NICHD

NEONATAL RESEARCH NETWORK

The Relationship Between Hispanic Ethnicity and Outcomes for Infants Born Extremely Preterm

Jane E. Brumbaugh, Carla M. Bann, Edward F. Bell, Colm P. Travers, Betty R. Vohr, Elisabeth C. McGowan, Heidi M. Harmon, Waldemar A. Carlo, Susan R. Hintz, and Andrea F. Duncan for the *Eunice Kennedy Shriver* NICHD Neonatal Research Network

NIH *Eunice Kennedy Shriver* National Institute of Child Health and Human Development

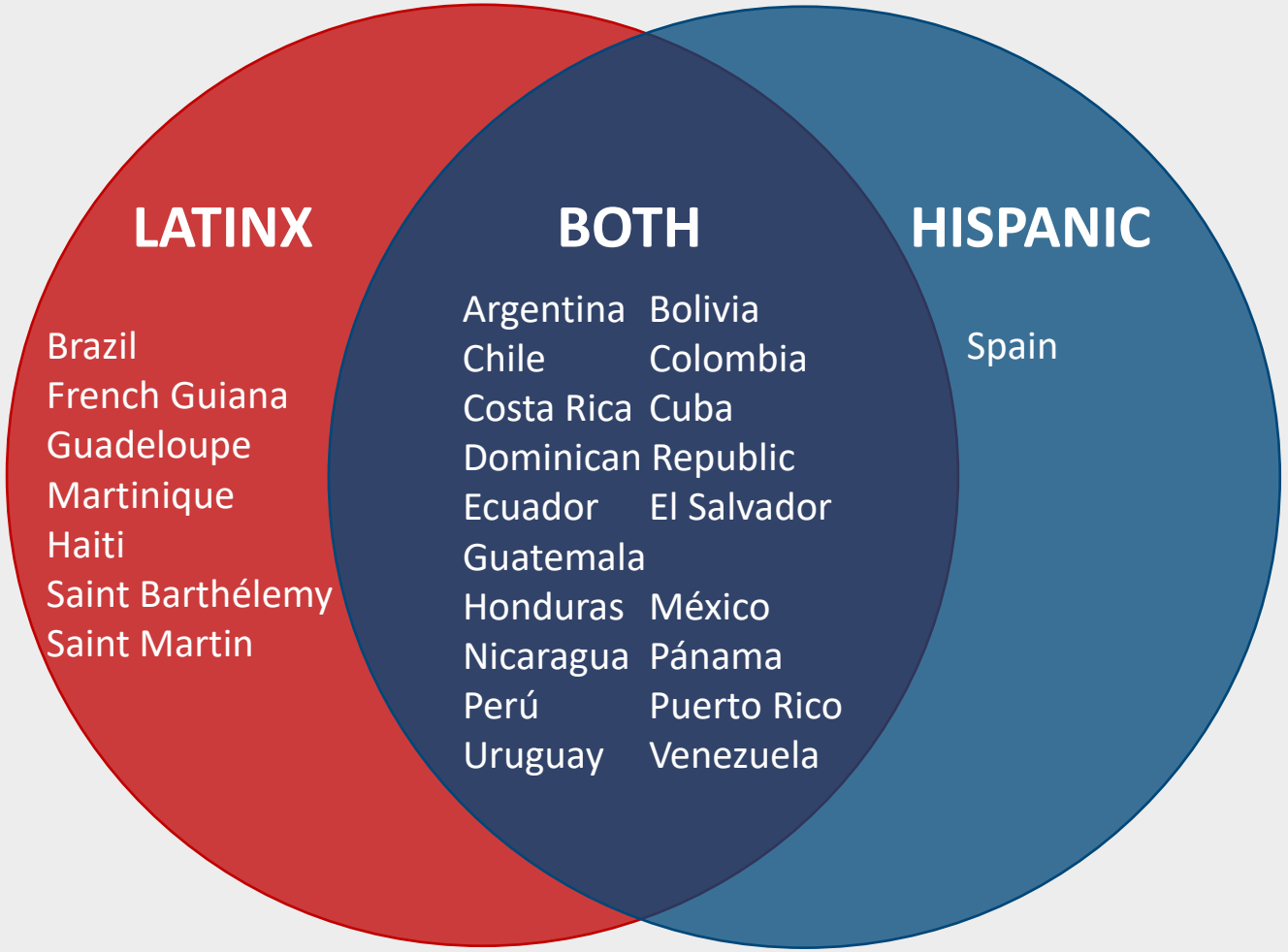
Disclosures

- Dr. Jane Brumbaugh has no financial relationships to disclose or conflicts of Interest to resolve. Any real or apparent conflicts of interest related to the content of this presentation have been resolved.

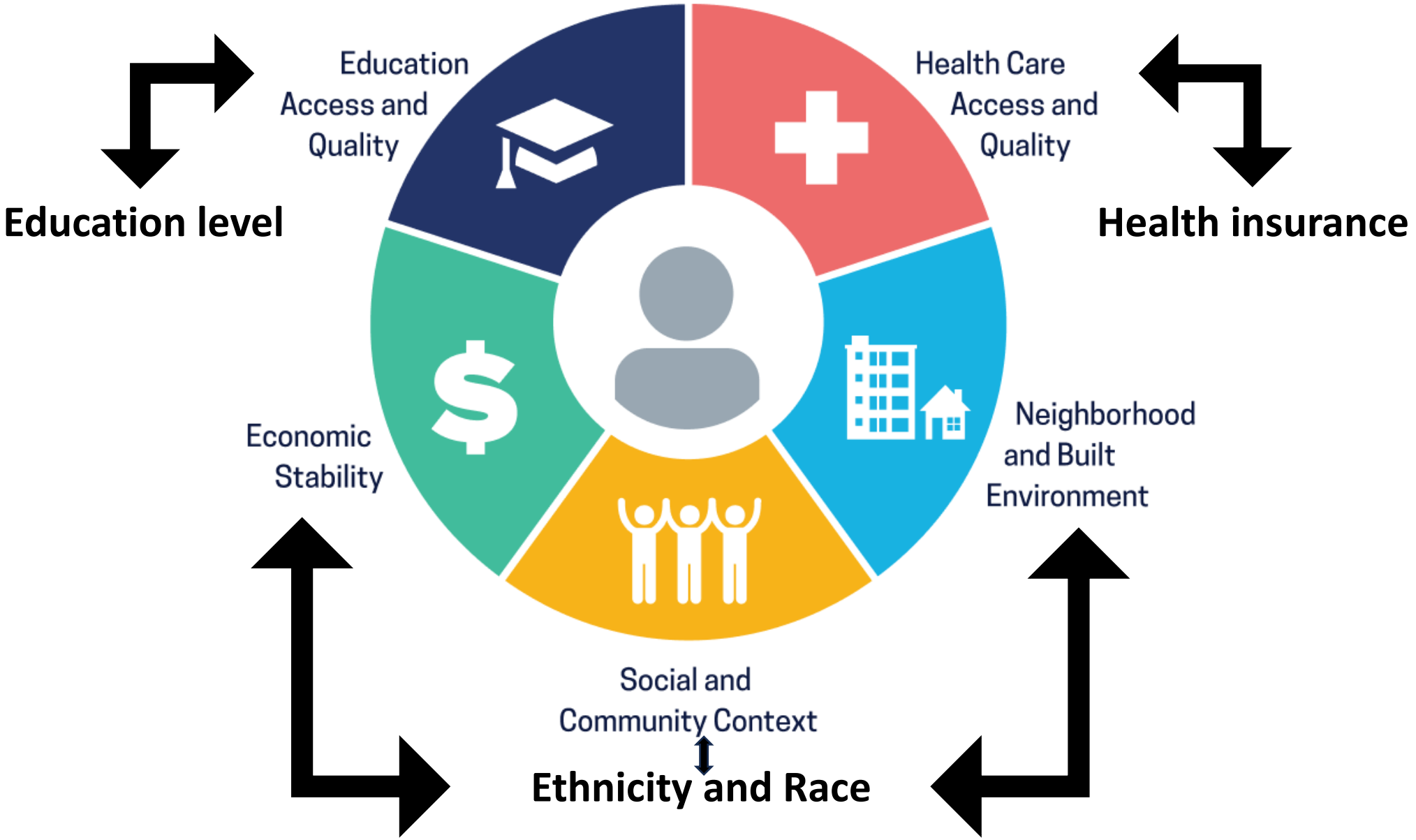
- This presentation will not involve discussion of unapproved or off-label, experimental or investigational use of a drug.

Introduction

- Ethnicity refers to identification with a shared cultural tradition
- 1/5 US population identifies as Hispanic ethnicity
- 1/4 US births classified as Hispanic ethnicity
- Hispanic paradox



Maternal Social Drivers of Health



Objectives

Primary

- To characterize the association between ethnicity and survival to newborn hospital discharge without major morbidity.

Secondary

- To characterize the association between ethnicity and survival to newborn hospital discharge.
- To characterize the association between ethnicity and neurodevelopmental impairment at 18-26 months' corrected age.

Methods

Inclusion criteria

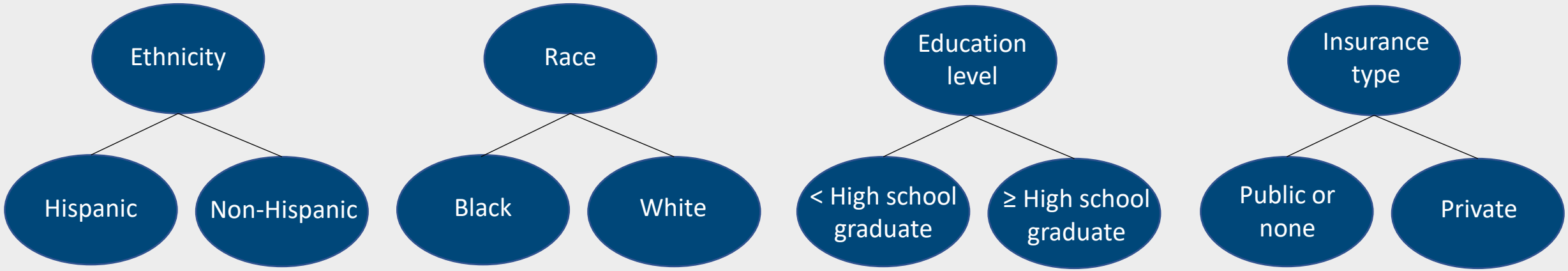
- Inborn at Neonatal Research Network centers
- Gestational age <27 weeks
- Birth years 2006-2020

Exclusion criteria

- Outborn
- Major congenital anomalies
- Race other than Black or White
- Missing data for ethnicity or race

Methods

- Binary classification of maternal sociodemographic characteristics



Outcomes

Primary

- Survival to discharge without major morbidity
  - EOS, LOS, NEC, BPD grade 3, IVH grade ≥3, PVL, ROP stage ≥3 or plus disease

Secondary

- Survival to discharge
- Neurodevelopmental impairment at 18-26 months' corrected age
  - Gross motor function classification system ≥2
  - Bayley cognitive or motor composite score <85
  - Bilateral blindness or no functional hearing with or without amplification

Methods

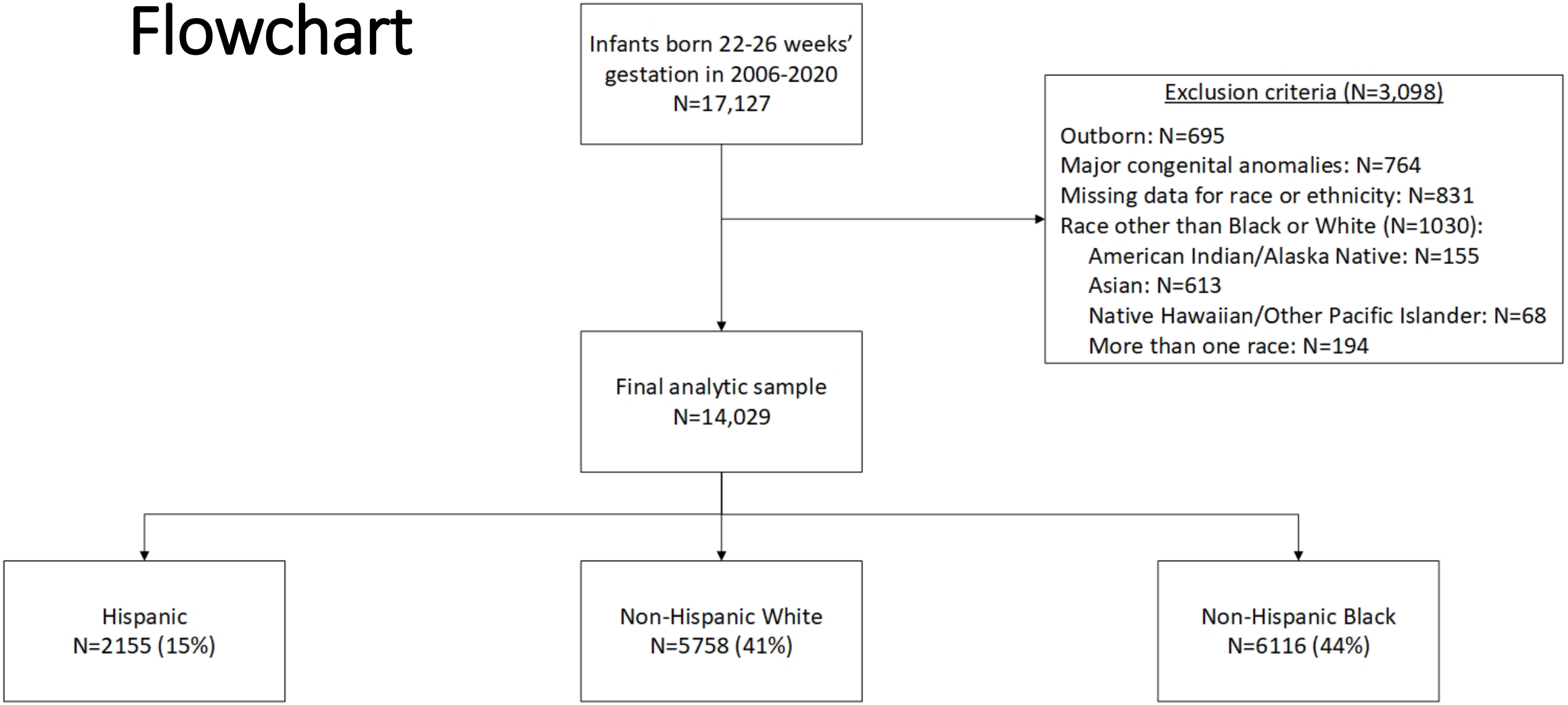
- Chi-square tests and ANOVA
- Linear and generalized linear mixed effect regression analyses

Maternal Characteristics
- Marital status
- Education level
- Insurance type
- Hypertension
- Multiple gestation
- Delivery mode
- Antenatal steroids

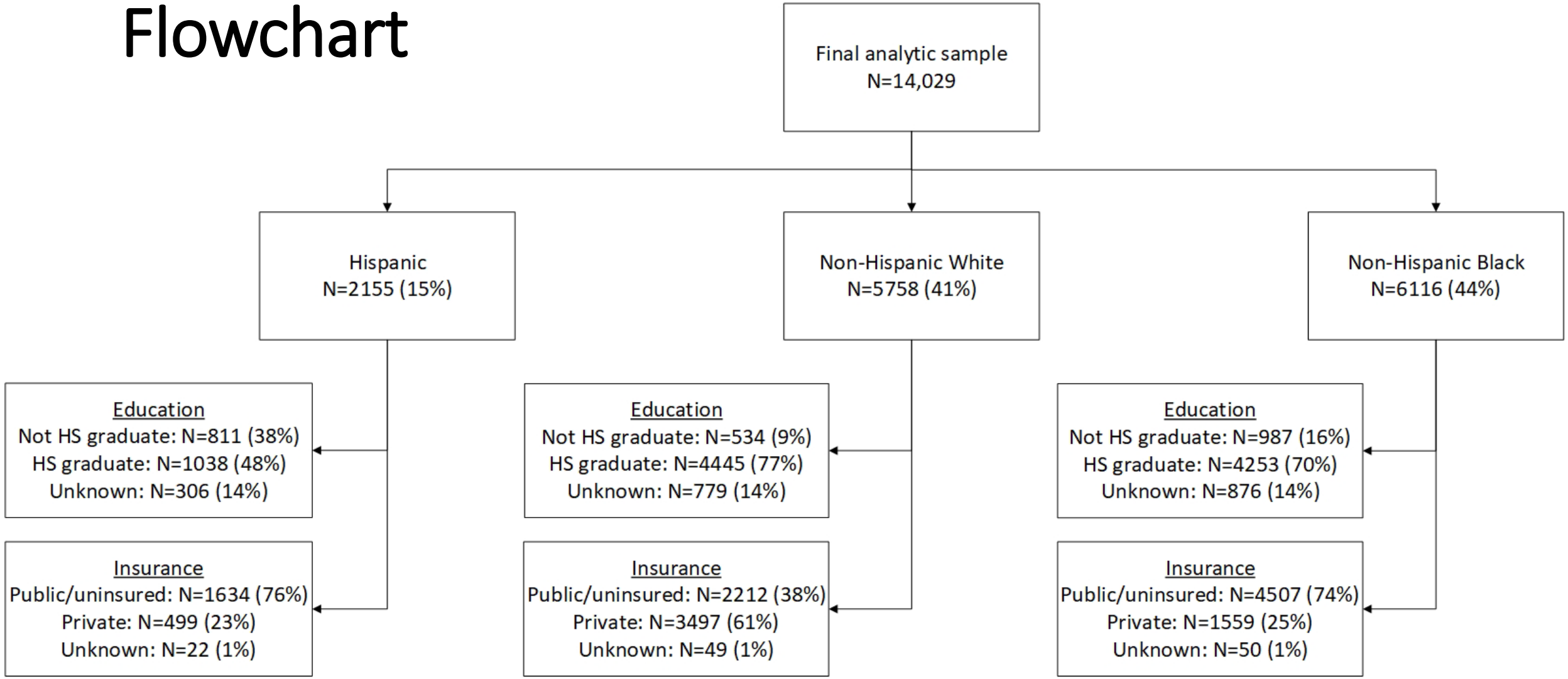
Infant Characteristics
- Center (random effect)
- Birth year
- Infant sex
- Gestational age
- Small for gestational age

Infant Morbidity
- EOS
- LOS
- NEC
- Grade ≥III IVH
- PVL
- ROP stage ≥3 or plus disease

Flowchart


Infants born 22-26 weeks' gestation in 2006-2020
N=17,127
Exclusion criteria (N=3,098)
Outborn: N=695
Major congenital anomalies: N=764
Missing data for race or ethnicity: N=831
Race other than Black or White (N=1030):
American Indian/Alaska Native: N=155
Asian: N=613
Native Hawaiian/Other Pacific Islander: N=68
More than one race: N=194
Final analytic sample
N=14,029
Hispanic
N=2155 (15%)
Non-Hispanic White
N=5758 (41%)
Non-Hispanic Black
N=6116 (44%)

Flowchart



HS = High School

Maternal Characteristics

Characteristic, n (%)	Maternal Ethnicity and Race		
	Hispanic	Non-Hispanic White	Non-Hispanic Black
Age (years), mean (SD)*	28 (7)	29 (6)	27 (6)
Married*	1010 (47)	3506 (61)	1436 (24)
Diabetes (insulin-dependent)*	98 (5)	200 (4)	278 (5)
Hypertension*	414 (19)	1125 (20)	1683 (28)
Histological chorioamnionitis*	433 (20)	1026 (18)	1212 (20)
Antenatal corticosteroids*	1622 (76)	5013 (87)	5017 (82)
Multiple gestation*	408 (19)	1894 (34)	1347 (22)
Cesarean delivery*	1194 (56)	3506 (61)	3440 (56)
Prenatal care*			
None	30 (4)	40 (2)	108 (5)
Limited	67 (10)	95 (5)	194 (9)
Adequate	608 (86)	1740 (93)	1755 (85)

*p<0.05

Infant Characteristics

Characteristic, n (%)	Maternal Ethnicity and Race		
	Hispanic	Non-Hispanic White	Non-Hispanic Black
Male*	1123 (52)	3065 (53)	3029 (50)
Gestational age (weeks), mean (SD)*	25.0 (1.3)	25.0 (1.3)	24.9 (1.3)
Birth weight (grams), mean (SD)*	729 (182)	717 (186)	686(169)
Small for gestational age*	145 (7)	492 (9)	535 (9)
Early-onset sepsis*	67 (4)	149 (3)	119 (2)
Late-onset sepsis*	550 (33)	1365 (29)	1637 (32)
Necrotizing enterocolitis*	228 (14)	524 (11)	675 (13)
Periventricular leukomalacia	102 (6)	276 (6)	276 (5)
Bronchopulmonary dysplasia grade 3*	126 (9)	410 (11)	492 (12)
Intraventricular hemorrhage grade ≥III*	400 (23)	991 (21)	1037 (20)
ROP stage ≥3 or plus disease*	382 (27)	1015 (26)	878 (20)

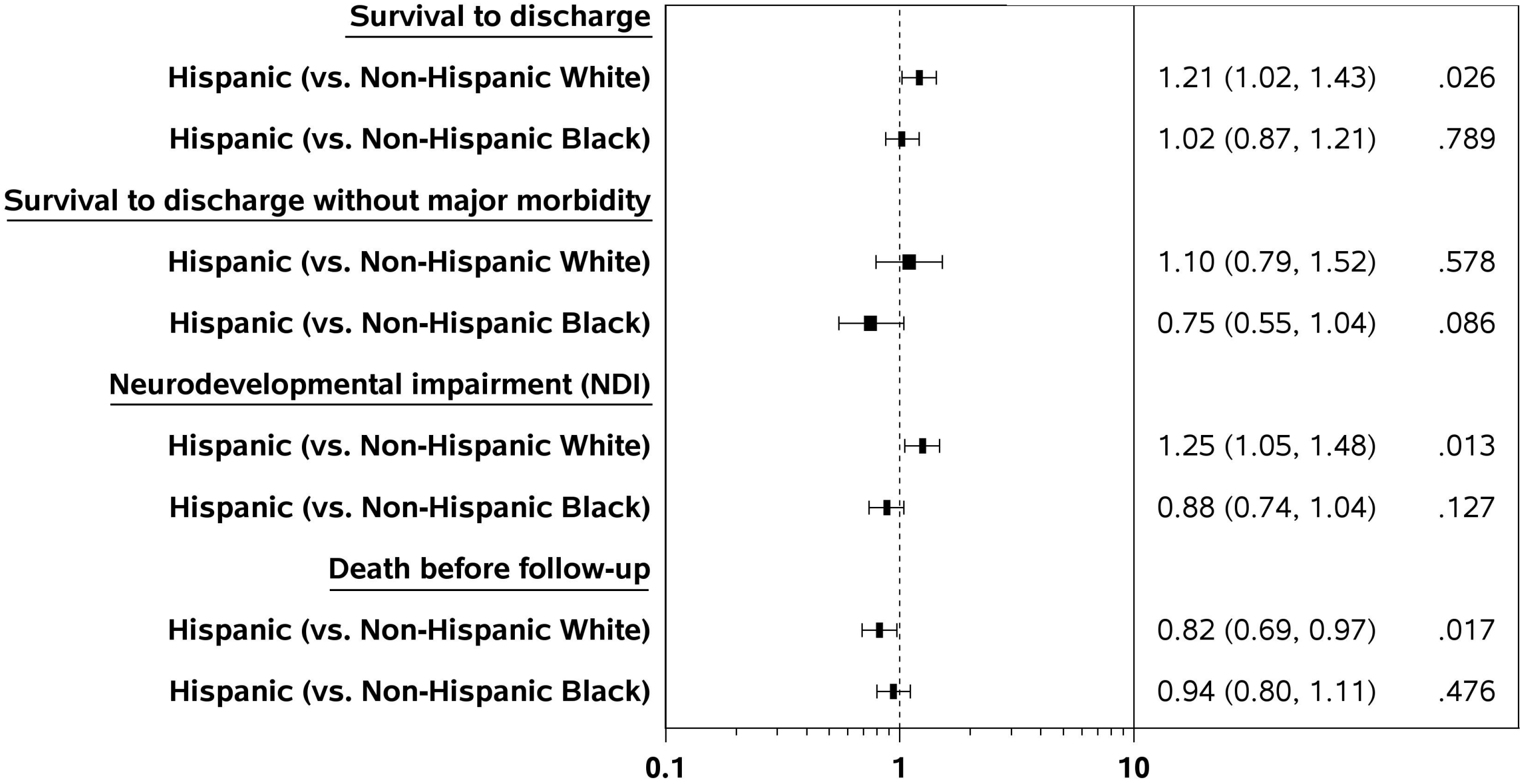
*p<0.05

Discharge and Follow-up Outcomes

Characteristic, n (%)	Maternal Ethnicity and Race		
	Hispanic	Non-Hispanic White	Non-Hispanic Black
Discharge			
PMA at discharge (weeks), mean (SD)*	42 (5)	43 (6)	43 (7)
Discharged with oxygen*	454 (33)	1690 (47)	1333 (34)
Survival to discharge	1412 (66)	3820 (67)	4109 (67)
Survival without major morbidity*	523 (25)	1494 (27)	1701 (29)
Follow-up			
Readmission by 18-26 months' corrected	616 (49)	1582 (48)	1808 (50)
Neurodevelopmental impairment*	544 (44)	1004 (32)	1573 (45)
Death	750 (35)	1961 (34)	2079 (34)

*p<0.05

Adjusted Outcomes by Ethnicity and Race



Outcomes by Race among Hispanic Subjects

Characteristic, n (%)	Hispanic Participants Only	
	Black (n=100)	White (n=2055)
Discharge		
PMA at discharge (weeks), mean (SD)	43 (7)	42 (5)
Discharged with oxygen	29 (41)	425 (33)
Survival to discharge	72 (73)	1340 (65)
Survival without major morbidity	25 (26)	498 (25)
Follow-up		
Readmission by 18-26 months' corrected	31 (53)	585 (48)
Neurodevelopmental impairment	26 (46)	518 (44)
Death	27 (27)	707 (35)

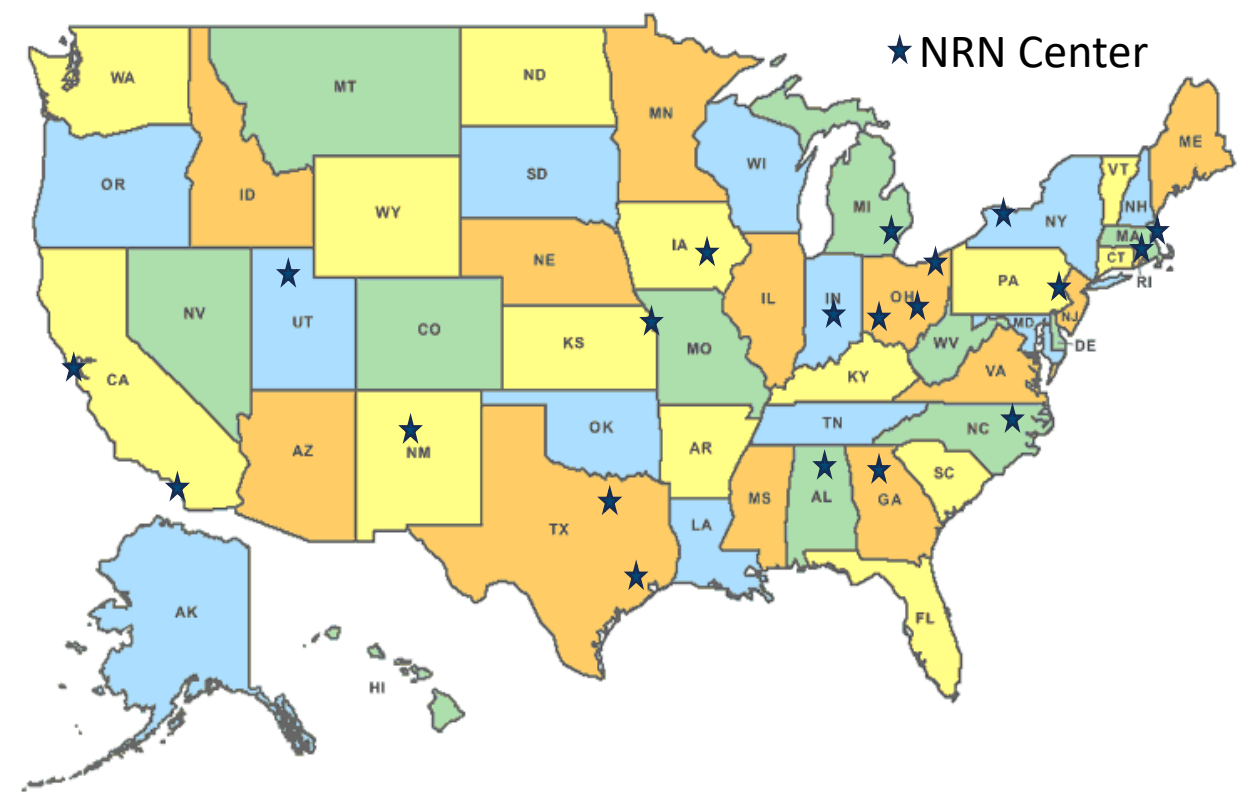
Strengths

Size of cohort

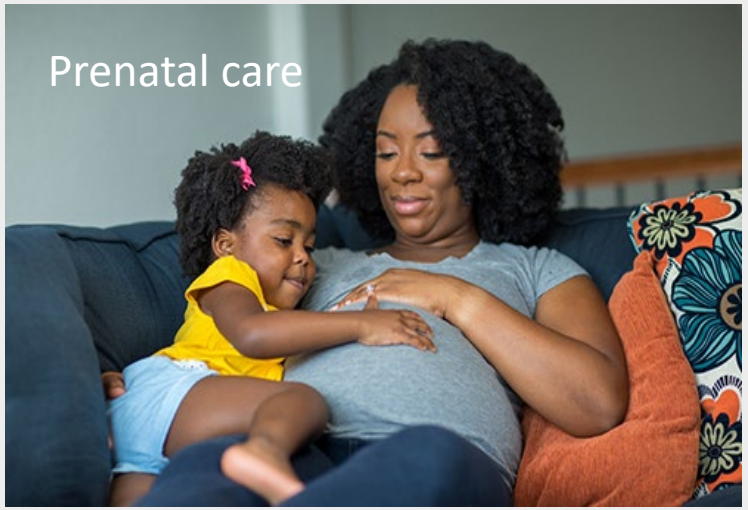
N=14,029

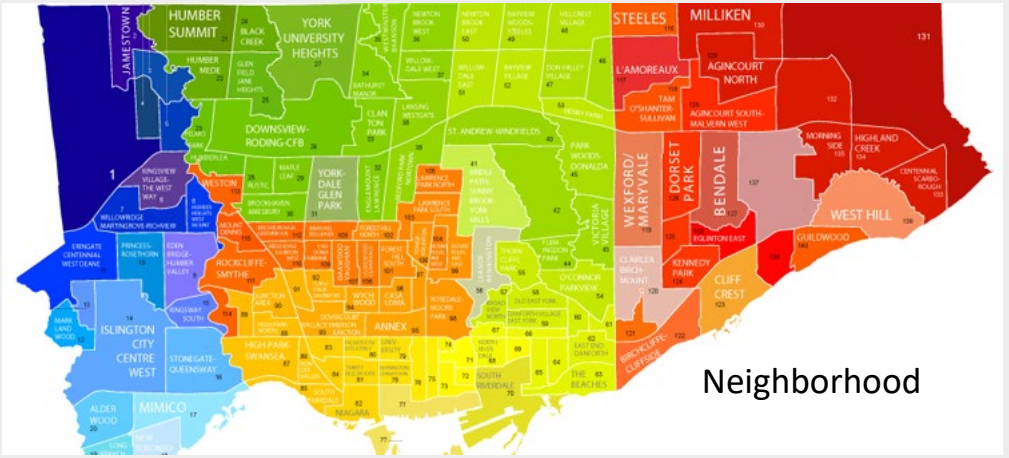
Social drivers of health

- Ethnicity
- Race
- Education level
- Insurance type



Limitations





Bayley™ (Pearson Assessments)

Conclusions

- In a multicenter US cohort of children born extremely preterm, Hispanic ethnicity was not associated with increased odds of survival to discharge without major morbidity.
  - Infants of Hispanic mothers had higher incidence of overall survival to discharge than those with non-Hispanic White mothers in adjusted, but not unadjusted, analyses.
  - Children of Hispanic mothers were 25% more likely to have neurodevelopmental impairment than children of non-Hispanic White mothers.

Acknowledgments

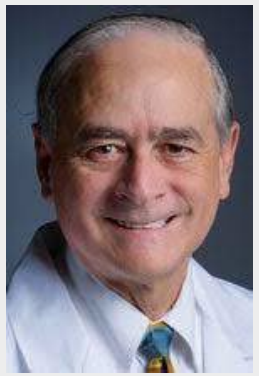
RTI
Carla Bann


Brown University
Betty Vohr & Liz McGowan

University of Pennsylvania
Andrea Duncan


University of Iowa
Ed Bell & Heidi Harmon

Stanford University
Susan Hintz

University of Alabama
Colm Travers & Wally Carlo

Neonatal Research Network Centers (2006-2020)

- Brown University
- Case Western Reserve University
- Children's Mercy Hospitals and Clinics, University of Missouri-Kansas City
- Cincinnati Children's Medical Center
- Duke University
- Emory University
- Indiana University
- Nationwide Children's Hospital, Ohio State University
- RTI International
- Stanford University
- Tufts Medical Center
- University of Alabama at Birmingham
- University of California – Los Angeles
- University of Iowa
- University of New Mexico
- University of Pennsylvania
- University of Rochester
- University of Texas Southwestern
- University of Texas Health Science Center
- University of Utah
- Wayne State University
- Yale University