Life course factors shaping prospects for longevity: Data linkage to examine disparities in child obesity

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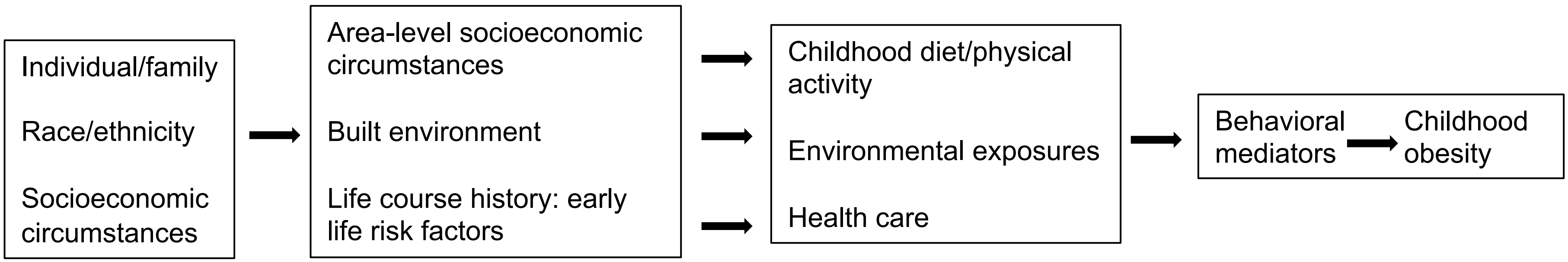
Disparities in child obesity

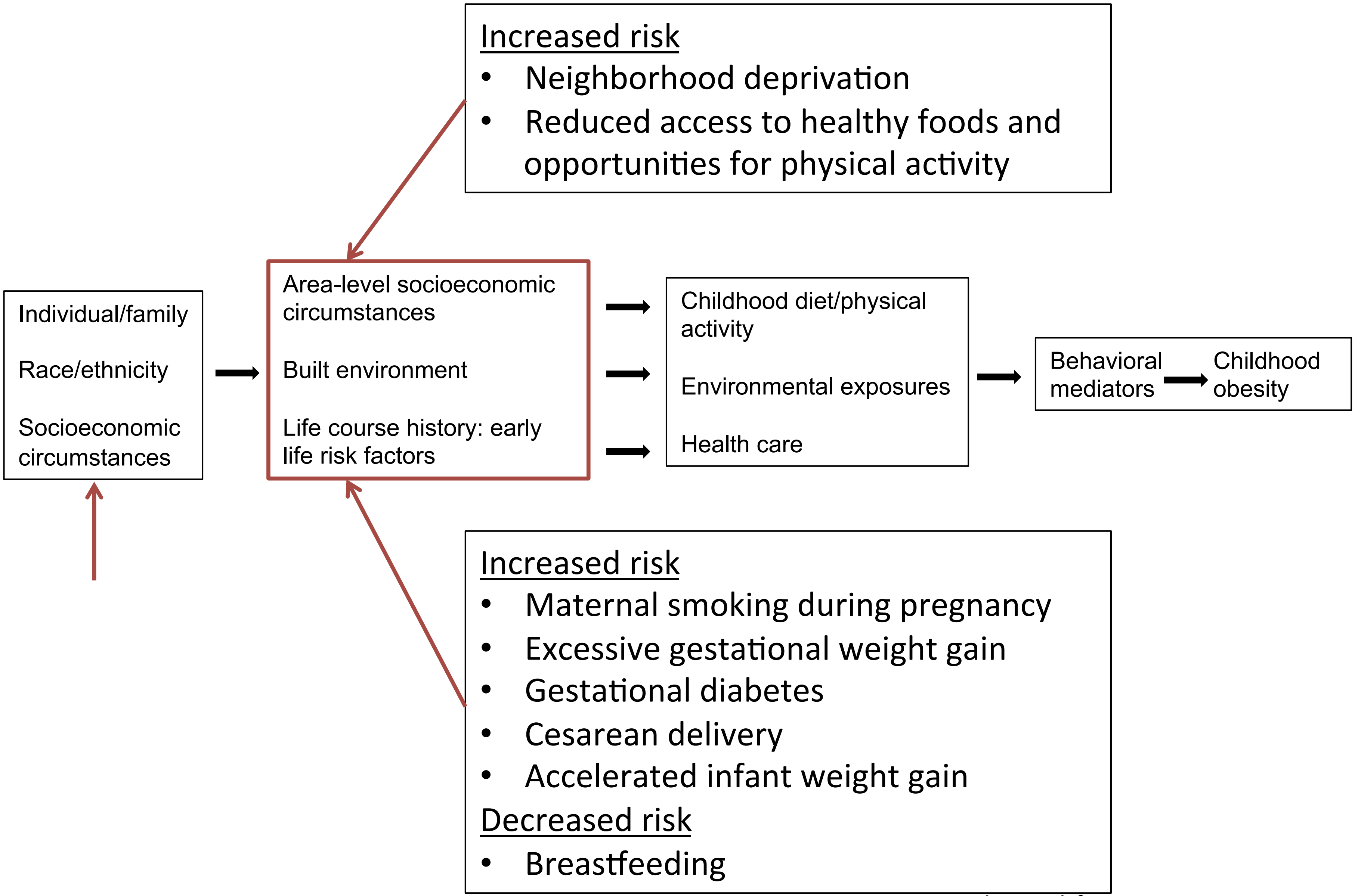
- Eliminating racial/ethnic and socioeconomic disparities is a national priority
- Why target obesity?
- In 2012, 17% of 2-19-year-olds were obese
- Obesity in childhood is associated with short- and long-term physical and psychosocial consequences
- Children from racial/ethnic minority groups and from disadvantaged backgrounds are disproportionately affected by obesity
- Examining the causes of these disparities could help inform interventions among those who need it most

Life course approach

- Life course frameworks propose that factors during pre- and post-natal periods may influence the development of obesity from early life through adulthood



Adapted from Diez Roux, 2012



Adapted from Diez Roux, 2012

What's needed

- Modifying early life risk factors and the neighborhood may be effective approaches for obesity prevention
- <u>But</u>, existing studies are limited by relatively small sample sizes, highly selected populations, lack of geographical data and serial outcome data, and potential confounding
- Need for new data

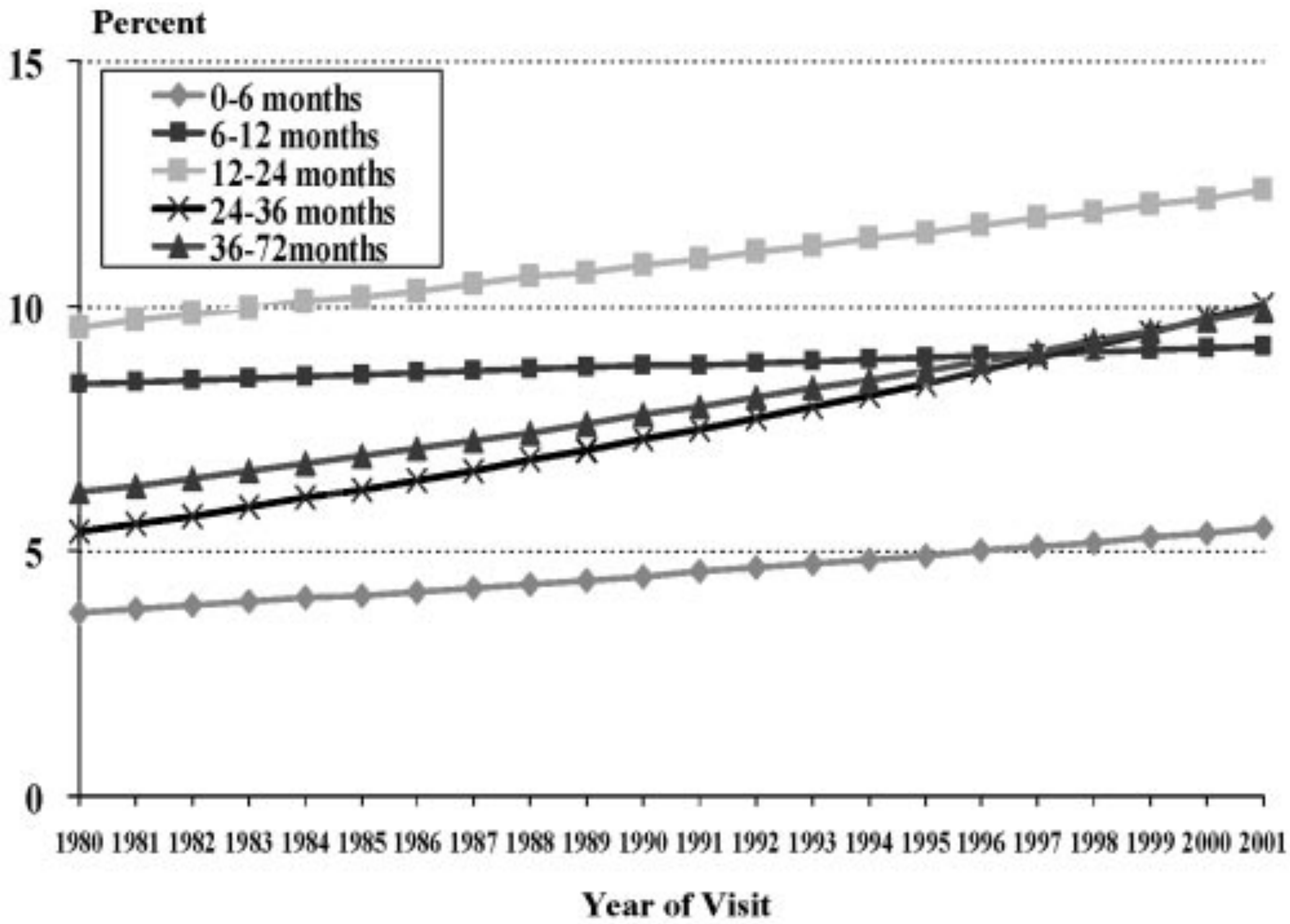
Data linkage

- Link clinical data and population data
- Each contribute different information
- Fill in missing data
- Funding: K99/R00 award from National Institute of Child Health and Human Development (2011-2015)

CENTURY Study

- Collecting Electronic Nutrition Trajectory Data using e-Records of Youth (CENTURY) Study (PI: Elsie Taveras)
- Funding from the CDC in 1996, 2001 and 2008
- Electronic medical records of well-child visits at 14 Harvard Vanguard Medical Associates (HVMA) health centers in eastern Massachusetts
- Database of 312,857 children age 0-18 years with 2,121,511 visits from 1980 to 2008
- Children with Medicaid were accepted from 1987 onwards
- Clinical data: height/weight
- Link siblings

CENTURY Study 1980-2001



Kim et al., 2006

CENTURY Study: 1980-2008

	Total N	%
Any data at age ≤18 years	312,857	
Any data at age <2 years	137,736	
Any data at age 5 years	77,760	
Any data at age 11 years	65,004	
Any data at age 17 years	51,276	
Child's race/ethnicity		
White		46%
Black		9%
Hispanic		3%
Other		7%
Missing		35%
Medical insurance		
Private		28%
Medicaid		7%
Missing		65%
Weight-for length ≥ 95th percentile anytime between 1 to 24 months	137,736	22%
BMI ≥ 95th percentile at:		
Age 5 years	77,760	11.3%
Age 11 years	65,004	15.2%
Age 17 years	51,276	11.3%

Massachusetts birth certificate

- Standard Certificate of Live Birth collected by Registry of Vital Records and Statistics
  - Parent worksheet: parents report on legal and socio-demographic information on child's mother and father
  - Hospital worksheet: designated hospital representative reports on prenatal care, labor and delivery, neonatal conditions and procedures, and discharge
- Mothers city of residence and census tract
- Undergone multiple revisions over study period

Massachusetts birth certificate

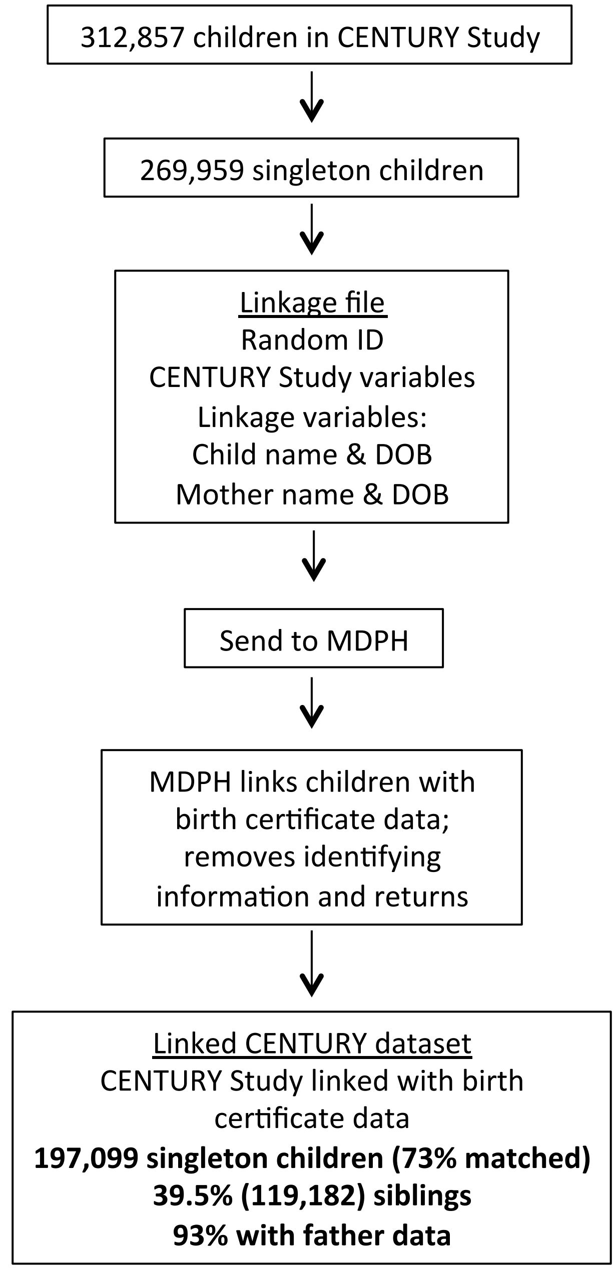
Infant/pregnancy measures	Socio-demographic characteristics	Maternal health behaviors
Child's name	Mother's name	# cigarettes before pregnancy
Child's date of birth	Mother's date of birth	# cigarettes during pregnancy
Infant's gender	Mother's age	Is mother breastfeeding
Infant's birth weight	Mother's race	Mother's total weight gain/loss
Plurality	Mother's ancestry	Inappropriate weight gain/loss
Parity	Mother's education	Diabetes, combined
Gestational age	Marital status	Diabetes, gestational
Month prenatal care began	Mother's birthplace (city, state)	Diabetes, other
Number of prenatal care visits	Delivery source of payment	Hypertension, chronic
Prenatal adequacy of care index	Mother's language preference	Hypertension, pregnancy
Mode of delivery	Census tract	
	Father's age	
	Father's race	
	Father's ancestry	
	Father's education	
	Father's birthplace (city, state)	
	Father's language preference	

Linkage algorithm

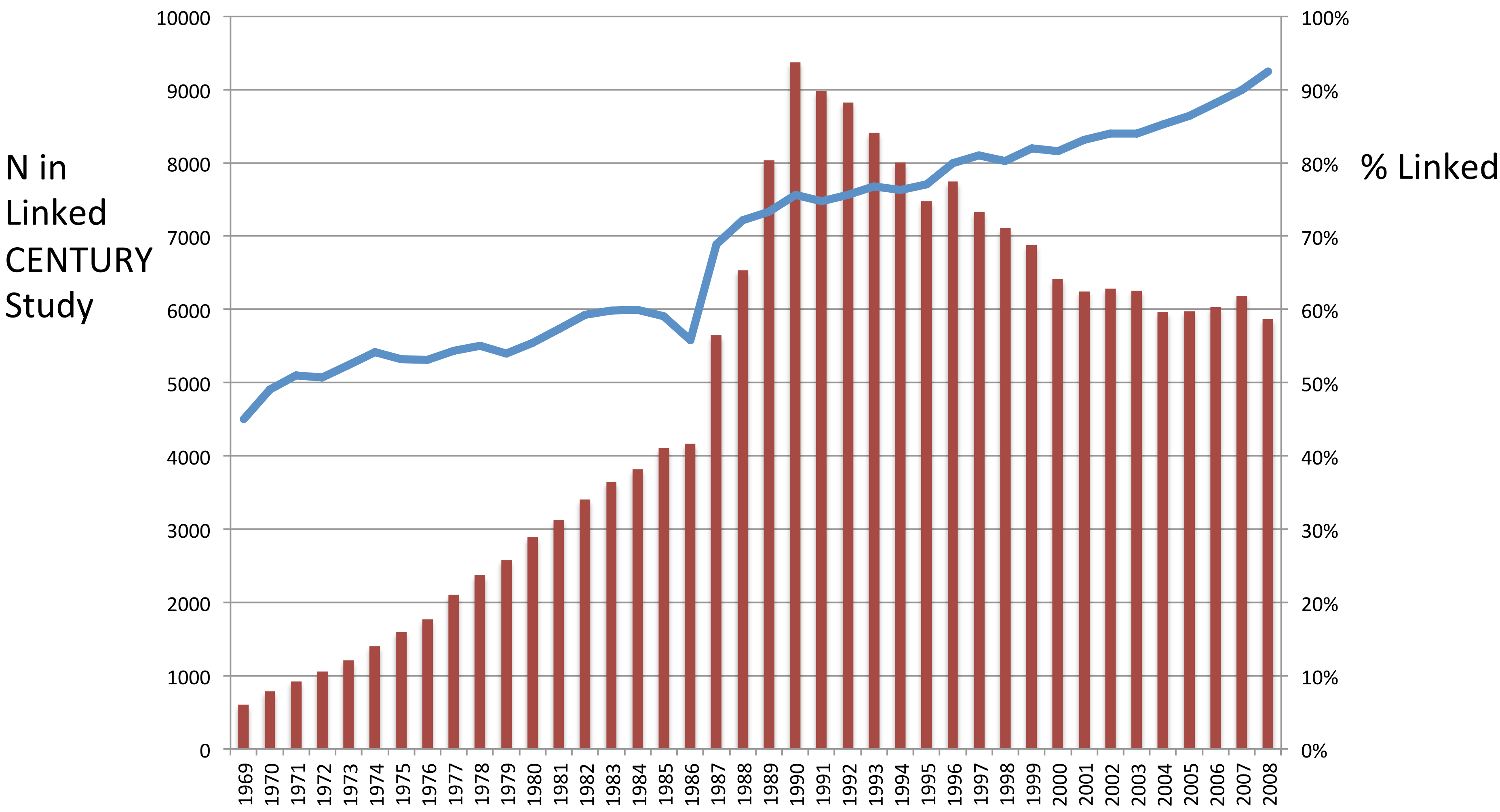
Specific

1. Baby's first, middle, and last name & DOB and mother's DOB
2. Baby's first, middle initial, and last name & DOB and mother's DOB
3. Baby's first, middle, and last name & DOB
4. Baby's first, middle initial, and last name & DOB
5. Baby's first and last name & DOB
6. Baby's first 3 letters of first name and last name & DOB

General


312,857 children in CENTURY Study
269,959 singleton children
Linkage file
Random ID
CENTURY Study variables
Linkage variables:
Child name & DOB
Mother name & DOB
Send to MDPH
MDPH links children with birth certificate data; removes identifying information and returns
Linked CENTURY dataset
CENTURY Study linked with birth certificate data
197,099 singleton children (73% matched)
39.5% (119,182) siblings
93% with father data

Linkage (N=197,099)



Research domains (now and later)

1. Using a life course perspective to examine racial/ethnic and socioeconomic disparities in early life risk factors for childhood obesity
2. Examine disparities in childhood obesity through the neighborhood
3. Potential to link with characteristics of built environment: food outlets, parks, etc
4. Assess policy changes
5. Other outcomes

Timeline: a labor of love

1/2010: Discussions began

6/2010: K award submitted

9/2011: K award started

2/2012: MDPH IRB submitted

6/2012: MDPH verbal approval

1/2013: MDPH written approval (11 months)

3/2013: MDPH says to prepare data

3/2013: HVMA requires additional IRB approval

6/2013: HVMA IRB approval

8/2013: Data confidentiality agreement required betw

4/2014: DCA signed (9 months later)

4/2014: HVMA prepares CENTURY data

7/2014: Data linked!

10/2014: Receive data and cleaning begins…

Future directions

- Linked dataset is greater than sum of parts
- Ability to update
- Provide context through linkage with other datasets
- How early do we begin preventing obesity?
- Can we close the gap in disparities?

Acknowledgements

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