The Ties that Bind: Redefining MCH in the Age of Chronic Disease Management, Social Determinants of Health, and Interconceptional Care

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Director

January 28, 2011

National Center for Chronic Disease Prevention and Health Promotion

Division of Reproductive Health

Outline

- Mission, Structure, and New Vision of DRH
- Integration of Chronic Disease with MCH
- Chronic Disease Prevention; the Role of Reproductive Health
- Winning Battles, Transforming Communities, Improving Systems
- Implications for Practice

MCH and Chronic Disease: The Game of Double Dutch

When do you jump in?

Division of Reproductive Health

Mission:

To promote optimal reproductive and infant health and quality of life by influencing public policy, health care practice, community practices, and individual behaviors through scientific and programmatic expertise, leadership and support.

Promote Healthy Reproduction for a Healthy Future

CDC's Safe Motherhood and Infant Health Initiative: Priority Areas

Infant Health:

Promoting the health and well-being of infants

Maternal Health:

Advancing the health of mothers

Women's Reproductive Health:

Improving health through research

Unintended and Teen Pregnancy Prevention:

Preventing teen and unintended pregnancies

Global Reproductive Health:

Committed to a healthier world

Infant Health

Preterm Birth

- Surveillance, research, and programs
- Translation of new research discoveries into public health prevention strategies
- Supporting community-based prevention programs among minority women

Sudden Unexpected Infant Death

- National initiative to improve the accuracy/consistency of reporting and classifying SUID deaths.

Maternal Health

PRAMS

- Ongoing, population-based, state-based surveillance system of women delivering live infants

Maternal and Child Health Epidemiology Program

- Builds state capacity to use and apply sound epidemiologic -scientific information to maternal and child health programs and policies.

Emergency Preparedness and Response

- Comprehensive preparedness plan focused on reproductive and perinatal health

Women's Reproductive Health

Chronic Disease Integration

- Monitoring chronic disease and chronic disease risk factors among women of reproductive age
  - Smoking
  - Hypertension
  - Diabetes

Assisted Reproductive Technology Surveillance

- Annual ART success rates report
- Data linkage to assess birth outcomes

Teen and Unintended Pregnancy Prevention

Teen Pregnancy Prevention

- Cooperative agreements to increase capacity of local organizations

Contraceptive Safety, Effectiveness and Use

- U.S.-specific adaptation of Medical Eligibility Criteria for Contraceptive Use

Interventions to Prevent HIV, STD, and Unintended Pregnancy

- Research assessing efficacy of biomedical and behavioral interventions

Global Reproductive Health

Maternal/Perinatal Mortality Prevention

- Sub-Saharan Africa
- Latin America
- Afghanistan

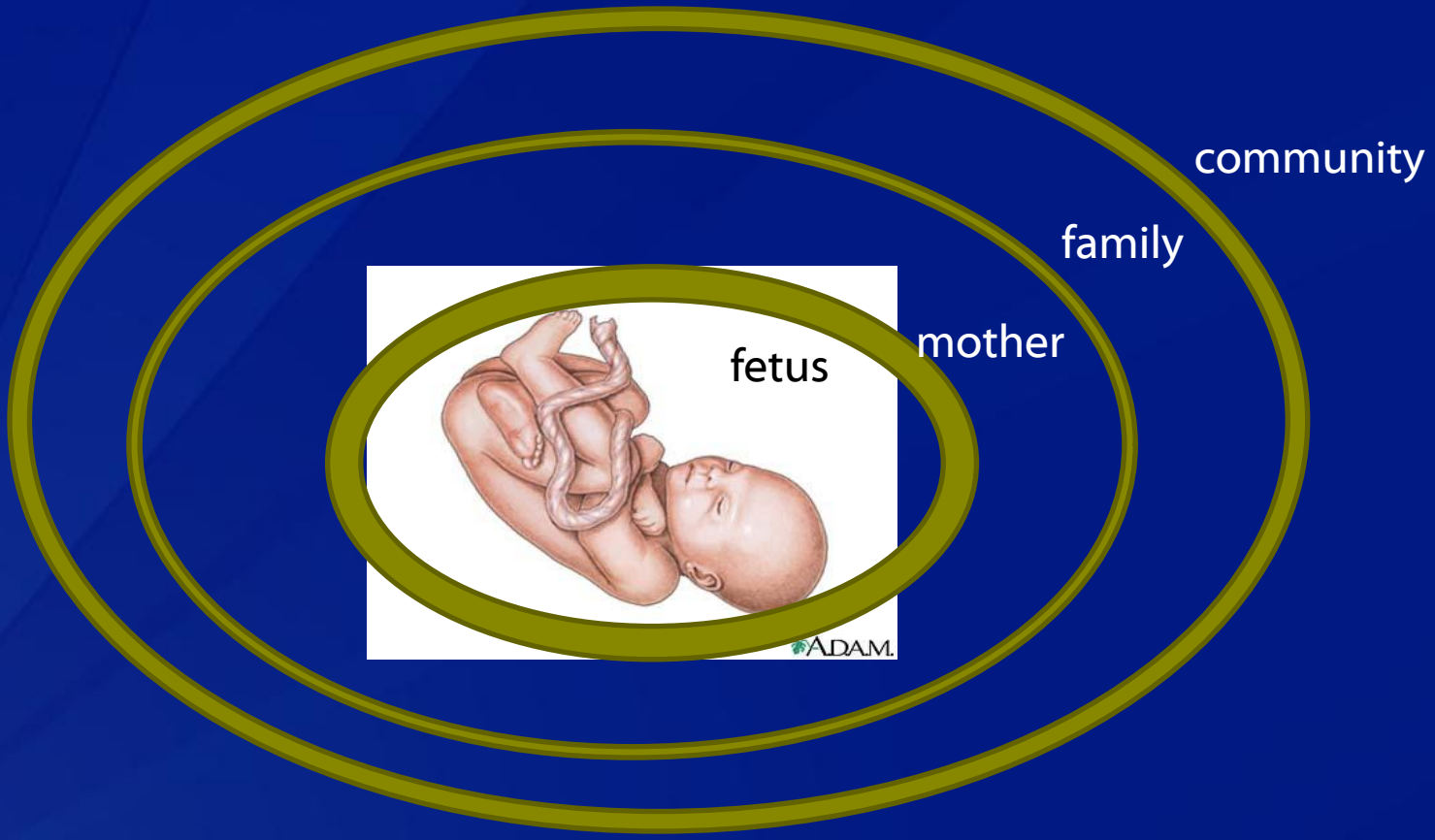
Technical Assistance

- Assessing the reproductive health needs of conflict-affected and refugee populations
- Collaboration with global partners

Beginning with the end in mind

Optimal maternal health for optimal infant and child health

Disparities in Chronic Disease and the Risk to the Fetus

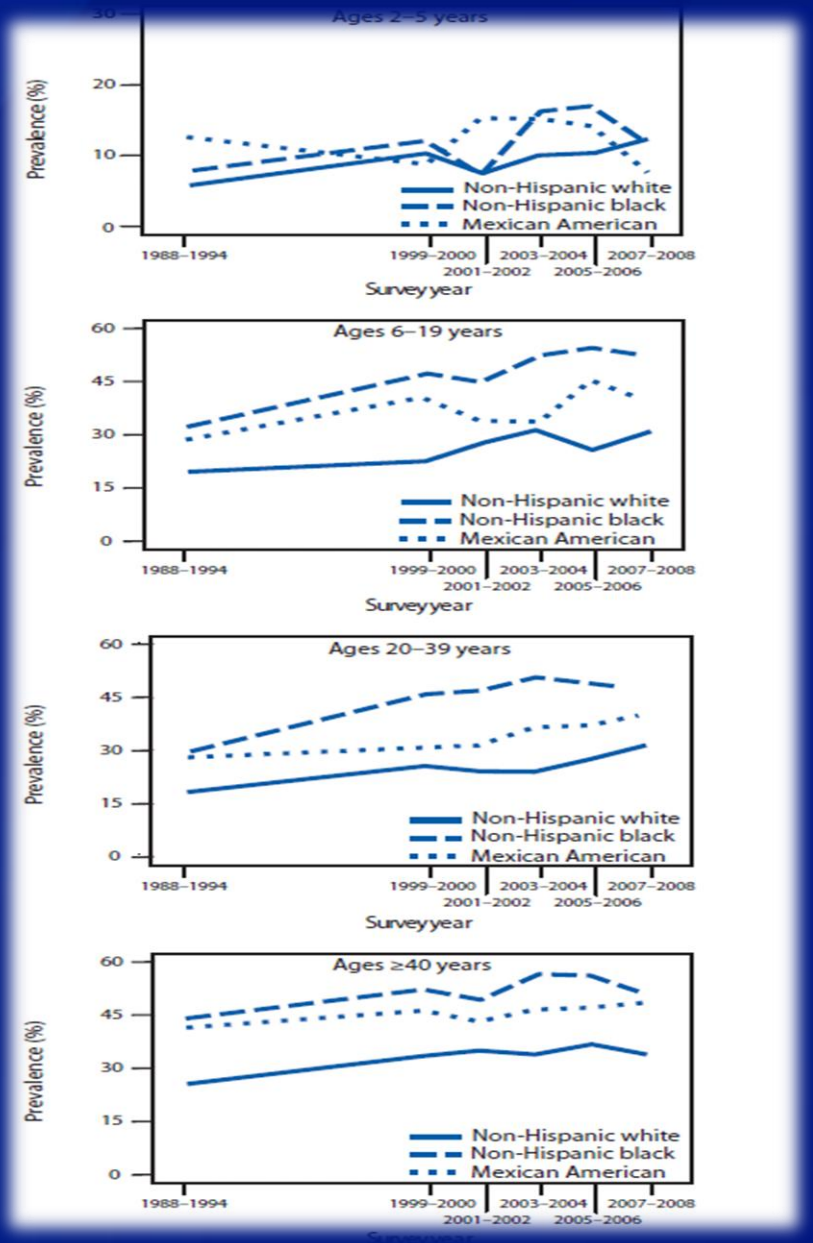


Prevalence of Current Asthma among Children by Race/Ethnicity and Poverty Level, U.S., 2006-2008

	Children Overall		Non-poor Children	
Race/Ethnicity	Prevalence (%)	95 % CI	Prevalence (%)	95 % CI
White, non-Hispanic	8.2	(7.6--8.9)	7.6	(7.0--8.3)
Black, non-Hispanic	14.6	(13.4--15.9)	13.6	(11.8--15.7)
Multiracial	13.6	(11.1--16.6)	9.2	(6.4--13.2)
Hispanic, Puerto Rican descent**	18.4	(14.9--22.5)	14.0	(10.0--19.3)

Source: National Health Interview Survey; Children aged 0-17 years

Prevalence of Obesity among Females by Age Group and Race/Ethnicity in US over time



Source: National Health and Nutrition Examination Survey—1988-1994 and 1999-2008

Age-Adjusted Prevalence of Medically Diagnosed Diabetes among Female Adults by Selected Characteristics, U.S., 2004 and 2008

	2004		2008	
Race/Ethnicity	Prevalence (%)	95 % CI	Prevalence (%)	95 % CI
Female, White, non-Hispanic	5.4	(4.8--6.0)	6.7	(6.1--7.3)
Female, Black, non-Hispanic	10.7	(9.1--12.3)	11.4	(9.8--13.0)
Female, Asian	8.6	(2.1--15.1)	7.2	(4.9--9.6)
Female, Hispanic	10.5	(8.9--12.1)	10.5	(9.9--11.1)

Source: National Health Interview Survey; Adults aged 18+ years

Number and Rate* of Deaths due to Coronary Heart Disease and Stroke, U.S. 2006

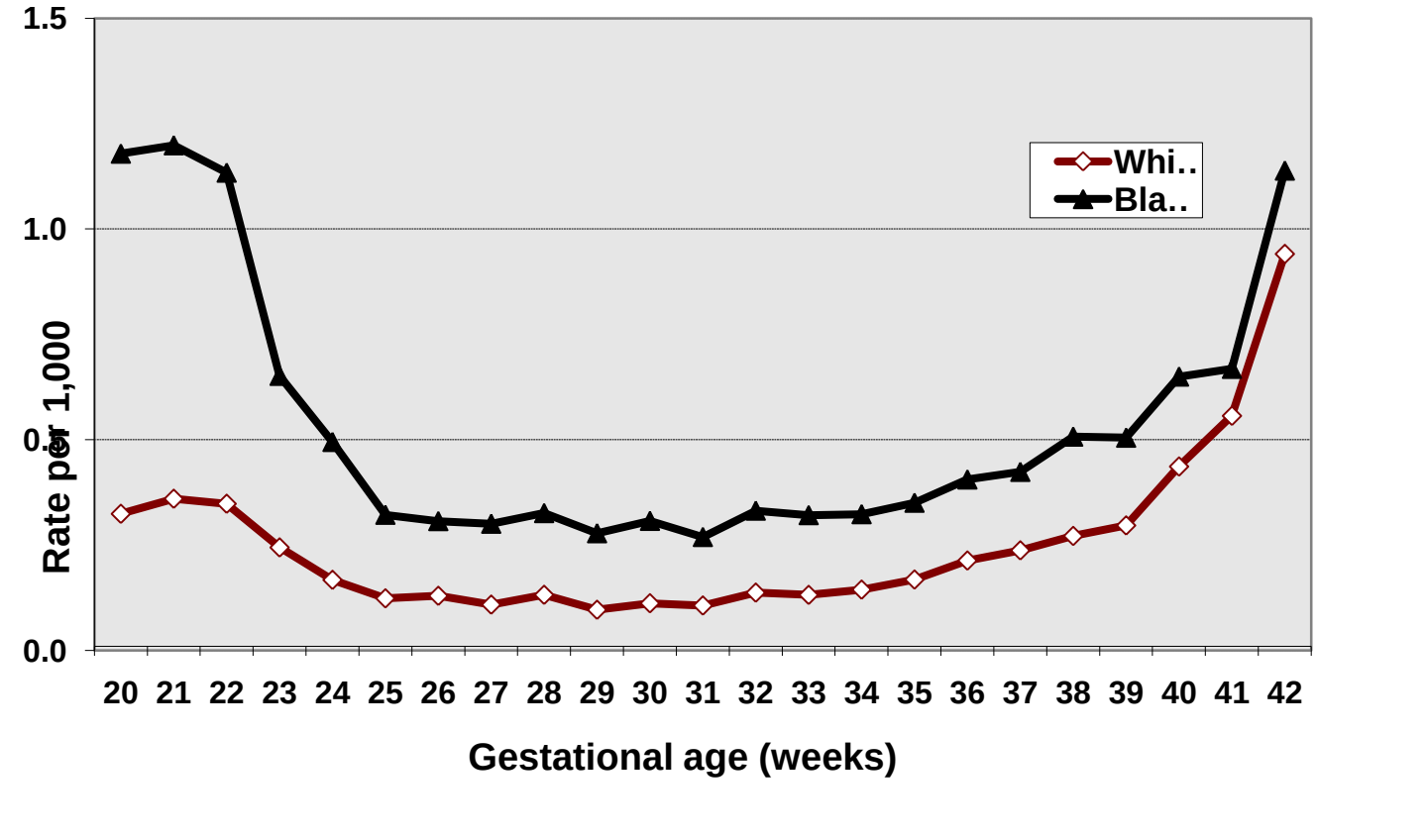
	Heart Disease		Stroke	
Race/ Ethnicity	N	rate	N	rate
American Indian/Alaska Native	1,880	97.4	548	29.4
Asian/ Pacific Islander	7,570	77.1	3,662	37.0
Black	44,530	161.6	17,045	61.6
White	371,445	134.2	115,864	41.7
Hispanic	20,939	106.4	7,005	34.2
Non-Hispanic	403,588	136.8	129,892	44.0

Source: National Center for Health Statistics, CDC

Impact of Maternal Health Disparities on Fetal and Infant Health Disparities

- Stillbirths
- Infant Death
- Birth Defects
- Growth Restriction
- Preterm Birth

Stillbirths, U.S. Whites vs Blacks, 2003-05

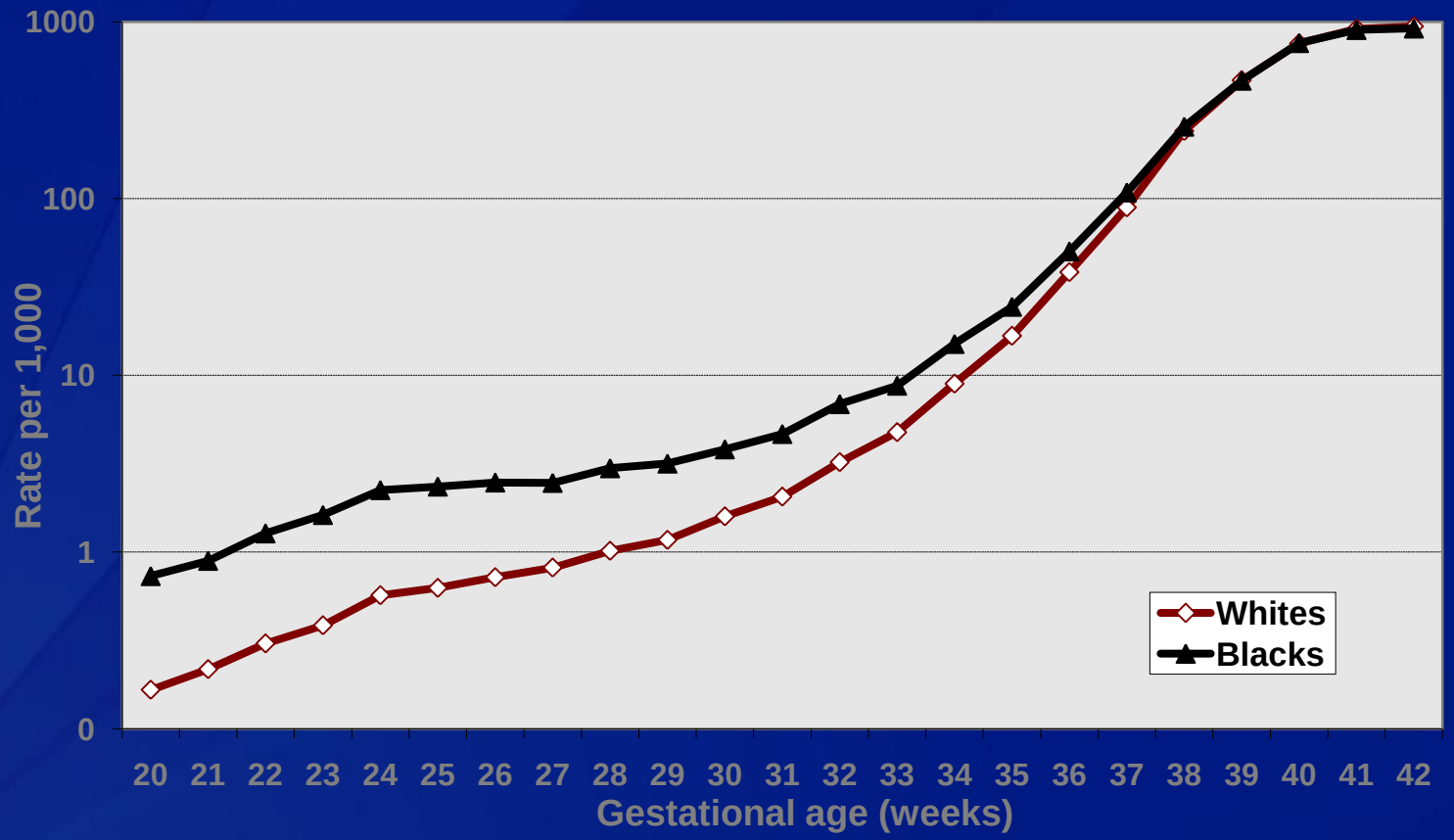


U.S. Infant Mortality, 2006

Maternal race/ethnicity	Infant mortality rate	Difference compared with non-Hispanic white mothers (%)
American Indian/Alaska Native†	8.28	48.4§
Asian/Pacific Islander†	4.55	–18.5§
Black, non-Hispanic	13.35	139.2§
White, non-Hispanic	5.58	Ref.
Hispanic, total¶	5.41	–3.0
Central or South American	4.52	–19.0§
Cuban	5.08	–9.0
Mexican	5.34	–4.3§
Puerto Rican	8.01	43.5§
Total	6.68	—

Source: National Center for Health Statistics, CDC

Live Births by Gestational Age U.S. Whites vs Blacks, 2003-05



Maternal Chronic Disease Results in Preterm Birth

Examples:

- Chronic hypertension
- Systemic lupus erythematosus
- Lung disease
- Hyperthyroidism
- Pregestational diabetes mellitus
- Cardiac disease
- Asthma
- Gestational diabetes mellitis
- Pregestational renal disorders
- Hypertensive disorders of pregnancy

Consequences of Preterm Birth

Lung problems
- Broncho-pulmonary dysplasia
- Reactive airways disease/asthma

Cardiovascular problems
- SIDS
- Cardiac disorders

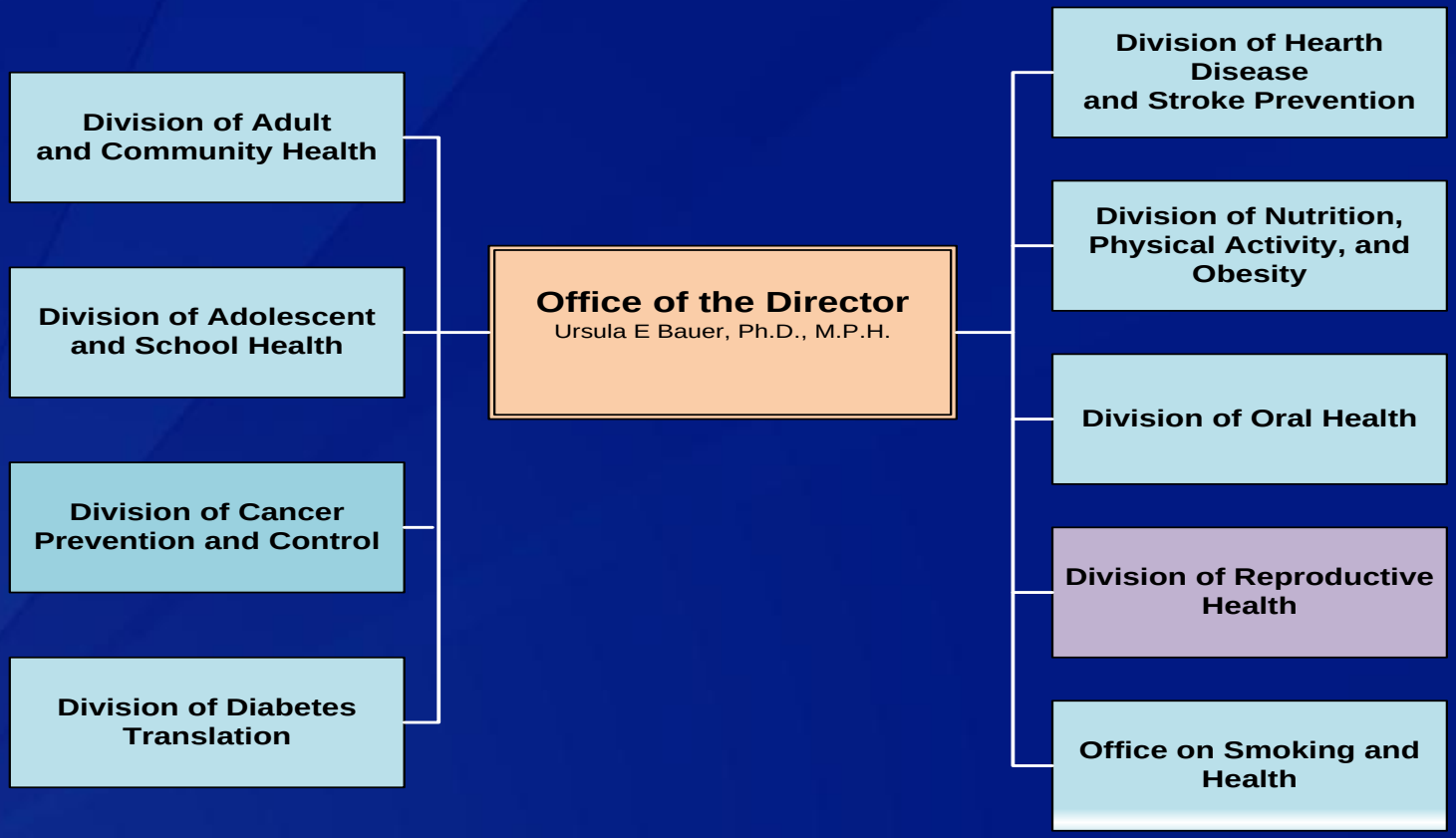
Renal problems
- Hypertension

Developmental problems
- Intraventricular hemorrhage
- Cerebral palsy
- Mental Retardation

Metabolic problems

Chronic Disease

National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP)



NCCDPHP Action Areas

Public Health Infrastructure

- Surveillance
- Applied research
- Capacity building /workforce

Healthy Communities

- Tobacco control
- Nutrition and physical activity
- Child and adolescent health
- Oral health
- Sexual health

Healthy Care Environments

- Promote delivery of clinical preventive services
- Chronic disease management
- Healthy schools and work environments

CDC Working With Communities

- REACH
- ACHIEVE
- Strategic Alliance for Health
- Prevention Research Centers
- Communities Putting Prevention to Work
- Community Transformation Grants

CDC's Key Winnable Battles

Healthcare-Associated Infections

Nutrition, Physical Activity, Obesity & Food Safety

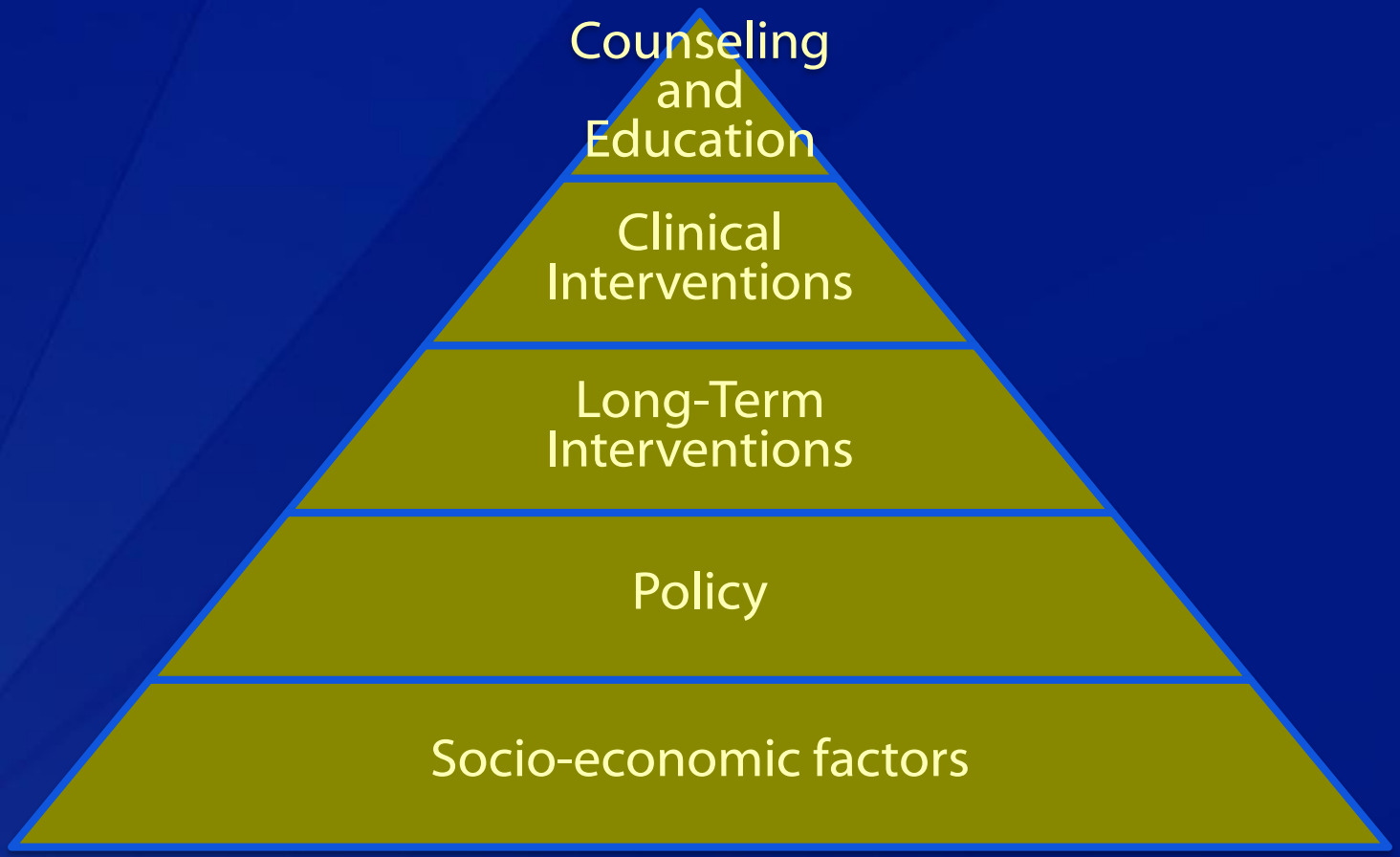
HIV

Teen Pregnancy

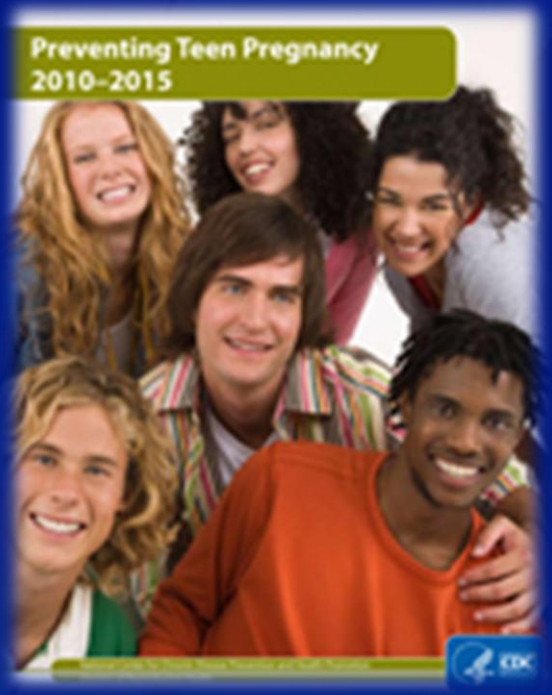
Motor Vehicle Injuries

Tobacco

Dr. Frieden's Public Health Pyramid

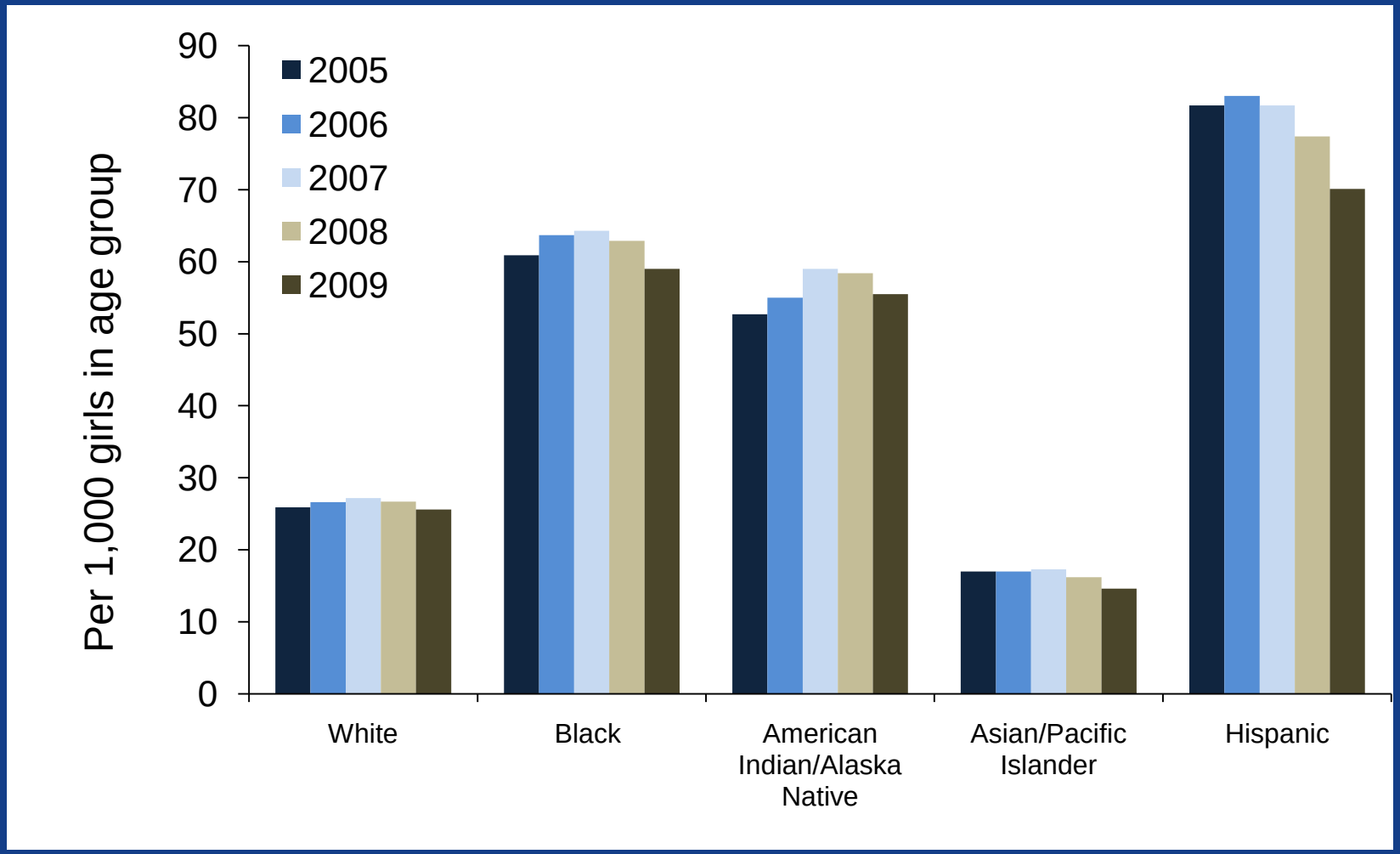


Teen Pregnancy as a Winnable Battle



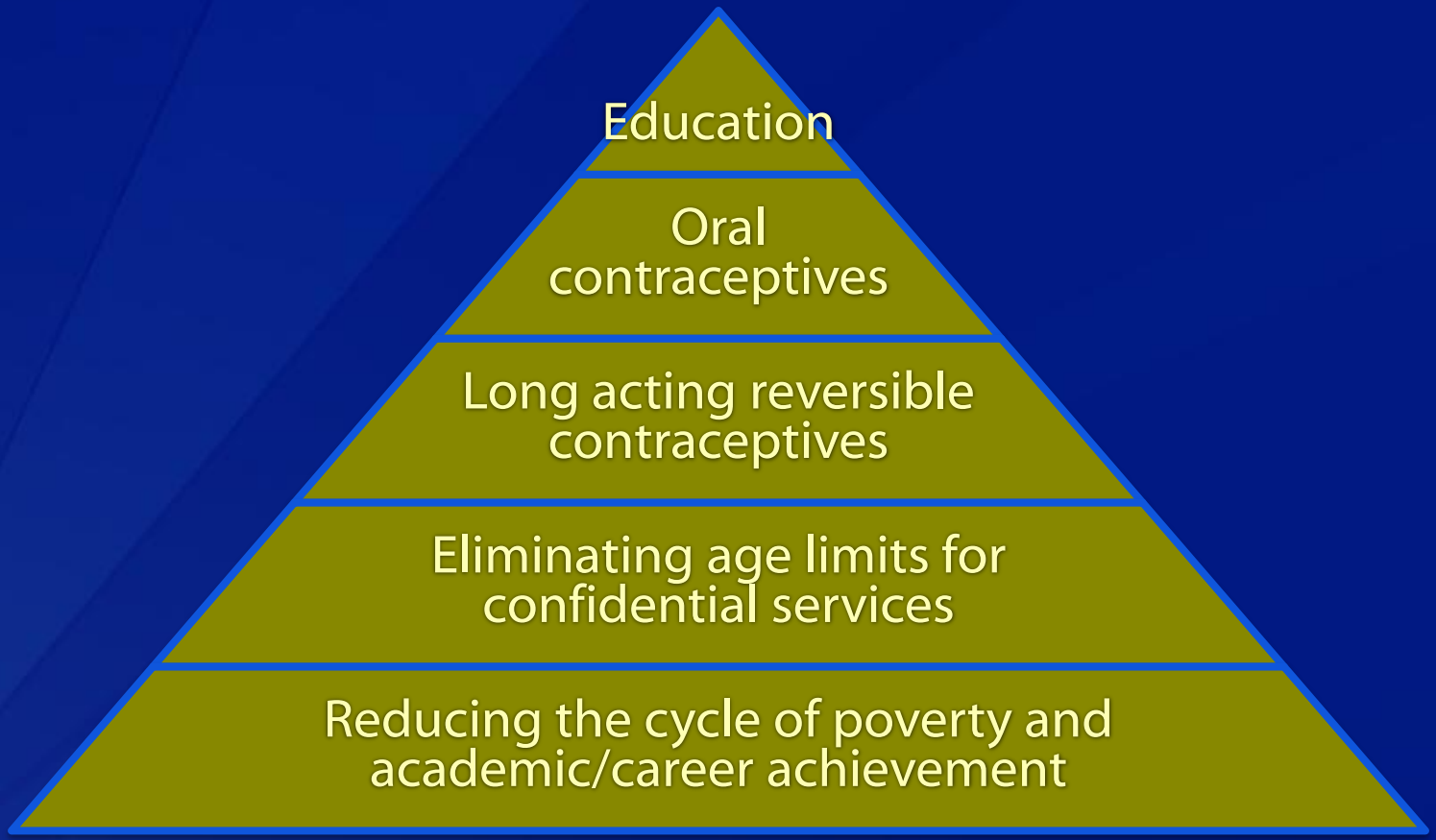
www.cdc.gov/teenpregnancy

Birth Trends by Race/Ethnicity, Girls 15-19



Source: National Center for Health Statistics

CDC's Approach to Teen Pregnancy Prevention



CDC is Working in Communities with High Teen Birth Rates

- Enhancing community partnerships & Improving access to family planning
- Promoting evidence-based prevention programs and policies
- Working with diverse communities—especially African American and Latina youth

Grantees are funded, in part, through a collaboration with the HHS Office of Adolescent Health, President's Teen Pregnancy Prevention Initiative and the Office of Population Affairs, Title X Program.

Jumping in: An example

REVIEW

Perinatal Regionalization for Very Low-Birth-Weight and Very Preterm Infants

A Meta-analysis

Sarah Marie Lasswell, MPH
Wanda Denise Barfield, MD, MPH
Roger William Rochat, MD
Lillian Blackmon, MD

Context For more than 30 years, guidelines for perinatal regionalization have recommended that very low-birth-weight (VLBW) infants be born at highly specialized hospitals, most commonly designated as level III hospitals. Despite these recommendations, some regions continue to have large percentages of VLBW infants born in lower-level hospitals.

Objective To evaluate published data on associations between hospital level at birth and neonatal or predischarge mortality for VLBW and very preterm (VPT) infants.

Data Sources Systematic search of published literature (1976–May 2010) in MEDLINE, CINAHL, EMBASE, and PubMed databases and manual searches of reference lists.

Study Selection and Data Extraction Forty-one publications met a priori inclu-

THE CONCEPT OF ORGANIZING perinatal services within geographic regions emerged in the

Perinatal Regionalization and Levels of Neonatal Care

Background

- Emerged in the late 1960s, first published guidelines in 1976.
- System of organizing perinatal care within geographical regions.

Levels of Neonatal Care

Level I

- Basic, uncomplicated neonatal care

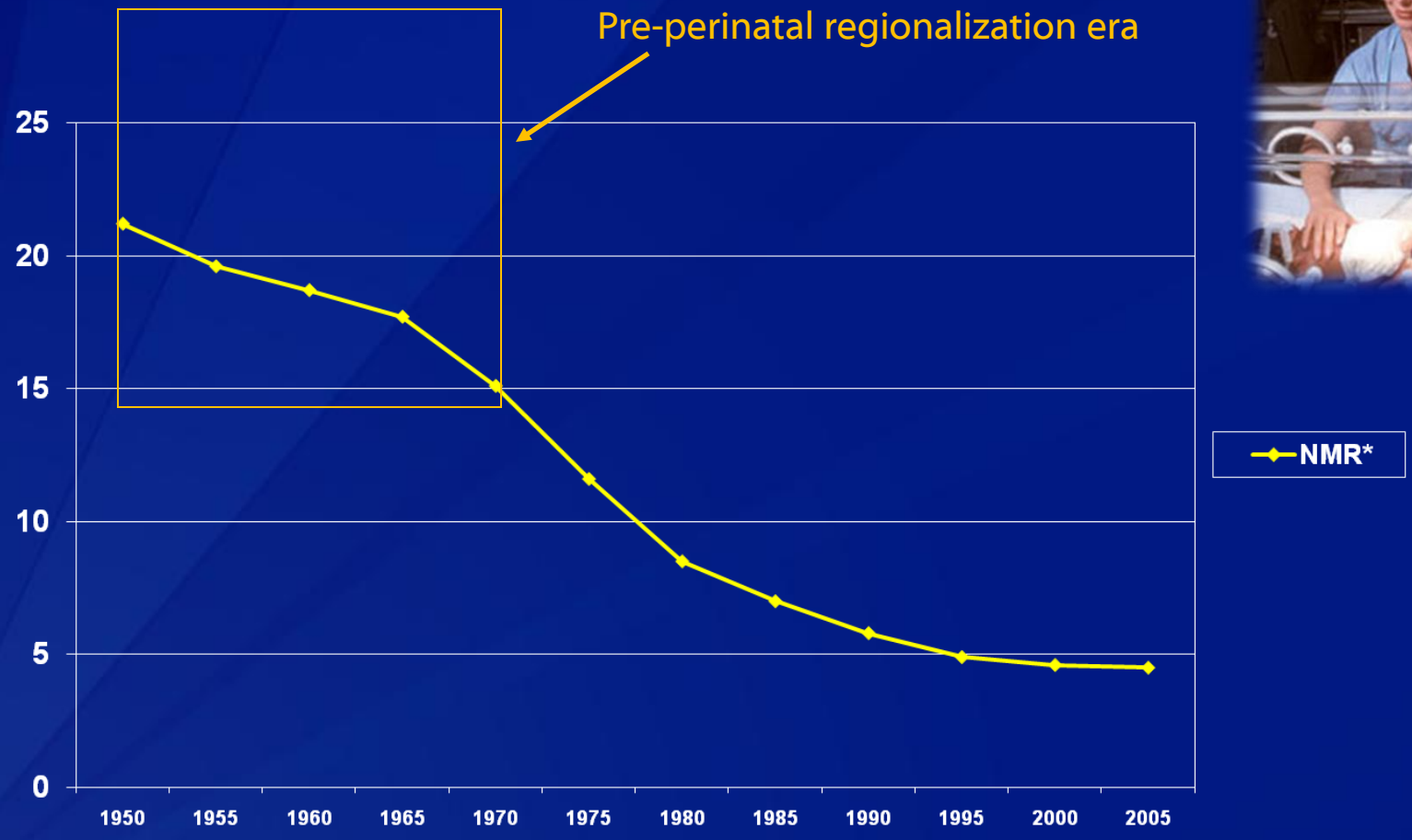
Level II

- Care for moderately-ill neonates expected to resolve quickly

Level III

- Equipped to handle serious neonatal illnesses and abnormalities, including very low birth weight infants (VLBW) (<1500g)

U.S. Trends in Neonatal Mortality: Advances in Intensive Care



*NMR=neonatal mortality rate: # deaths to infants <28 days/1,000 live births

Current Problems/Challenges

Disintegrating Systems of Regionalization

- Poor/uninsured most vulnerable
  - Potential increase risk for VLBW or critically ill newborns

Stagnant/Increasing Infant Mortality

- Approx 55,000 VLBW births/year
  - 2% of US births
  - 50% of US infant deaths
  - Survivors: major contributor to long-term morbidity

Ineffective Guidelines

- Essentially unchanged from previous versions for level III
- Slow adoption by stakeholders
- Inconsistent classification/definitions

Questions

Evidence

- How important is the level of hospital at birth to VLBW survival?

Policy

- What are the existing state policies on neonatal levels of care? Are they effective?

Data to action

- How can the existing data inform policy and improve practice?

Evidence: Level of Care and VLBW Outcomes

Meta-analysis of published literature over 30 years

Methods:

- Cochrane Database guidelines for literature search
  - a-priori inclusion/exclusion criteria
- Systematic data coding and abstraction of each publication with independent reviewers using standardized forms
  - ORs 95% CIs
  - Rates, %s, counts
- Additional subgroup analysis characteristics
  - Study design, location, population-based data, control of confounding, outcome, data source, birth weight subgroups, hospital level of comparison

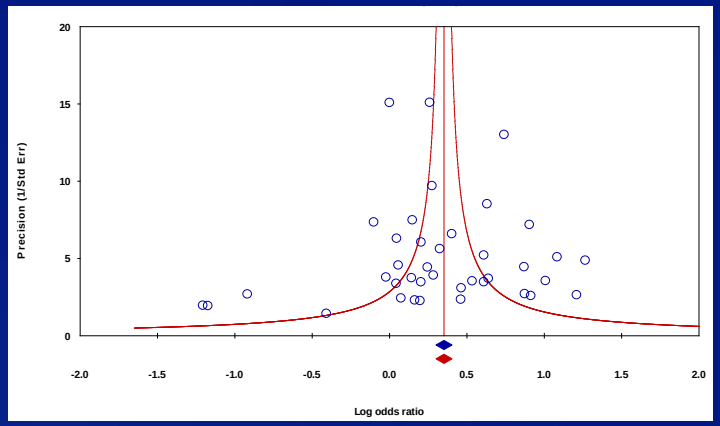
Lasswell, Barfield, Rochat, Blackmon: JAMA 2010

Evidence

- **41 studies published between 1978 and 2008**
- **Combined study population of 113,144 VLBW infants.**

- No Evidence of Publication Bias

Funnel Plot:



Egger' Test of the Intercept: Insignificant (p=0.825)

- One-Study-Removed Sensitivity Analysis: Clear

Mortality at Non-Level II Hospitals

Overall Weighted, Combined Odds Ratio

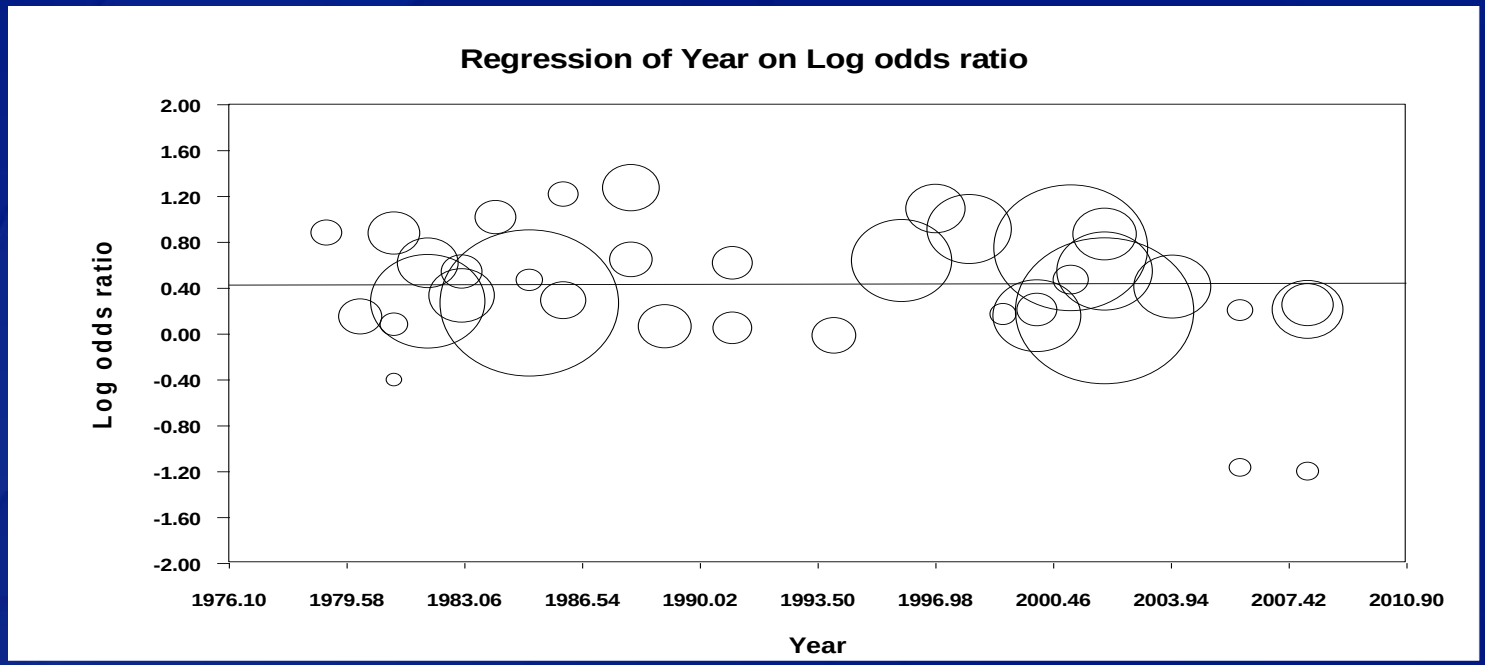
- VLBW (≤1500g) infants (37 studies)
- OR 1.62, 95% CI 1.44-1.83

Comparison Subsets

- ELBW (≤1000g) infants (4 studies)
- OR 1.64 95% CI 1.14-2.36
- Very Preterm (≤32 weeks) infants (4 studies)
- OR 1.55, 95% CI 1.21, 1.98

Change in Evidence Over Time

Meta-Regression of log odds ratio by year of publication did not show a change in effect over time (slope 0.000, p value= 0.87).



Lasswell, Barfield, Rochat, Blackmon: In Preparation

Policy: State Roles in the Provision of Neonatal Services

States regulate health care services and facilities

- License hospitals
- Promulgate State Health Plans/Regulations
- Approve facility expansion and construction
- Implement Title V programs ($)

Studies: all 50 states and DC

- Definitions
- Performance measures/outcomes

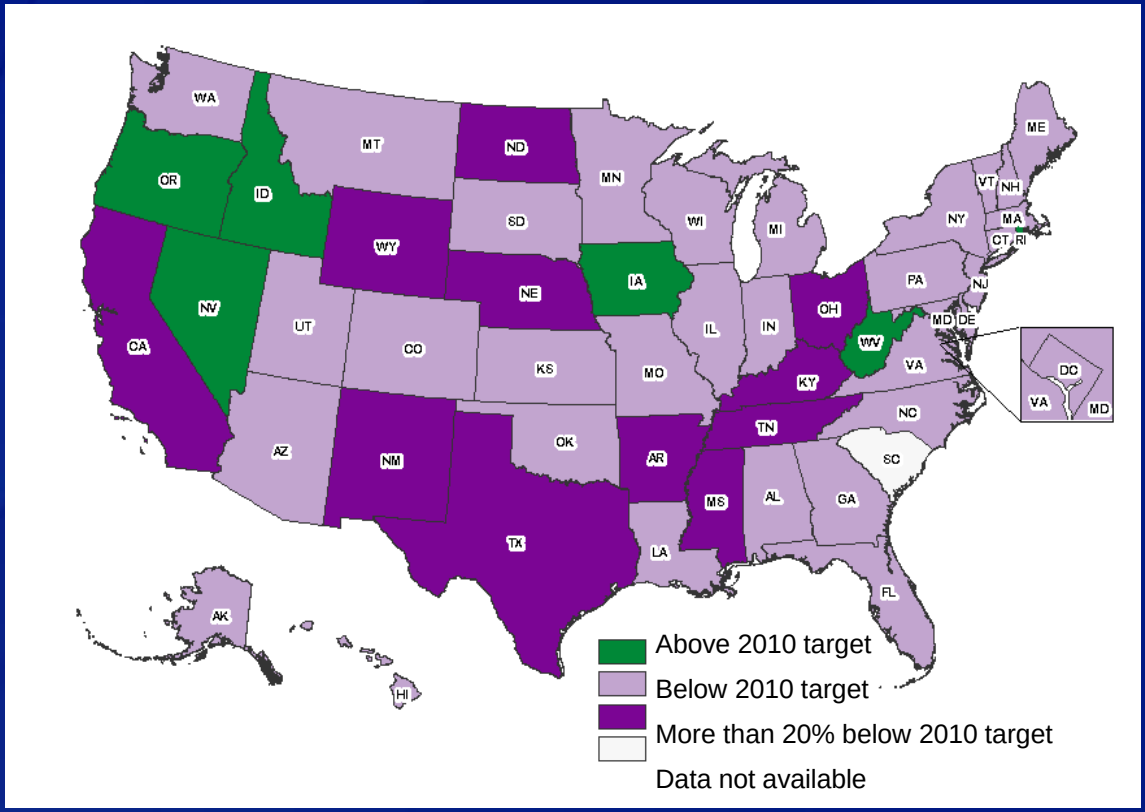
*Blackmon, Barfield, Stark *J Perinatol 2009*

State Definitions for Levels of Neonatal Services

None	Named Beds/Units	Two Levels	Three Levels	Four Levels	Five or More Levels
Arkansas	Alaska	Oklahoma	California	Alabama	Arizona
New Hampshire	Connecticut	Rhode Island	Hawaii	Florida	Colorado
South Dakota	District of Columbia	Wisconsin	Kansas	Georgia	Delaware
	Idaho		Kentucky	Louisiana	Illinois
	Michigan		Maine	Massachusetts	Indiana
	Minnesota		Mississippi	New Jersey	Iowa
	Missouri		Nevada	New York	Maryland
	Montana		Ohio	North Carolina	South Carolina
	Nebraska		Pennsylvania	Tennessee	Washington
	New Mexico		Texas	Virginia	
	North Dakota		Utah		
	Oregon				
	Vermont				
	West Virginia				
	Wyoming				

*Blackmon, Barfield, Stark *J Perinatol 2009*

HRSA/MCHB Performance Measure #17: Percent of VLBW Infants Delivered at Facilities for High Risk Deliveries and Neonates by State



*Goal: 90%

Data to Action

- Expanded birth certificate, 2003 version
- Data on NICU admission at birth
- Included16 states in 2006
- Drawn from documentation from the medical record
  - NCHS definition:
    - NICU defined as "Hospital facility or unit staffed and equipped to provide continuous mechanical ventilatory support for a newborn for more than 24 hours."
    - = AAP Level 3A definition

NICU Admission at Birth by Race: VLBW Infants, 2006

TABLE 1. Number and percentage of infants with very low birth weight (VLBW) (<1,500 g) admitted to neonatal intensive-care units (NICUs), by state and maternal race/ethnicity — 19 states, 2006

State	No. of infants with VLBW	No. and % admitted to NICUs											
		Total*			White, non-Hispanic			Black, non-Hispanic			Hispanic		
		No.	%	95% CI†	No.	%	95% CI†	No.	%	95% CI†	No.	%	95% CI†
Overall§	25,231	19,512	77.3	(76.8–77.9)	8,579	80.5	(79.7–81.3)	5,053	79.5	(78.5–80.5)	4,819	71.8	(70.7–72.9)
California	5,965	3,801	63.7	(62.5–64.9)	1,036	68.1	(65.8–70.4)	451	60.4	(56.9–63.9)	1,788	62.1	(60.3–63.9)
Delaware	193	172	89.0	(84.5–93.4)	74	91.4	(85.3–97.5)	82	88.2	(81.6–94.8)	—¶		—
Florida	3,306	2,718	82.2	(80.9–83.5)	943	82.1	(79.9–84.3)	1,098	81.8	(79.7–83.9)	602	82.4	(79.6–85.2)
Idaho	206	176	85.4	(80.5–90.2)	138	85.7	(80.3–91.1)	—		—	34	85.0	(73.9–96.1)
Kansas	411	331	80.7	(76.9–84.5)	227	84.4	(80.1–88.7)	52	75.4	(65.2–85.6)	45	71.4	(60.2–82.6)
Kentucky	647	573	88.6	(86.1–91.0)	423	87.8	(84.9–90.7)	120	90.2	(85.1–95.3)	—		—
North Dakota	82	77	93.4	(87.8–99.0)	67	93.1	(87.2–99.0)	—		—	—		—
Nebraska	276	232	84.3	(79.9–88.6)	172	86.9	(82.2–91.6)	—		—	—		—
New Hampshire	121	102	84.3	(77.8–90.8)	90	84.1	(77.2–91.0)	—		—	—		—
New York**	1,588	1,401	88.2	(86.6–89.8)	840	88.1	(86.0–90.2)	325	88.1	(84.8–91.4)	188	90.0	(85.9–94.1)
Ohio	1,991	1,534	77.0	(75.2–78.9)	990	79.1	(76.8–81.4)	465	73.6	(70.2–77.0)	48	78.7	(68.4–89.0)
Pennsylvania	1,998	1,667	83.4	(81.8–85.0)	985	86.0	(84.0–88.0)	492	82.1	(79.0–85.2)	120	75.5	(68.8–82.2)
South Carolina	944	815	86.4	(84.2–88.6)	304	86.9	(83.4–90.4)	461	87.0	(84.1–89.9)	33	76.7	(64.1–89.3)
South Dakota	111	104	92.8	(87.2–98.3)	65	91.6	(85.1–98.1)	—		—	—		—
Tennessee	1,316	1,132	86.0	(84.1–87.9)	633	86.8	(84.3–89.3)	412	84.8	(81.6–88.0)	68	88.3	(81.1–95.5)
Texas	5,266	4,107	78.1	(76.9–79.2)	1,246	76.1	(74.0–78.2)	1,018	82.0	(79.9–84.1)	1,717	77.1	(75.4–78.8)
Vermont	57	45	79.0	(68.4–89.5)	44	80.0	(69.4–90.6)	—		—	—		—
Washington	726	518	71.5	(68.2–74.8)	299	73.5	(69.2–77.8)	38	55.9	(44.1–67.7)	108	77.7	(70.8–84.6)

* Includes 1,252 births to Asian/Pacific Islander and American Indian/Alaska Native women and 252 births to women with unspecified race/ethnicity.
† Confidence interval.
§ Because of small numbers, stratified data for Wyoming infants are not shown, but are included in the overall estimates.
¶ Data excluded because cell size <30.
** Excludes New York City.

Barfield et al, MMWR, 2010

*16 states, NCHS 2006

http://images.google.com/imgres?imgurl=http://www.sequoiapediatricgroup.com/images/nicu_baby.

- Evidence: Place matters for VLBW infant survival and the elimination of disparities
- Policy: States vary considerably in definitions, criteria, and monitoring
- Action: Collaborative partnerships need to be developed to adopt standardized measures to save lives

Partnerships to Improve Risk-Appropriate Care

CDC/HRSA/AMCHP/AAP/ACOG/MOD

- Multi-state collaboration to improve PM-17 data
- CA, AK, TN, NY, FL, CO

TIOP-III

- Quality improvement in perinatal care

Joint Commission

ACOG

- Antenatal transfer
- Maternal levels of care?

MCH in the Age of Chronic Disease: How will you jump in to the challenge?

Questions?

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