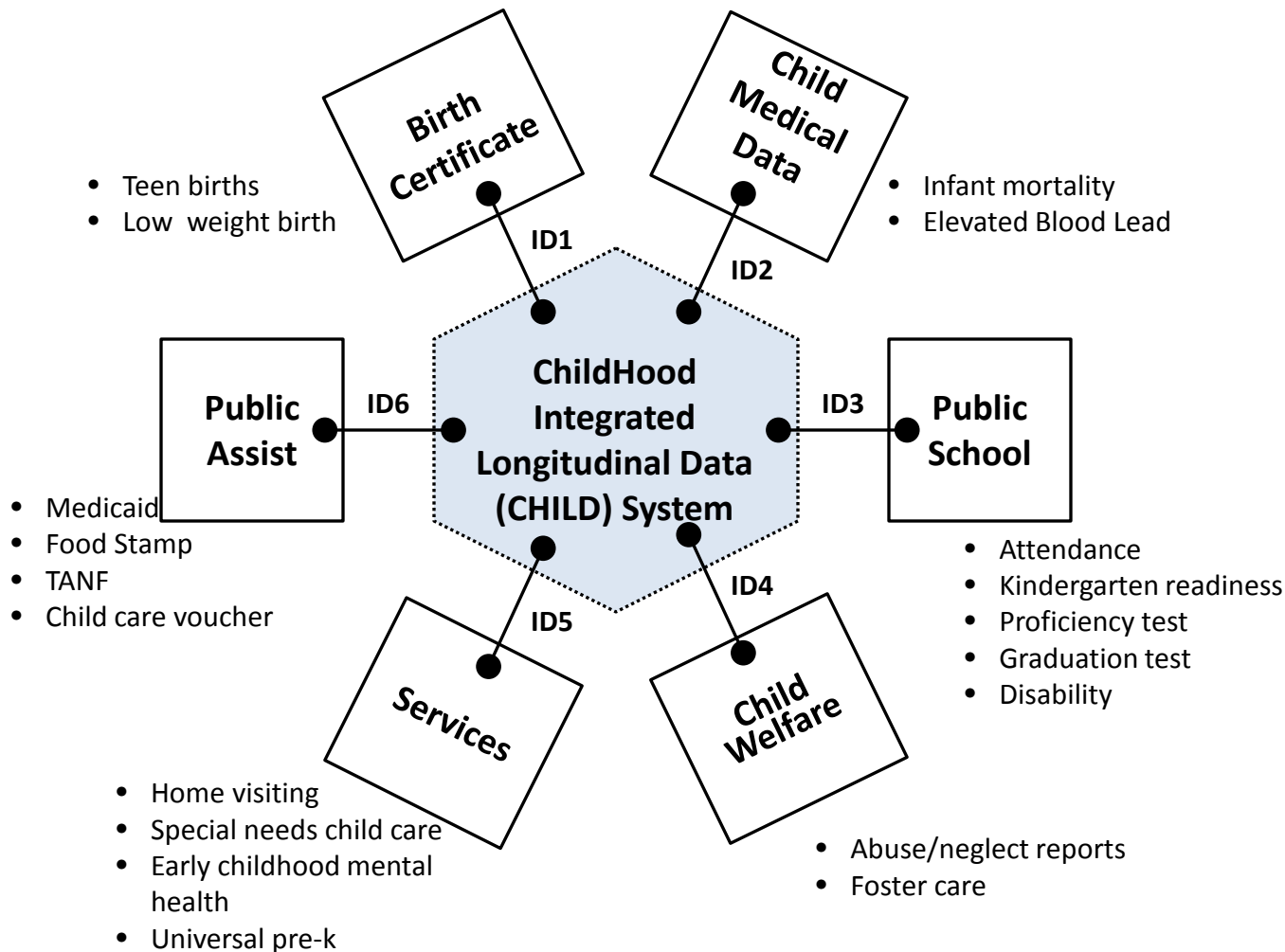
CASE WESTERN RESERVE
UNIVERSITY

IDS provides longitudinal perspective



Longitudinal Pipeline

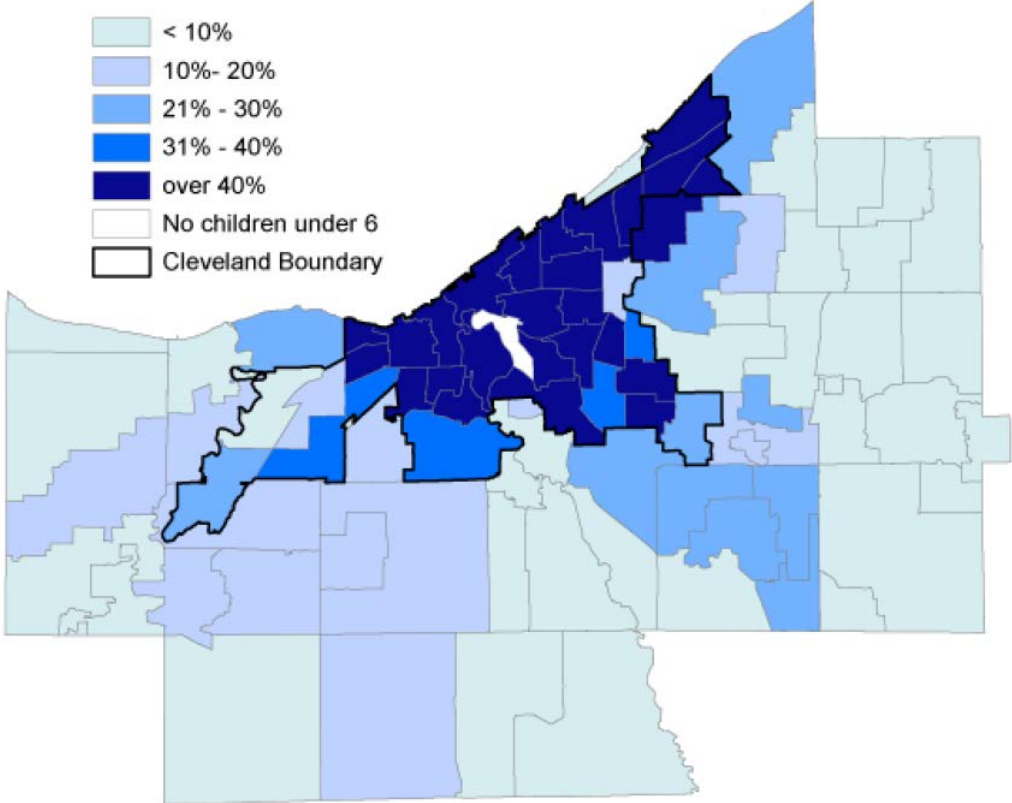
IDS approach: CHILD system



Child Well-Being: Poverty

Child Poverty in Cuyahoga County

Percentage of Children under 6 years old living below the poverty level, 2005-2009



Source: American Community Survey data, 2005-2009
Prepared by: Center on Urban Poverty and Community Development, MSASS, Case Western Reserve University

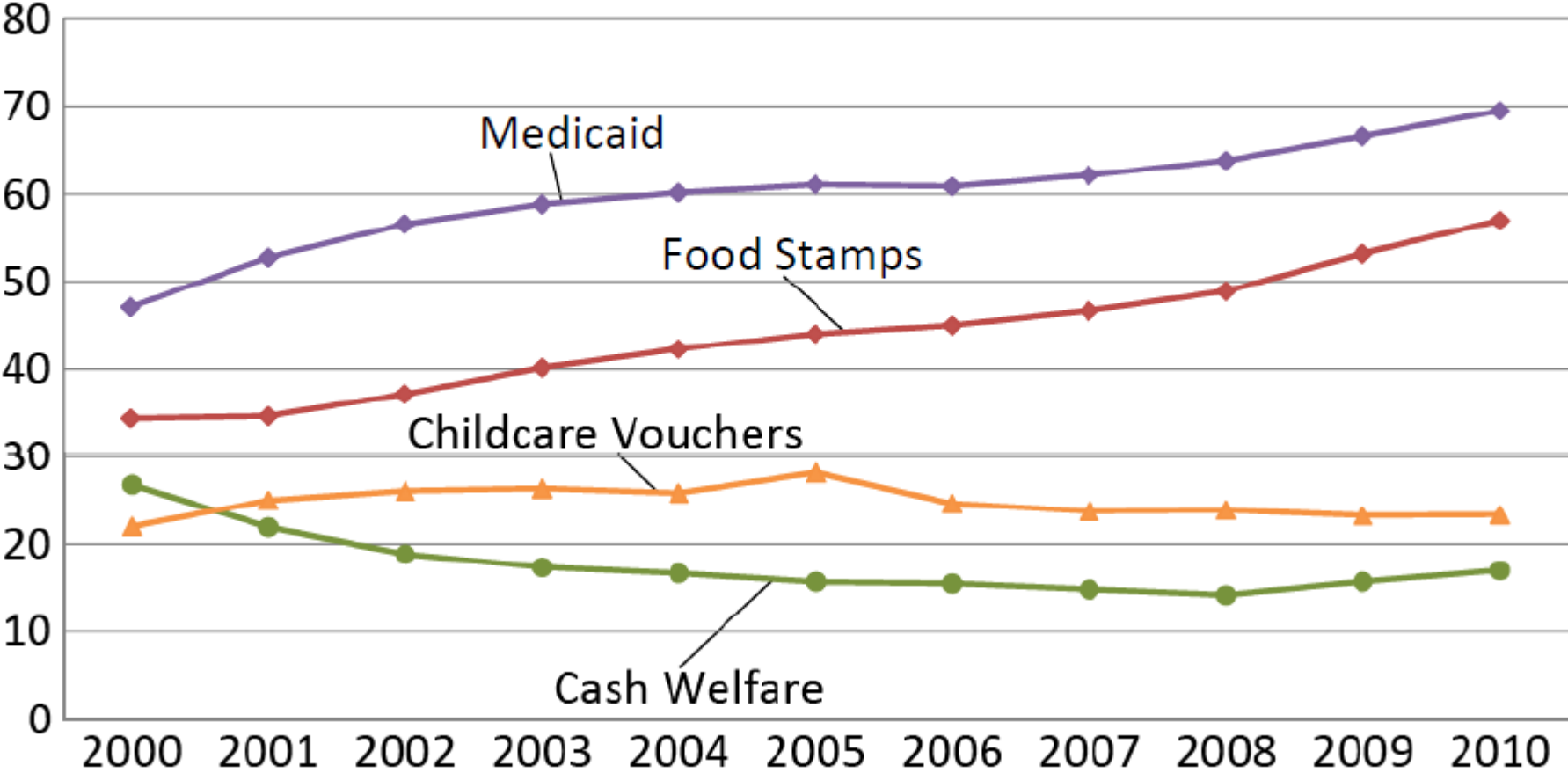


JACK, JOSEPH AND MORTON MANDEL
SCHOOL OF APPLIED SOCIAL SCIENCES

CASE WESTERN RESERVE
UNIVERSITY

Child Well-Being: Public Assistance

Percent of children under the age of 6 receiving public assistance (unduplicated annual totals), Cuyahoga County



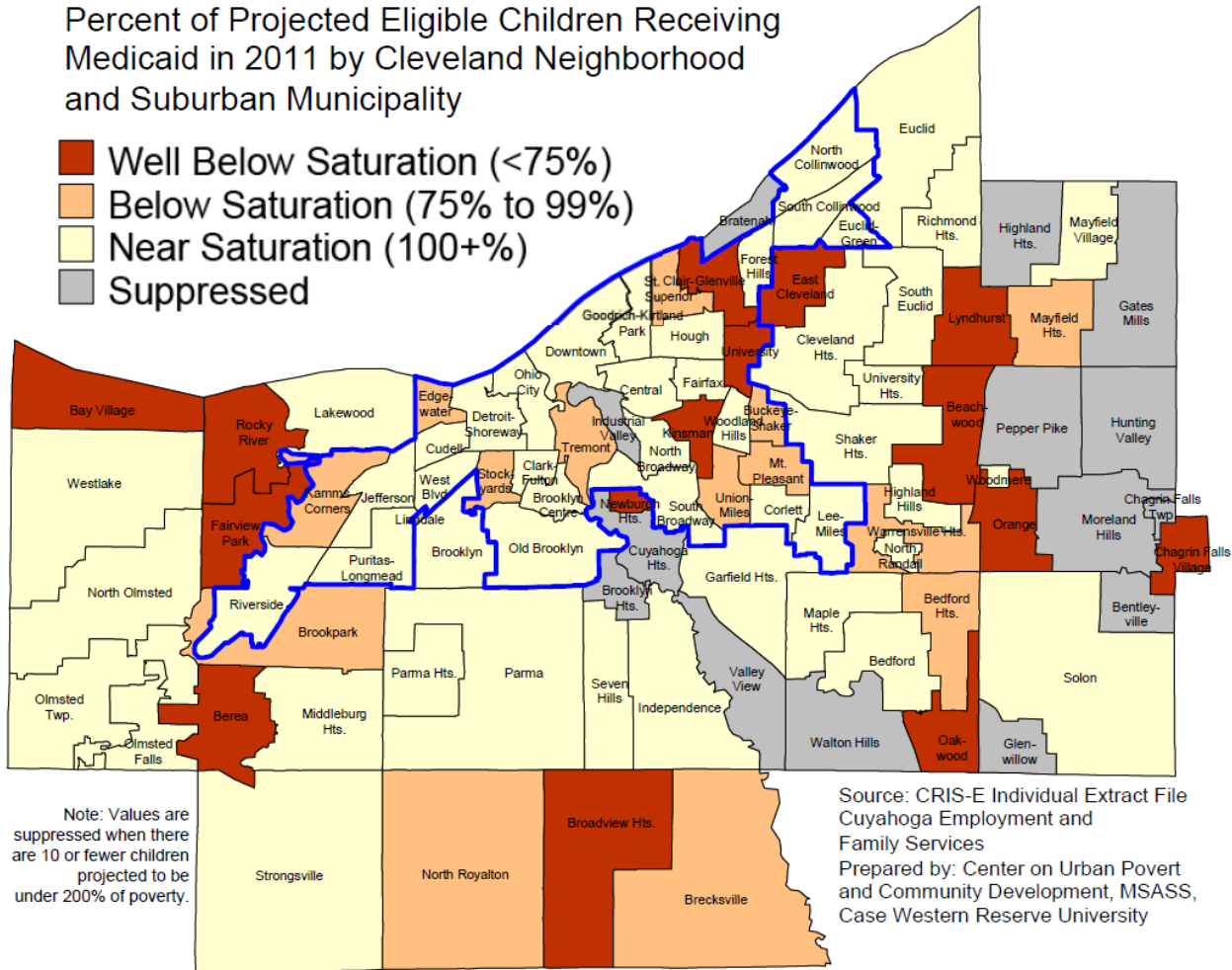
JACK, JOSEPH AND MORTON MANDEL
SCHOOL OF APPLIED SOCIAL SCIENCES

CASE WESTERN RESERVE
UNIVERSITY

Child Well-Being: Medicaid

Percent of Projected Eligible Children Receiving Medicaid in 2011 by Cleveland Neighborhood and Suburban Municipality

- Well Below Saturation (<75%)
- Below Saturation (75% to 99%)
- Near Saturation (100+%)
- Suppressed



Source: CRIS-E Individual Extract File
Cuyahoga Employment and Family Services
Prepared by: Center on Urban Poverty and Community Development, MSASS, Case Western Reserve University

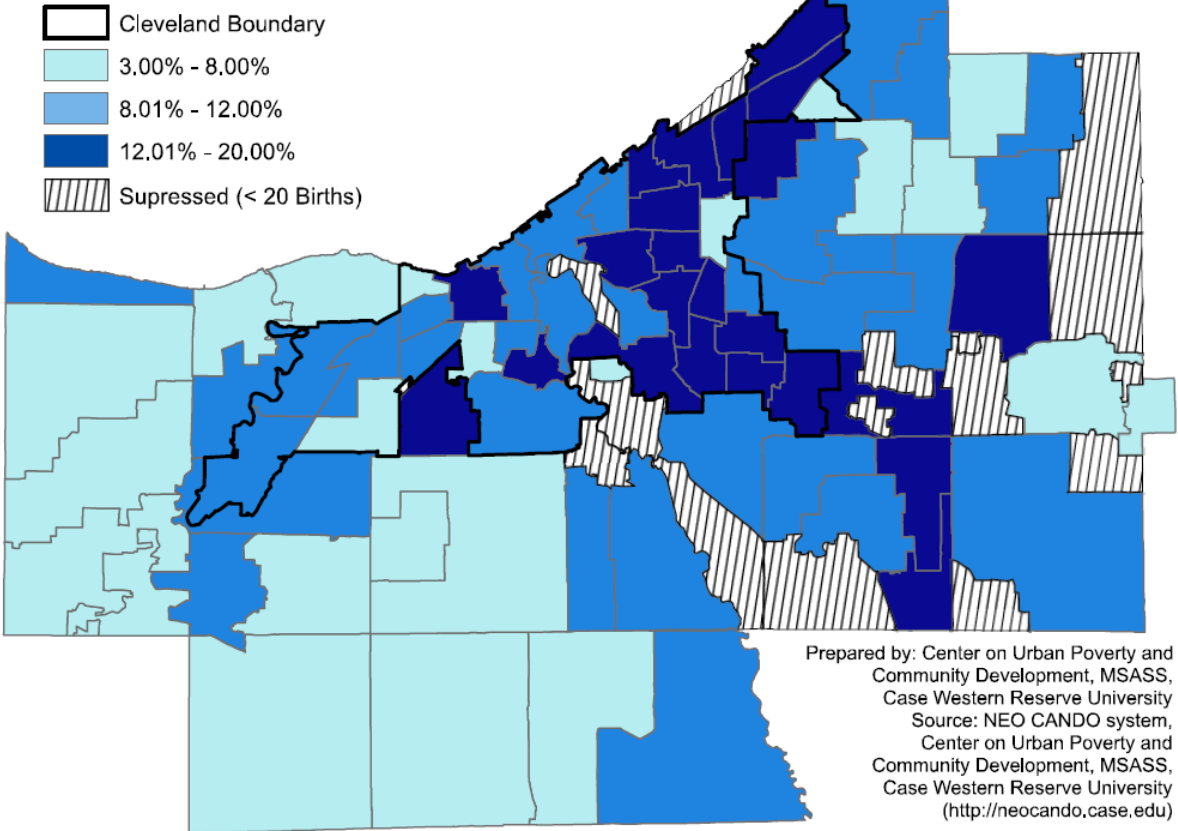


JACK, JOSEPH AND MORTON MANDEL
SCHOOL OF APPLIED SOCIAL SCIENCES

CASE WESTERN RESERVE
UNIVERSITY

Child Well-Being: Low Birth Weight Births

Low Birth Weight in Cuyahoga County, 2009
Percent of births weighing less than 2500 grams



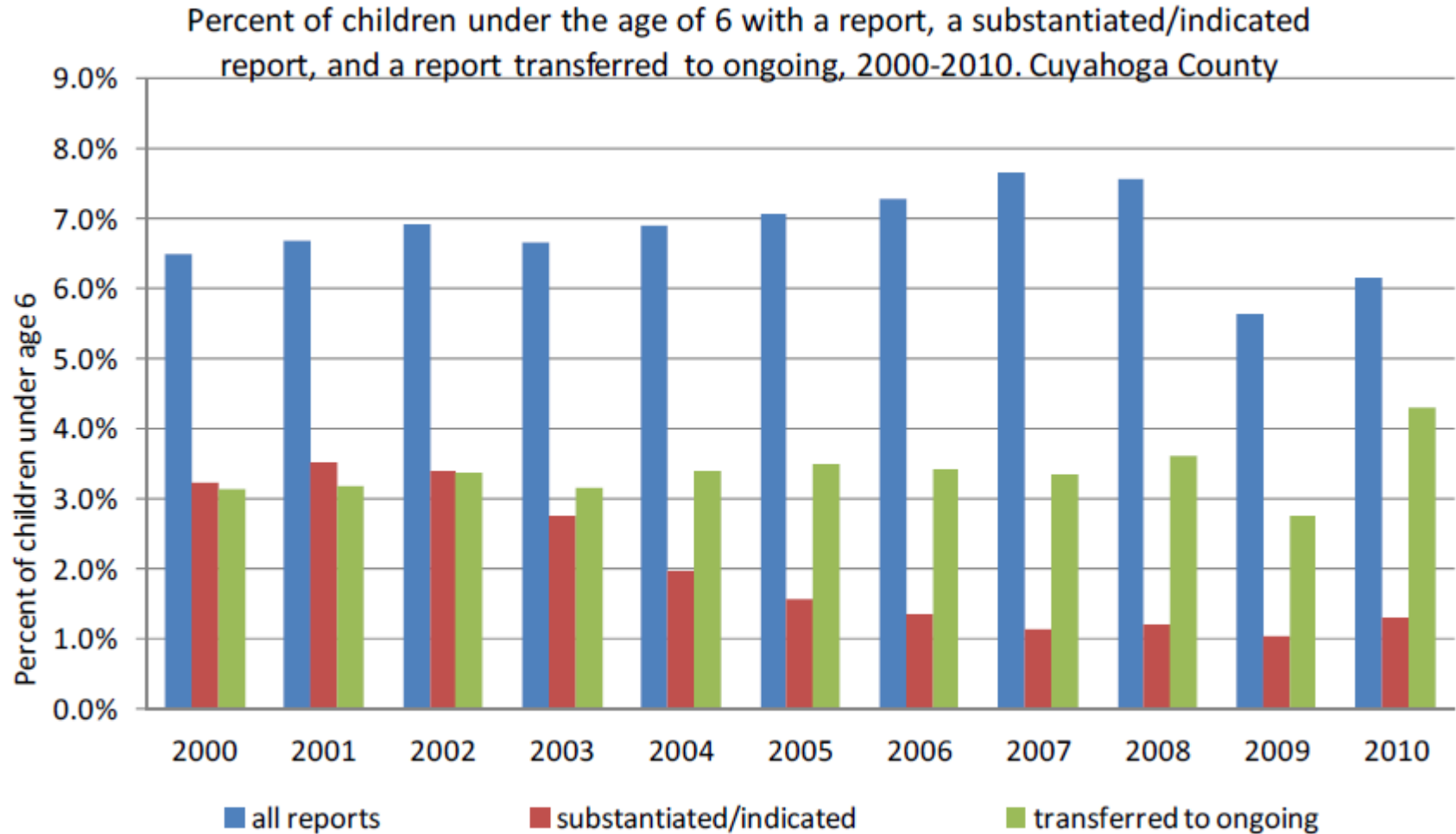
Note: 190 births had missing birth weight or address, or the address could not be geocoded.



JACK, JOSEPH AND MORTON MANDEL
SCHOOL OF APPLIED SOCIAL SCIENCES

CASE WESTERN RESERVE
UNIVERSITY

Child Well-Being: Child Maltreatment



JACK, JOSEPH AND MORTON MANDEL
SCHOOL OF APPLIED SOCIAL SCIENCES

CASE WESTERN RESERVE
UNIVERSITY

The Power of Integrated Data

- Data helps inform our understanding of the early childhood system
- Individuals and families interact with multiple systems and services, so integrated data offers a more complete view of reality
- Understanding of how systems work and how to better meet existing needs can be informed by integrated data
- Service models emphasize long term and collective impact, so data needed across services and over time



JACK, JOSEPH AND MORTON MANDEL
SCHOOL OF APPLIED SOCIAL SCIENCES

CASE WESTERN RESERVE
UNIVERSITY

Using Integrated Data

Examples

- Tracking well-child visits
- Understanding school readiness
- Informing 'Pay for Success' planning



JACK, JOSEPH AND MORTON MANDEL
SCHOOL OF APPLIED SOCIAL SCIENCES

CASE WESTERN RESERVE
UNIVERSITY

Child Health Example

- Despite dramatic increase in health insurance coverage for children ages 0-6, only 43% of poor children got all the recommended well-child visits in the first year of life
- Integrated data showed that 49% of these families were involved with other services close to birth
- A preventive approach developed by having dedicated staff at clinics reach out to families
- Result - Medical Home Pilot with one Patient Advocate each at NEON & Neighborhood Family Practice
 - 86% of families completed scheduled well-child visits, double the rate for children born on to Medicaid in Cuyahoga County



JACK, JOSEPH AND MORTON MANDEL
SCHOOL OF APPLIED SOCIAL SCIENCES

CASE WESTERN RESERVE
UNIVERSITY

School Readiness example

- State of Ohio passed Third Grade “Reading Guarantee” in 2012
- Used integrated data to understand early child influences on kindergarten readiness
 - Cohort of all children entering CMSD 2007-2010
 - Early childhood data examined retrospectively to birth
 - Early school performance data examined forward to 3rd grade

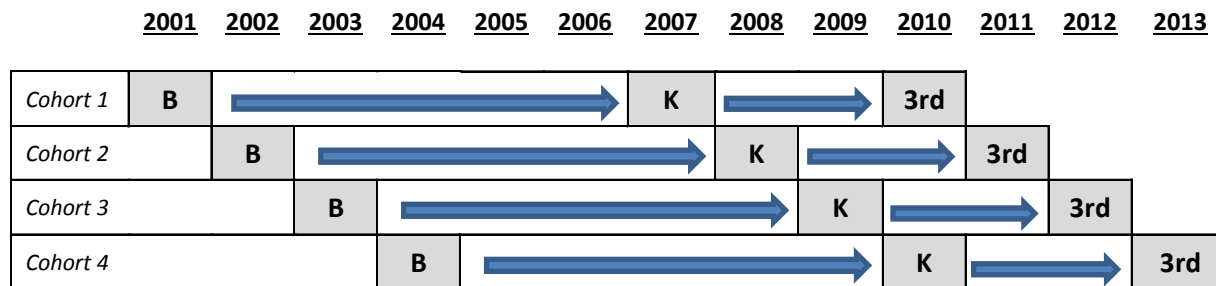
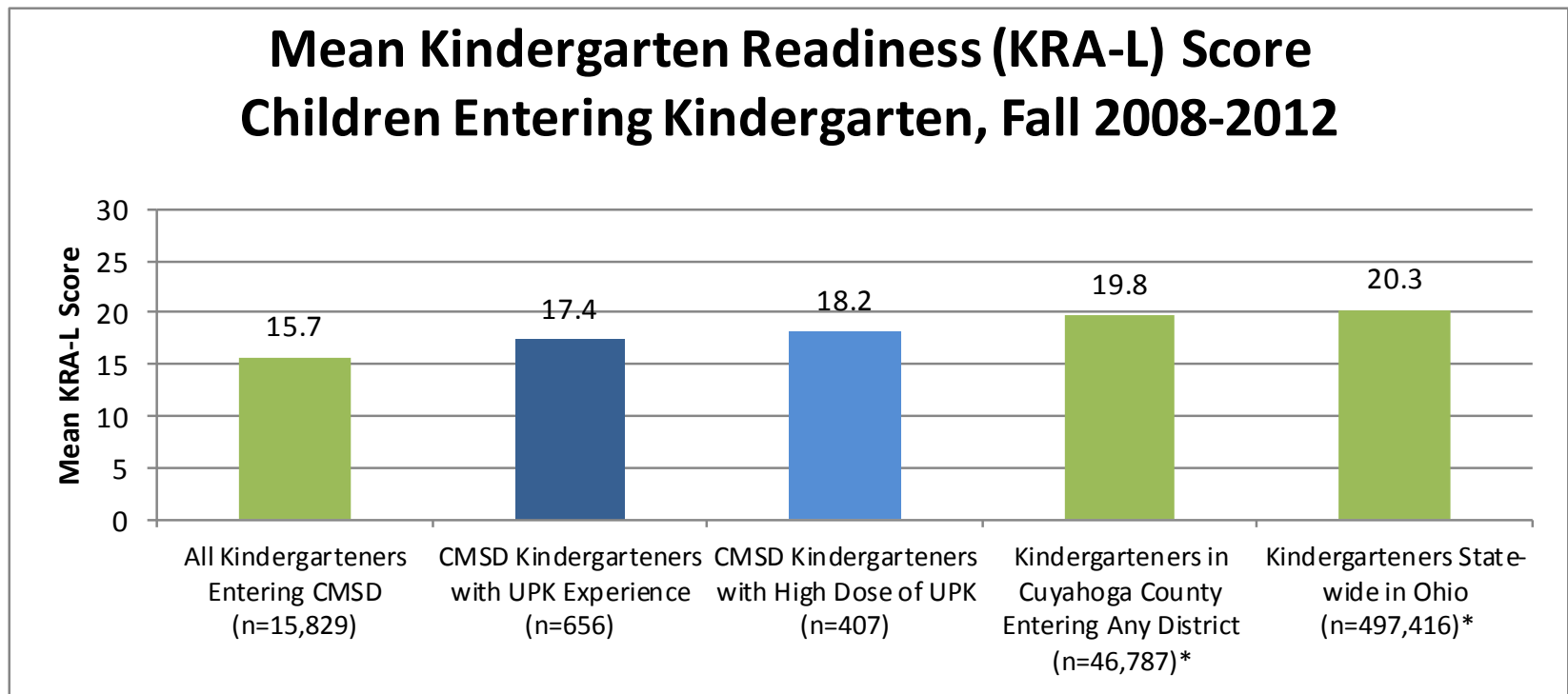


Figure 1: Cohort-based Study Design

- Showed negative influence of maternal education, poverty, as well as home visiting and high-quality preschool experiences



Children from UPK Sites Entering CMSD Are More Prepared



The Kindergarten Readiness Assessment-Literacy (KRA-L) has a value of 0-29 and has three score bands: Band 1 0-13 (Assess broadly for intense instruction), Band 2 14-23 (Assess for targeted instruction), and Band 3 24-29 (Assess for enriched instruction). Children scoring Band 1 may be at serious risk of being unprepared for kindergarten.



Pay for Success Example

- CHILD system data were used to explore the experiences of homeless families with child welfare services, particularly the use of foster care services.
- The population was sufficiently large and costly to merit new intervention.
- Cuyahoga County launched the first county-level Pay For Success initiative with a focus on reducing foster care stays for children whose families experience homelessness.



JACK, JOSEPH AND MORTON MANDEL
SCHOOL OF APPLIED SOCIAL SCIENCES

CASE WESTERN RESERVE
UNIVERSITY

Disseminating Results

Child & Family Well Being Indicators	County District 2 (2008)	Cuyahoga County (2008)
Births	1,443	16,246
# Teen Births, mother's age 10 - 14 (rate per 1,000)	2 (1)	42 (1)
# Teen Births, mother's age 15 - 19 (rate per 1,000)	124 (39)	2,031 (41)
% of Mothers without High School diploma	14%	19%
% Low Birth Weight	9%	10%
% Premature Low Weight Births	6%	7%
% Mothers w/adequate prenatal care	52%	53%
% Mothers w/out prenatal care	1%	1%
% Healthy Births	53%	49%
Infant Deaths (rate per 1,000 births)*		

Child & Family Well Being Indicators	County District 8 (2008)	Cuyahoga County (2008)
Births	1,877	16,246
# Teen Births, mother's age 10 - 14 (rate per 1,000)	12 (2)	42 (1)
# Teen Births, mother's age 15 - 19 (rate per 1,000)	358 (79)	2,031 (41)
% of Mothers without High School diploma	32%	19%
% Low Birth Weight	14%	10%
% Premature Low Weight Births	9%	7%
% Mothers w/adequate prenatal care	42%	53%
% Mothers w/out prenatal care	2%	1%
% Healthy Births	36%	49%
Infant Deaths (rate per 1,000 births)*	29 (15)	164 (10)
#(%) Children with Elevated Blood Lead Levels ($\geq 5\mu\text{g}/\text{dl}$)	637 (16%)	3,951 (16%)
#(%) Children with Elevated Blood Lead Levels ($\geq 10\mu\text{g}/\text{dl}$)	168 (4%)	1,174 (5%)



JACK, JOSEPH AND MORTON MANDEL
SCHOOL OF APPLIED SOCIAL SCIENCES

CASE WESTERN RESERVE
UNIVERSITY

Informing system responses

- What does the CMSD kindergarten class look like?

Family Well Being Indicators	CMSD Kindergarten Class 2008-09¹	Cleveland²	Cuyahoga County³
% Teen Births, mother's age 10 – 14	<1	<1	<1
% Teen Births, mother's age 15 – 19	22.4	16.7	9.8
% of Mothers without H.S. diploma	41.7	30.2	15.9
% Low Birth Weight	12.6	11.6	9.4
% Premature Low Weight Births	8.7	8.2	6.7
% Mothers w/ adequate prenatal care (Kessner Index)	63.1	69.4	81.3
% Mothers w/out prenatal care	1.9	1.7	0.9
% Healthy Births (based on information about Apgar, prenatal care, birthweight, gestational age)	56.4	61.5	70.9
% Children with a substantiated or indicated report of abuse/neglect by age 4	12.1	9.6	5.1
% Children referred to ongoing services with Child & Family Services by age 4	19.8	14.7	7.6
% Children with any report of abuse/neglect by age 4, including substantiated and unsubstantiated	35.2	26.7	14.7
% Children in households receiving Food Stamps in 2008	76.9	51.1	28.8
% Children in households receiving Cash Assistance in 2008	19.0	11.3	6.1



JACK, JOSEPH AND MORTON MANDEL
SCHOOL OF APPLIED SOCIAL SCIENCES

CASE WESTERN RESERVE
UNIVERSITY

Weaknesses of early childhood re: Big Data

- Organizational culture and politics not sufficiently data driven and data savvy
- Big data requires long term investments, but funding is tough to raise, and short term results come quicker from “one off” data collection
- Proportion of early childhood research effort devoted to big data small relative to survey and observational data
- Too few early childhood folks with Big Data skills



JACK, JOSEPH AND MORTON MANDEL
SCHOOL OF APPLIED SOCIAL SCIENCES

CASE WESTERN RESERVE
UNIVERSITY

Challenges to pursuing Big Data

- Funding!
- Data access – data sharing, privacy concerns
- Data depth – matching variables, service measures, outcome measures
- Data frequency/recency
 - how frequent is enough?
 - Capacity issues for data partners



JACK, JOSEPH AND MORTON MANDEL
SCHOOL OF APPLIED SOCIAL SCIENCES

CASE WESTERN RESERVE
UNIVERSITY

Navigating Big Data challenges

- Defining the “system”
- Securing and sustaining funding
- Promoting collaboration
- Using data to inform decisionmaking
- Managing partner expectations



JACK, JOSEPH AND MORTON MANDEL
SCHOOL OF APPLIED SOCIAL SCIENCES

CASE WESTERN RESERVE
UNIVERSITY

What's Next?

- Undertake more study of factors that predict longitudinal outcomes for children
- Explore mechanisms to make aggregate data from more available to the policy and practice communities
- Extend CHILD System to include more early childhood data (e.g., Head Start, developmental disabilities) and data from later adolescence (e.g., juvenile court involvement, school systems)



JACK, JOSEPH AND MORTON MANDEL
SCHOOL OF APPLIED SOCIAL SCIENCES

CASE WESTERN RESERVE
UNIVERSITY