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NEONATAL RESEARCH NETWORK

Redirection of Care in Relation to Social Determinants of Health for Infants Born Extremely Preterm

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

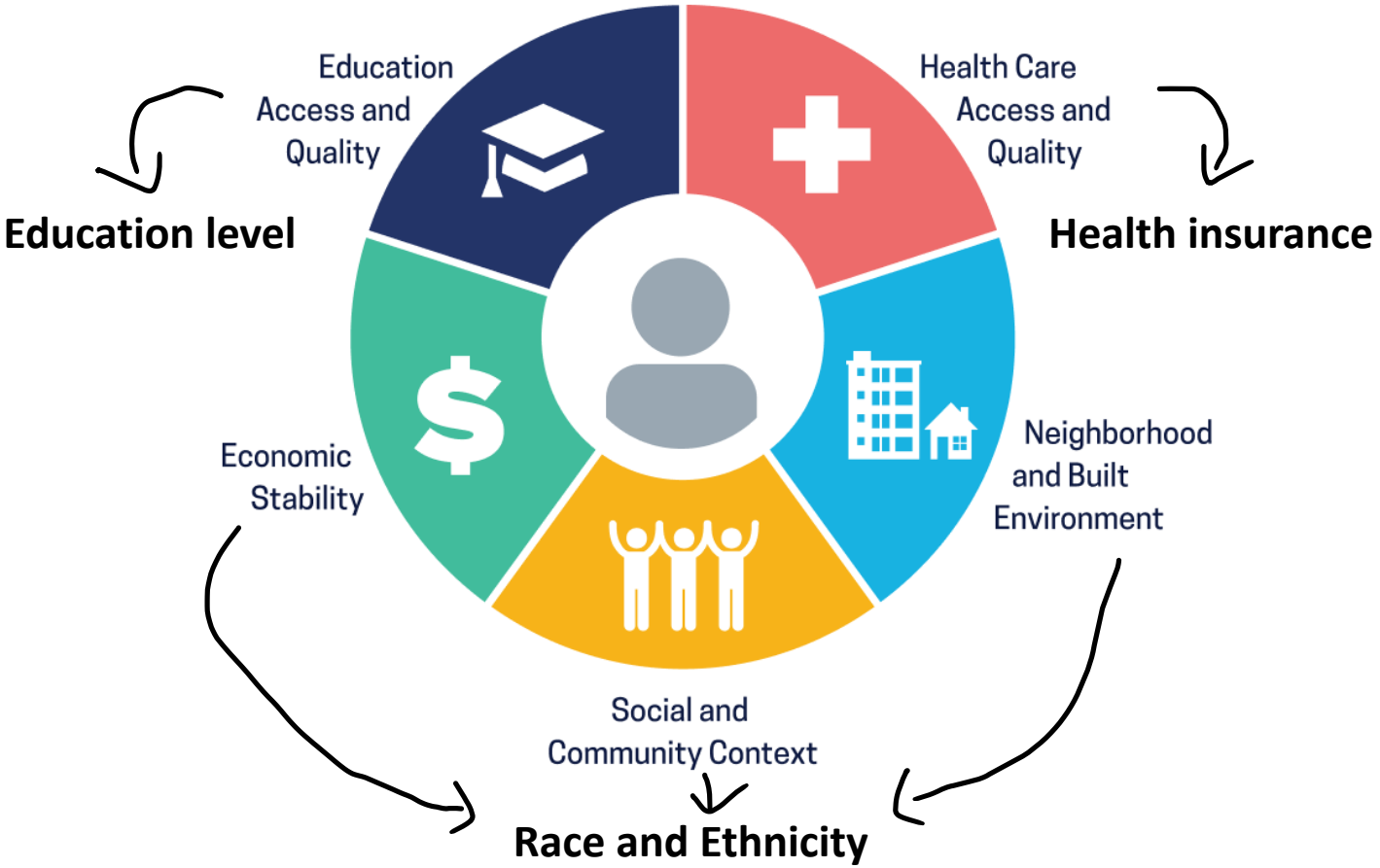
Disclosures

- Speaker: Jane E. Brumbaugh, MD
- Dr. Brumbaugh has no financial relationships to disclose or conflicts of interest to resolve.
- This presentation will not involve discussion of unapproved or off-label, experimental, or investigational use of a drug.

Introduction

- Redirection of care refers to shifting goals of care when the original goals are no longer achievable
- May include transition from intensive to palliative measures
  - Limitation of treatment
  - Withdrawal of treatment
  - Non-escalation of care

Maternal Social Determinants of Health

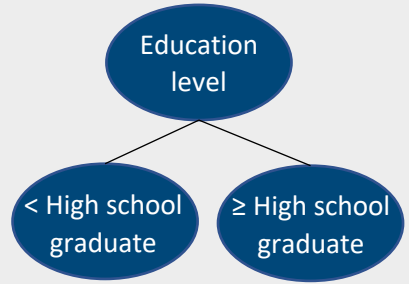


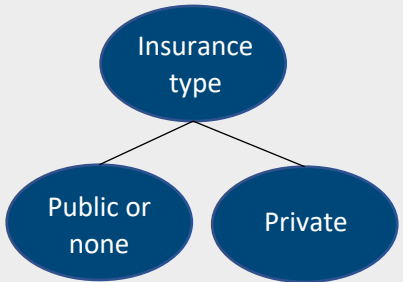
Objective

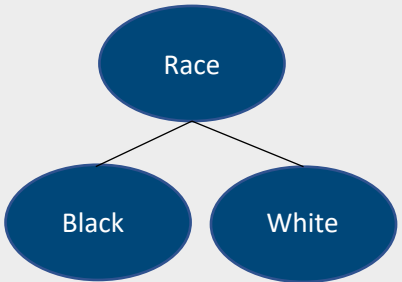
- To determine whether redirection of care discussion occurrence for infants born extremely preterm varied by four maternal sociodemographic characteristics:
  - Education level
  - Insurance type
  - Race
  - Ethnicity

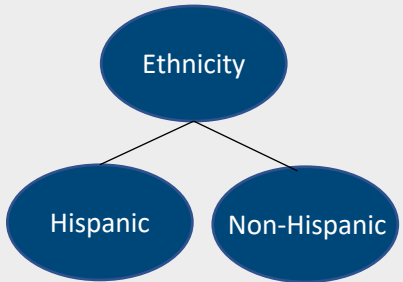
Methods

- Secondary analysis of a cohort born <29 weeks' gestation
  - Birth years 2011-2020
  - Follow-up at 22-26 months' corrected age
- Binary classification of maternal sociodemographic characteristics









Methods

- Outcomes compared using chi-square tests and t-tests
- Generalized linear mixed effect models to compute adjusted odds ratios or mean differences of outcomes for each individual SDH exposure

Methods

- Analyses adjusted for perinatal characteristics, infant morbidity, and center

Maternal Characteristics

- Maternal age
- Marital status
- Hypertension
- Multiple gestation
- Delivery mode
- Antenatal steroids

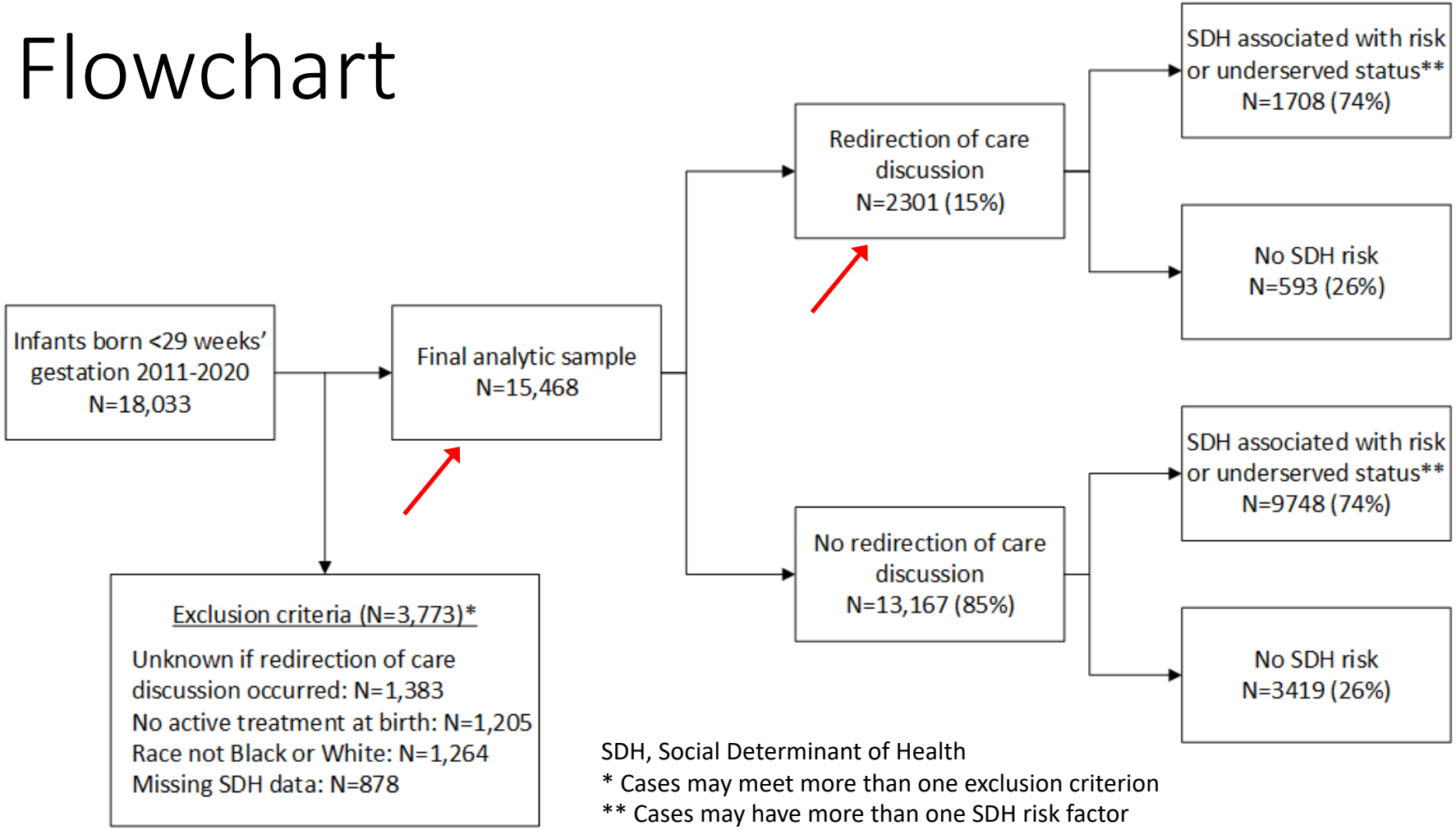
Infant Characteristics

- Infant sex
- Gestational age

Infant Morbidity

- Early- or late-onset sepsis
- Grade III/IV IVH or PVL
- Proven NEC
- ROP stage ≥3 or plus disease

Flowchart



SDH, Social Determinant of Health

* Cases may meet more than one exclusion criterion

** Cases may have more than one SDH risk factor

Characteristics

Characteristic % or mean (SD)	Redirection of Care Discussion Occurred					
	Education			Insurance		
	< High school graduate	≥ High school graduate	p-value	Public or None	Private	p-value
Maternal						
Hypertension	20%	28%	0.003	28%	27%	0.740
Multiple gestation	18%	28%	<0.001	23%	33%	<0.001
Antenatal steroids	79%	87%	<0.001	83%	91%	<0.001
Cesarean delivery	60%	62%	0.469	60%	64%	0.127
Infant						
Male sex	54%	56%	0.529	57%	54%	0.116
Gestational age (w)	24.4 (1.6)	24.6 (1.7)	0.138	24.5 (1.7)	24.6 (1.7)	0.873
Infant morbidity	67%	67%	0.875	68%	65%	0.214

Infant morbidity included EOS or LOS, grade III/IV IVH or PVL, proven NEC, and ROP stage ≥3 or plus dz

Characteristics

Characteristic % or mean (SD)	Redirection of Care Discussion Occurred					
	Race			Ethnicity		
	Black	White	p-value	Hispanic	Not Hispanic	p-value
Maternal						
Hypertension	33%	23%	<0.001	25%	28%	0.266
Multiple gestation	24%	29%	0.015	18%	28%	<0.001
Antenatal steroids	86%	87%	0.388	79%	87%	<0.001
Cesarean delivery	58%	64%	0.005	65%	61%	0.295
Infant						
Male sex	53%	58%	0.010	59%	56%	0.266
Gestational age (w)	24.4 (1.7)	24.7 (1.7)	<0.001	24.8 (1.7)	24.5 (1.7)	0.003
Infant morbidity	70%	64%	0.008	69%	66%	0.462

Infant morbidity included EOS or LOS, grade III/IV IVH or PVL, proven NEC, and ROP stage ≥3 or plus dz

Redirection of Care Discussion Documented

Characteristic	Adjusted	
	aOR* (95% CL)	p-value
Maternal		
Hypertension	1.26 (1.12, 1.42)	<0.001
Antenatal steroids	0.67 (0.57, 0.79)	<0.001
Multiple gestation	1.01 (0.89, 1.13)	0.928
Cesarean section	1.14 (1.01, 1.27)	0.027
Infant		
Male sex	1.28 (1.16, 1.42)	<0.001
Gestational age (weeks)	0.59 (0.57, 0.61)	<0.001
Neonatal morbidity	1.80 (1.62, 2.01)	<0.001
Social determinants of health		
Less than high school education	0.95 (0.82, 1.11)	0.516
Public/no insurance	0.99 (0.87, 1.12)	0.854
Black race	0.85 (0.75, 0.96)	0.009
Hispanic ethnicity	0.75 (0.62, 0.91)	0.003

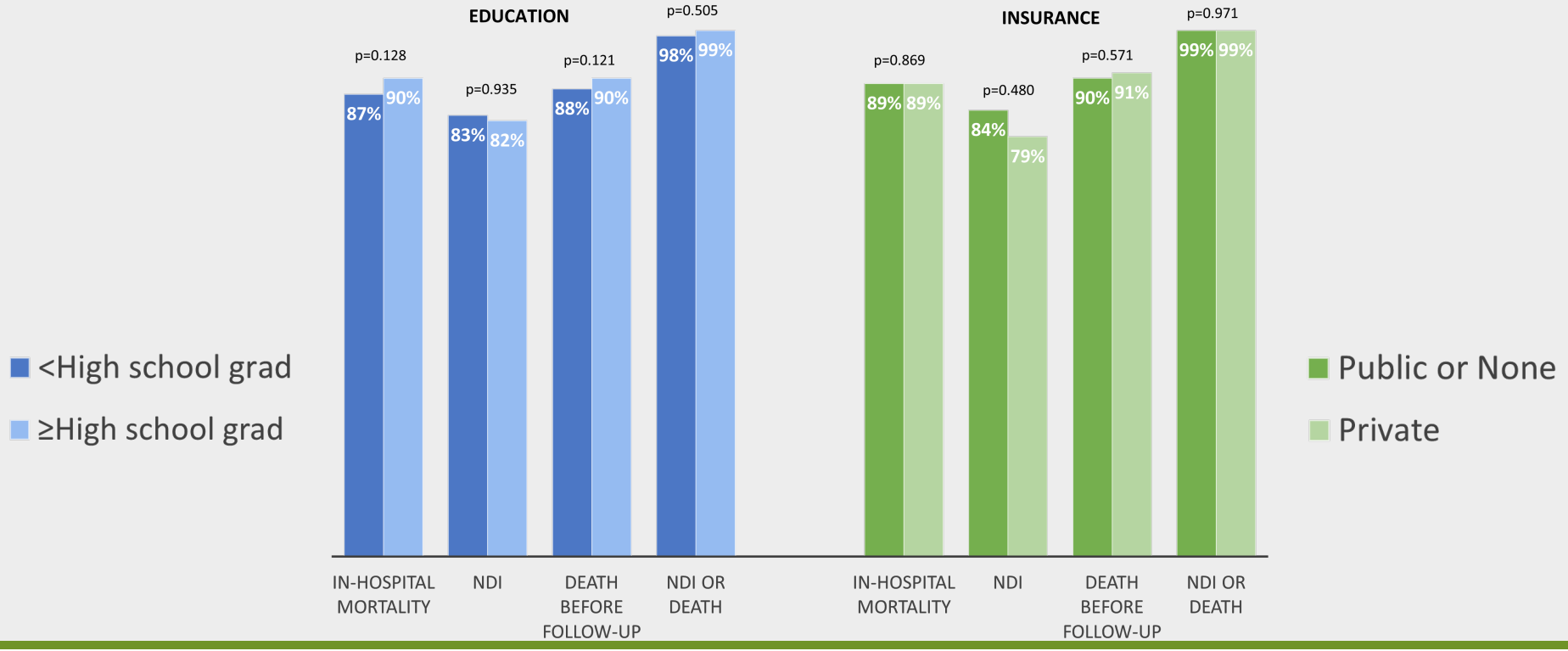
*Adjusted for perinatal characteristics, infant morbidity, and center

Redirection of Care Occurred

Characteristic	Adjusted	
	aOR* (95% CL)	p-value
Maternal		
Hypertension	1.32 (1.16, 1.50)	<0.001
Antenatal steroids	0.67 (0.56, 0.79)	<0.001
Multiple gestation	1.07 (0.95, 1.21)	0.272
Cesarean section	1.11 (0.98, 1.25)	0.102
Infant		
Male sex	1.27 (1.14, 1.41)	<0.001
Gestational age (weeks)	0.60 (0.58, 0.62)	<0.001
Neonatal morbidity	1.66 (1.48, 1.86)	<0.001
Social determinants of health		
Less than high school education	0.91 (0.77, 1.08)	0.286
Public/no insurance	0.98 (0.86, 1.12)	0.778
Black race	0.74 (0.65, 0.85)	<0.001
Hispanic ethnicity	0.68 (0.56, 0.84)	<0.001

*Adjusted for perinatal characteristics, infant morbidity, and center

Outcomes following Redirection Discussion



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NDI, neurodevelopmental impairment: moderate or severe cerebral palsy, gross motor function classification system level ≥2, Bayley-III cognitive composite score <85, bilateral blindness, or hearing impairment ± amplification

Outcomes following Redirection Discussion

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Outcomes by Number of Risk-Associated Social Determinants of Health

	Redirection of Care Discussions Occurred Number of Social Determinants of Health Associated with Risk or Under-Resourced Status				
Outcome	**0 (N=593)**	**1 (N=674)**	**2 (N=798)**	**≥ 3 (N=236)**	**p-value**
In-hospital mortality (birth hospitalization)	92%	88%	90%	84%	0.019
NDI among survivors	65%	83%	91%	79%	0.065
Death before follow-up	92%	90%	90%	85%	0.027
NDI or death	99%	99%	99%	98%	0.232

NDI, neurodevelopmental impairment

Outcomes by Number of Risk-Associated Social Determinants of Health

	Redirection of Care Discussions Occurred		
	Number of Social Determinants of Health Associated with Risk or Under-Resourced Status		
Outcome	**1 vs. 0**	**2 vs. 0**	**≥ 3 vs. 0**
	aOR‡ (95% CL)	**aOR‡ (95% CL)**	**aOR‡ (95% CL)**
In-hospital mortality (birth hospitalization)	0.63 (0.42, 0.94)*	0.66 (0.42, 1.02)	0.45 (0.26, 0.78)^
NDI among survivors	4.05 (0.99, 16.49)	6.24 (1.17, 33.13)*	3.82 (0.56, 26.12)
Death before follow-up	0.67 (0.44, 1.02)	0.66 (0.42, 1.04)	0.45 (0.25, 0.79)^
NDI or death	0.89 (0.32, 2.47)	1.40 (0.39, 5.02)	0.51 (0.13, 2.08)

‡Adjusted for perinatal characteristics, infant morbidity, and center
*p<0.05, ^p<0.01

Conclusions

- Redirection of care discussions and actions occurred less frequently for infants with Black or Hispanic mothers
- For infants with redirection of care discussions
  - In-hospital mortality was lower for children with Hispanic mothers than non-Hispanic mothers
  - Neurodevelopmental impairment occurred more frequently for children with Black mothers than White mothers
  - Mortality was lower for children exposed to risk-associated social determinants of health than for those unexposed

Limitations

- Unmeasured variables (religion, culture, medical mistrust) may have impacted redirection discussion occurrence
- Race and ethnicity abstracted from maternal medical record
- Whether redirection of care presented as an option or as a recommendation unavailable
- Lacked data on race and ethnicity of physicians
- Discussion documentation may have been more consistent when transition to palliative care occurred

Neonatal Research Network Centers (2011-2021)

- 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
- 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