MS Infant Mortality:

From data to action

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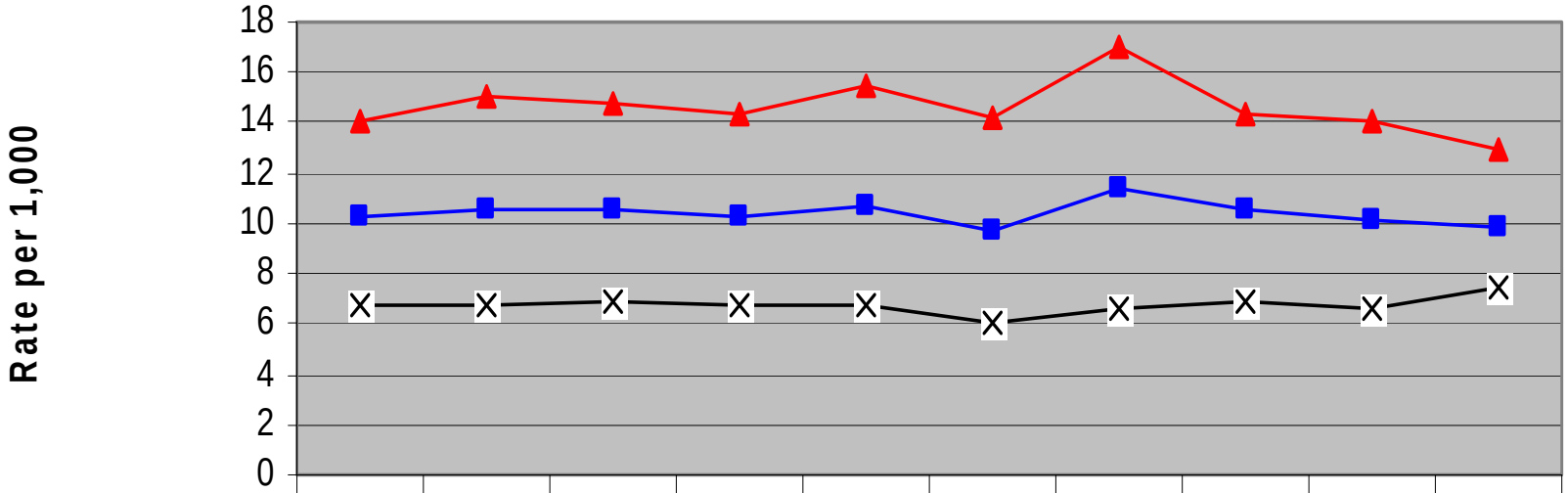
Agenda

- List leading causes of infant mortality in Mississippi
- Discuss Mississippi infant mortality research projects
- Describe innovative strategy in Mississippi to reduce VLBW

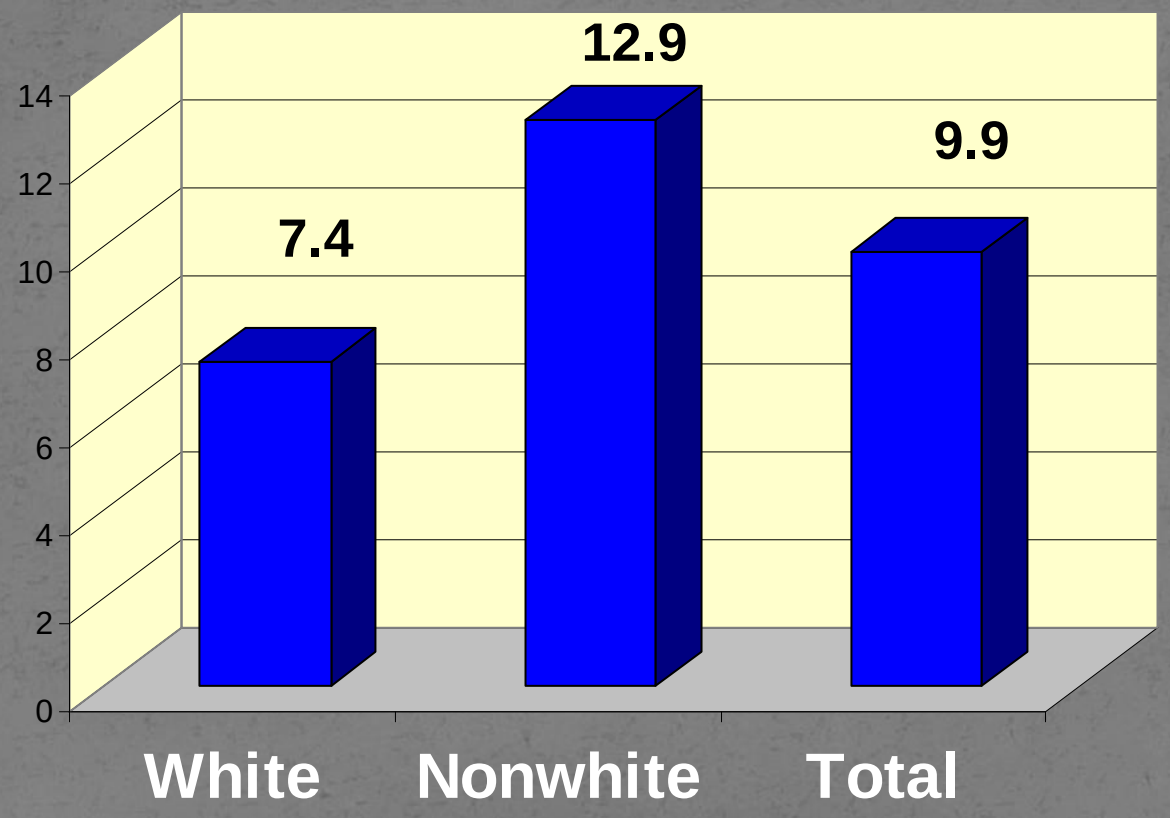
Figure 1. Infant Mortality, Mississippi, 1999-2008



	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Total	10.2	10.6	10.5	10.3	10.7	9.7	11.4	10.5	10.1	9.9
White	6.7	6.7	6.9	6.8	6.8	6.1	6.6	6.9	6.6	7.4
Nonwhite	14.1	15.1	14.7	14.4	15.4	14.2	17.0	14.4	14.1	12.9

Total White Nonwhite

Infant mortality by race, Mississippi 2008

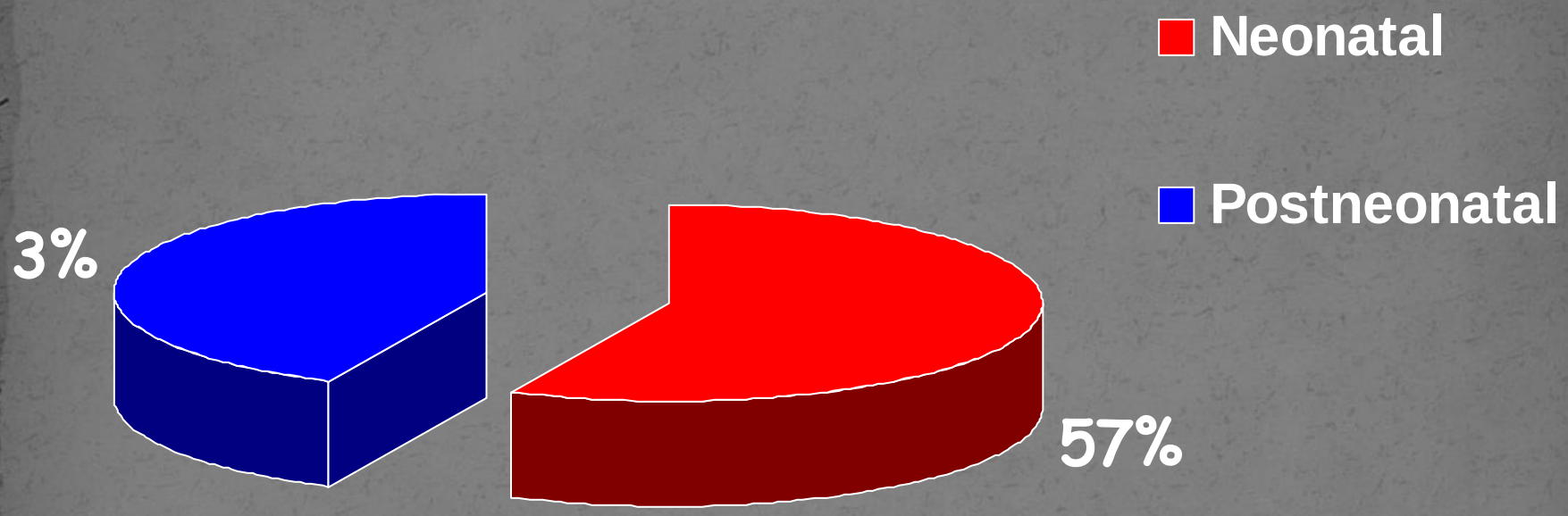


White & Non-white rates

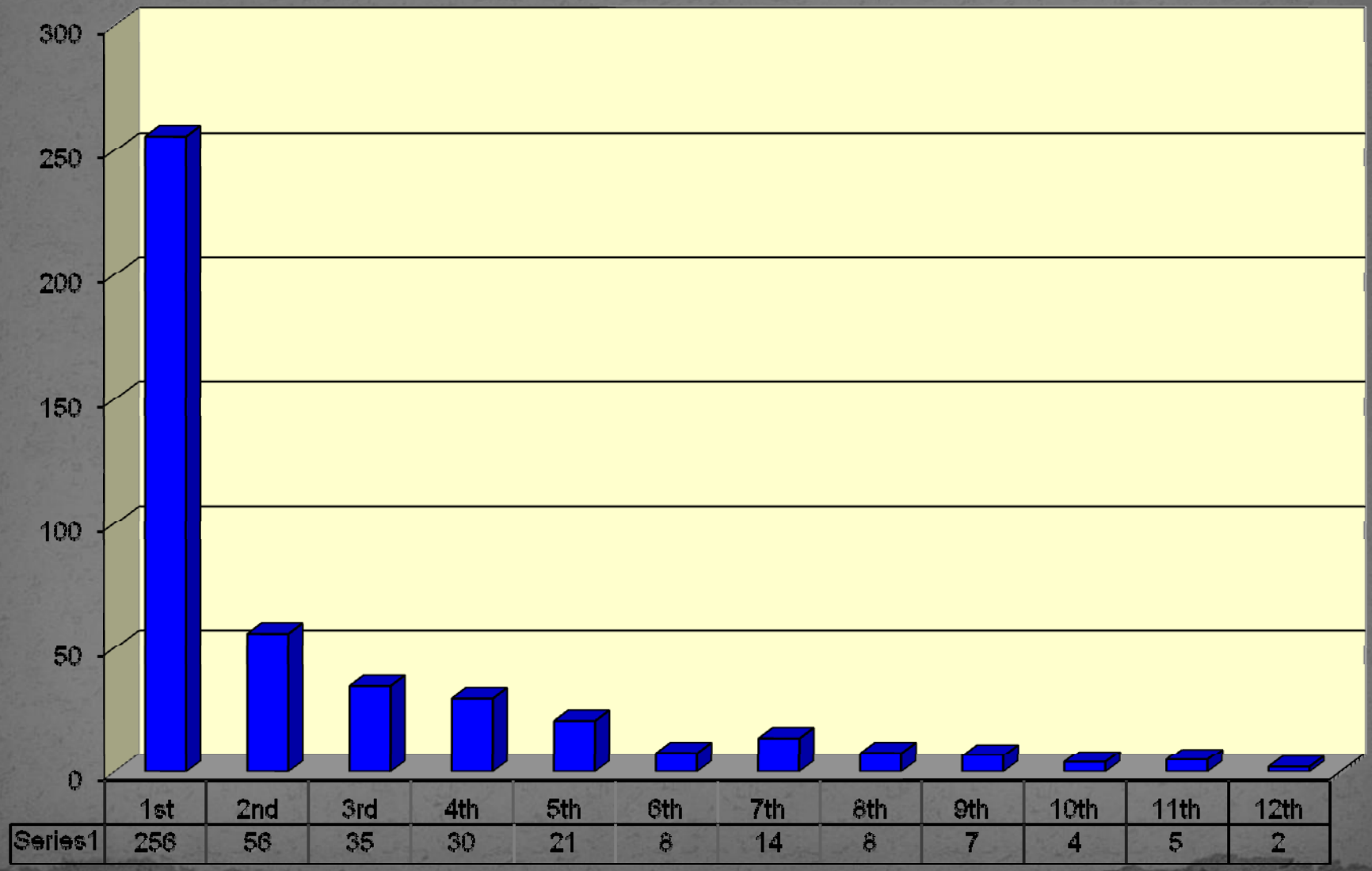
	1999	2000	2001	2002	2003
Total	10.2	10.6	10.5	10.3	10.7
White	6.7	6.7	6.9	6.8	6.8
Nonwhite	14.1	15.1	14.7	14.4	15.4

	2004	2005	2006	2007	2008
Total	9.7	11.4	10.5	10.1	9.9
White	6.1	6.9	6.9	6.6	7.4
Nonwhite	14.2	14.4	14.4	14.1	12.9

Infant mortality by period of death, MS 2008

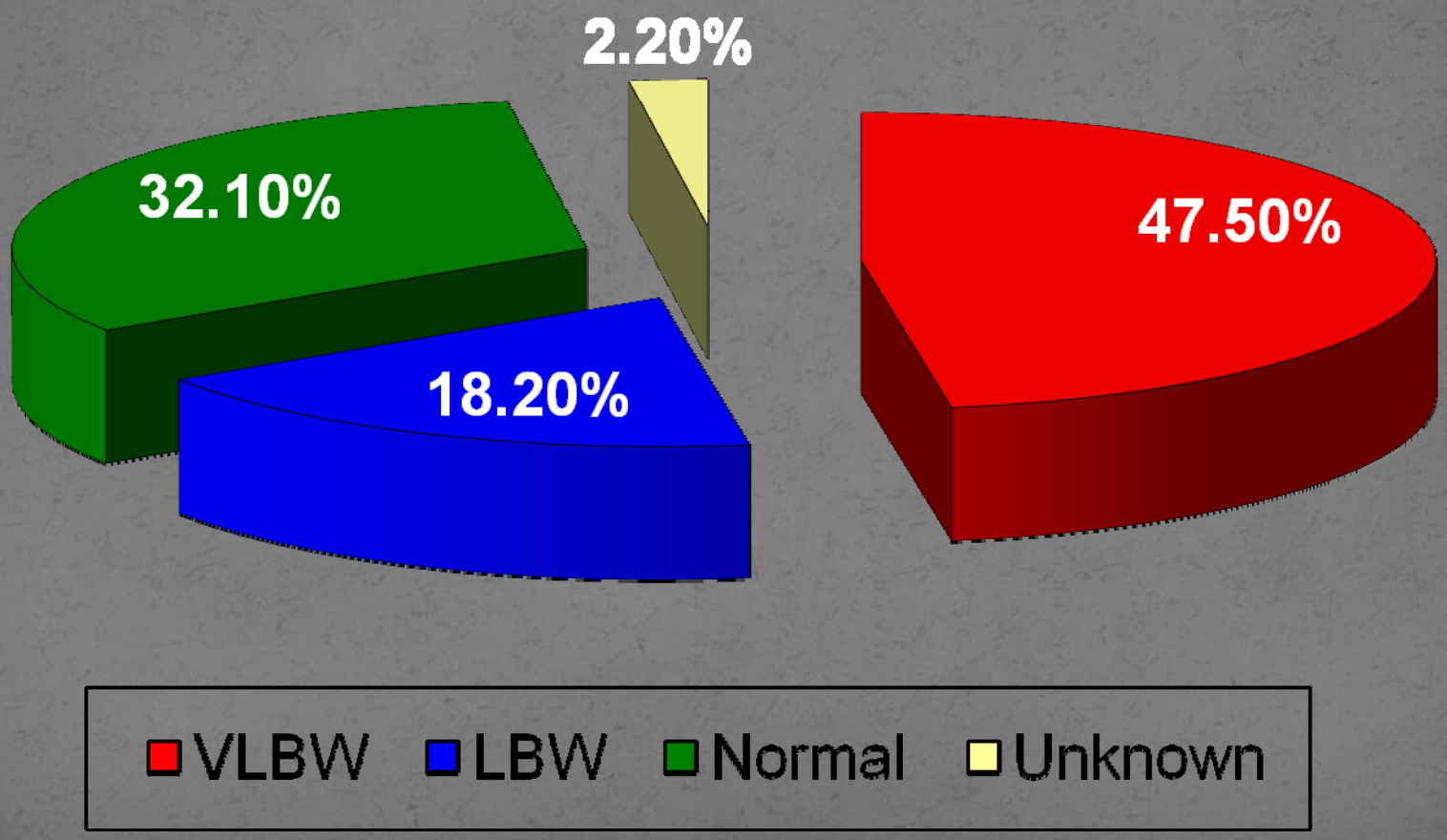


Infant deaths by months of life, MS 2008

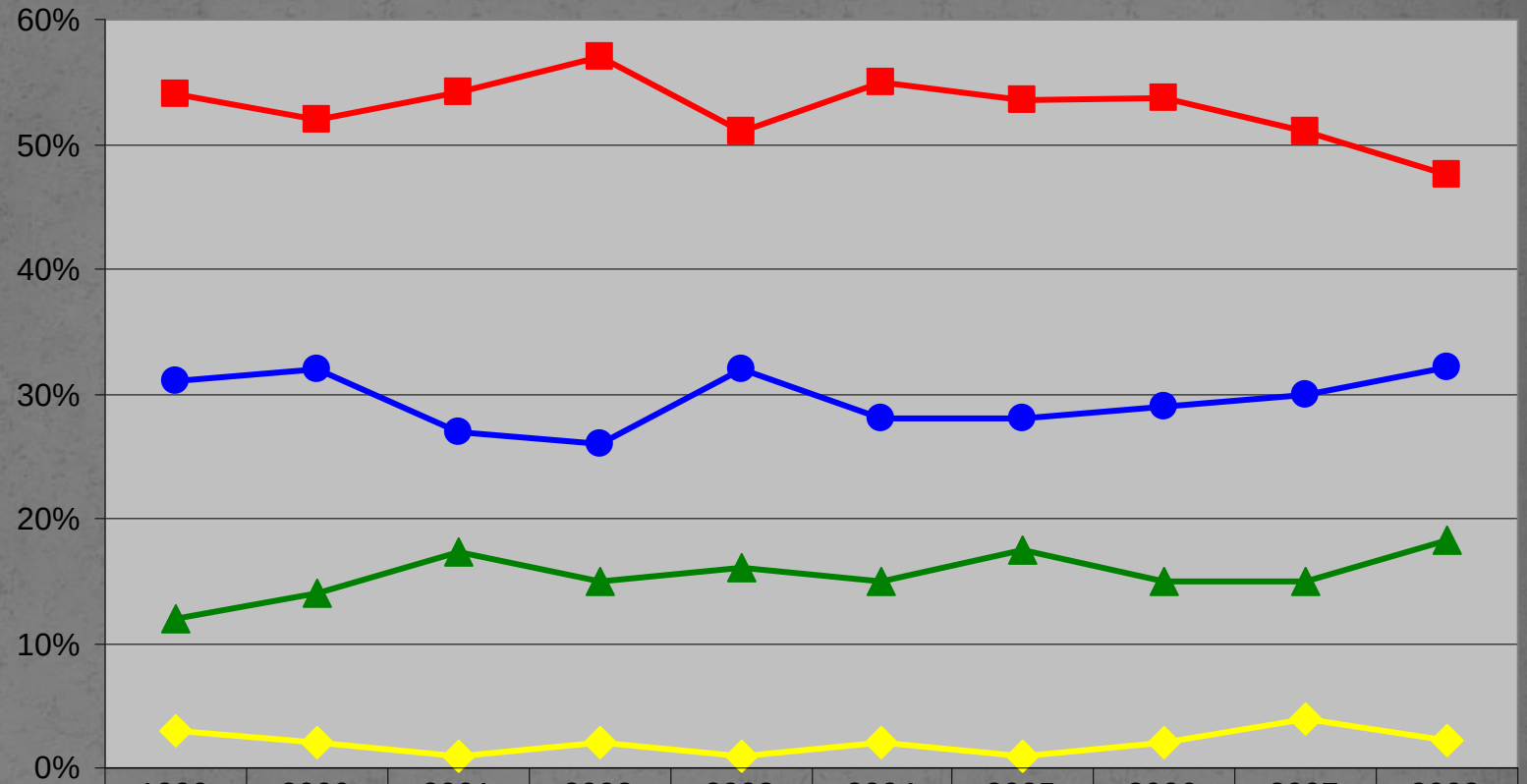


	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
Series1	256	56	35	30	21	8	14	8	7	4	5	2

Percent of infant deaths by birthweight, MS 2008

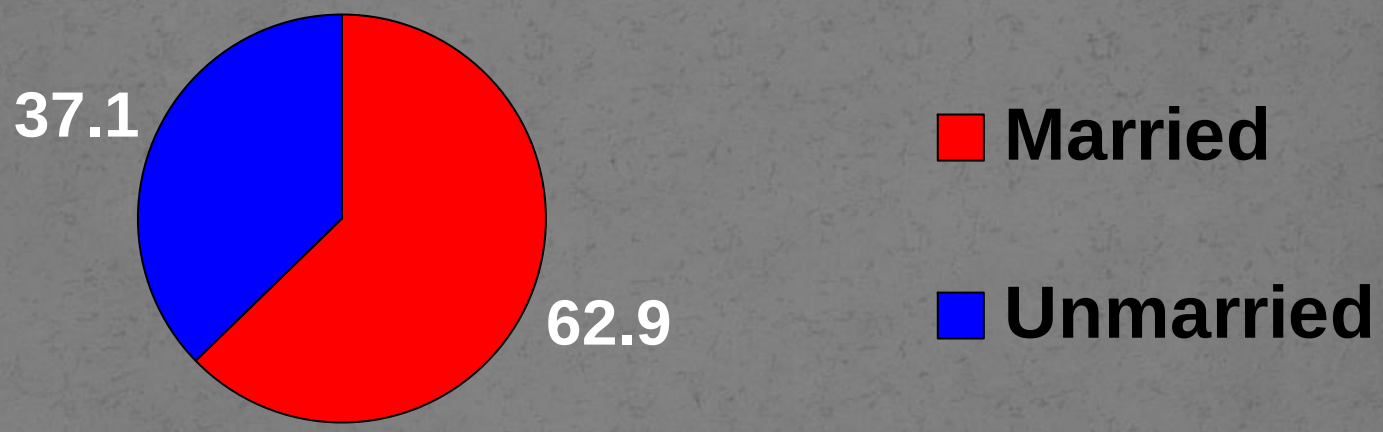


Percent of infant deaths by birthweight, MS 1999-2008



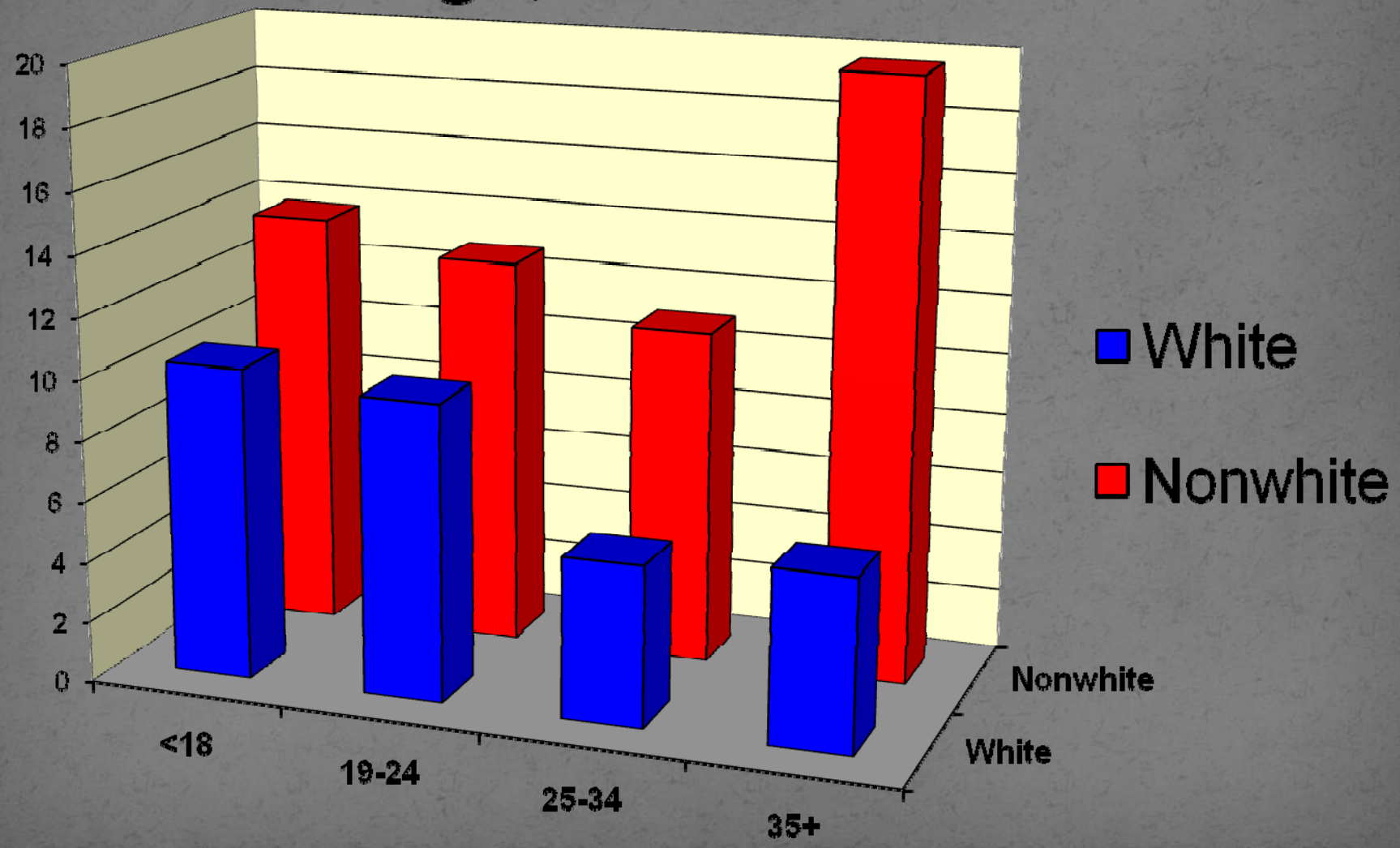
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
< 1,500 g	54%	52%	54%	57%	51%	55%	54%	54%	51%	48%
1,500-2,499 g	12%	14%	17%	15%	16%	15%	18%	15%	15%	18%
2,500+ g	31%	32%	27%	26%	32%	28%	28%	29%	30%	32%
Unknown	3%	2%	1%	2%	1%	2%	1%	2%	4%	2%

Infant mortality by maternal marital status, MS 2008

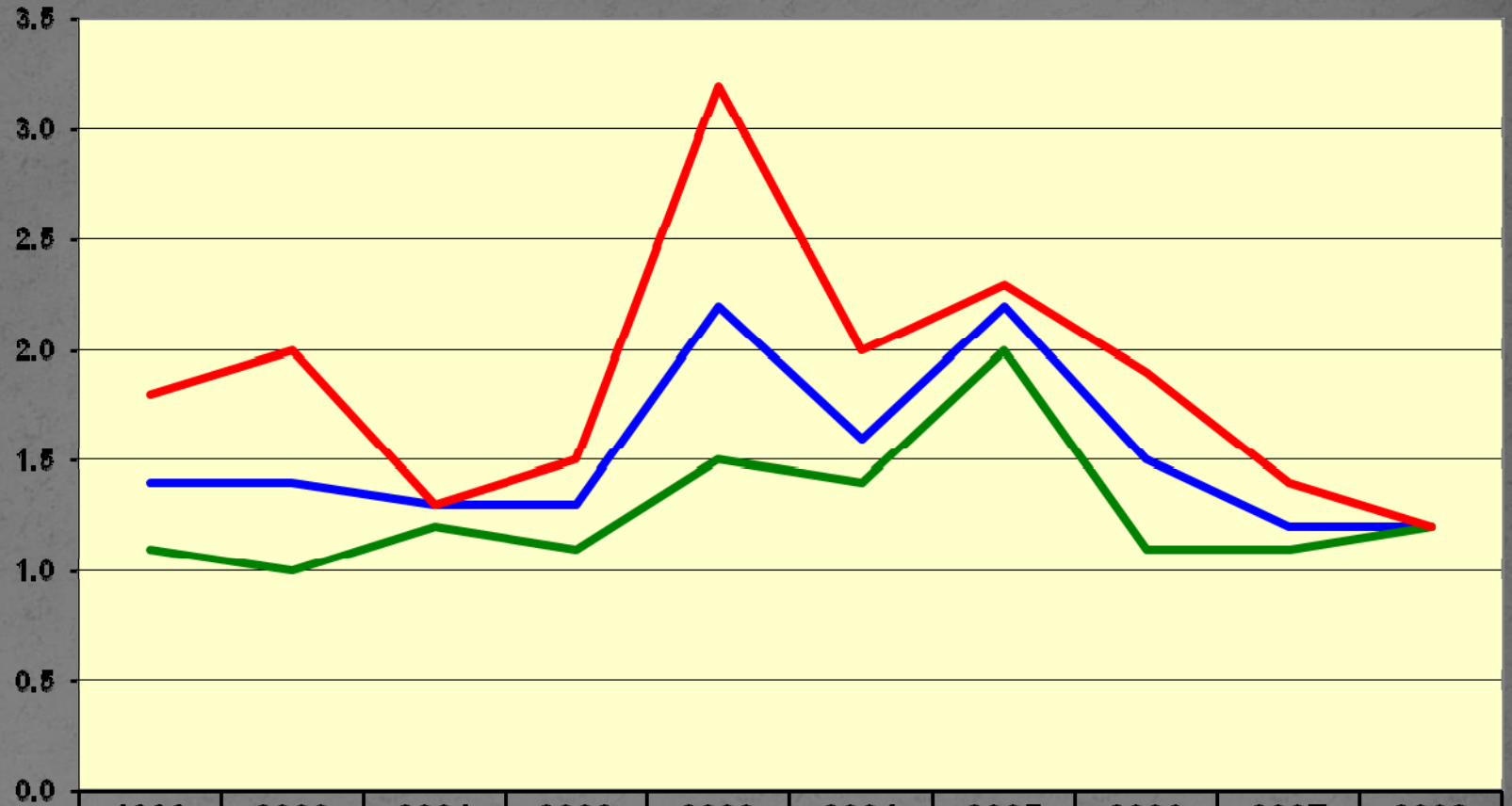


The IMR for unmarried mothers was 11.3 compared to 8.0 deaths per 1,000 live births among married mothers.

Infant mortality by race and mother's age, MS 2008

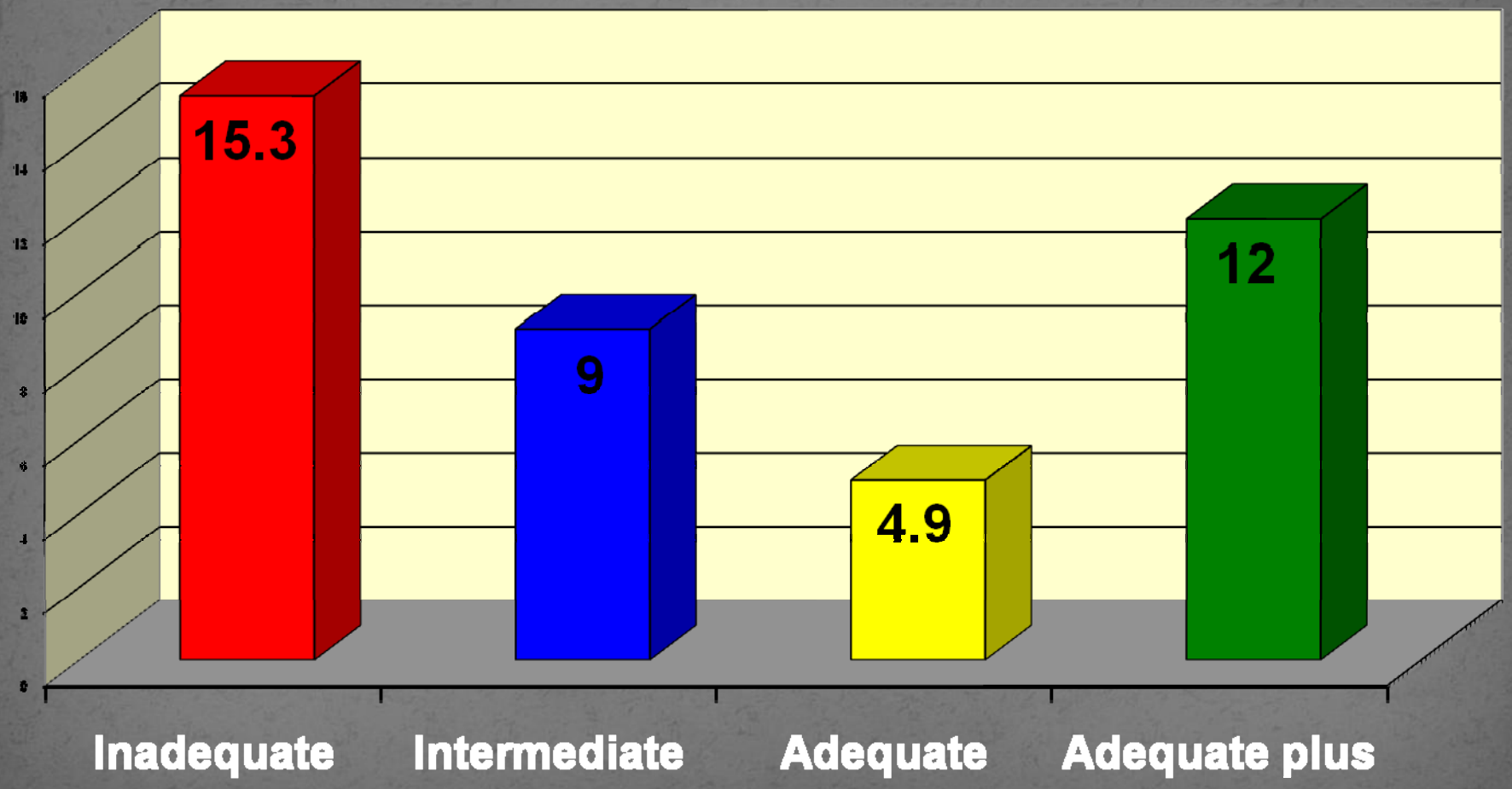


SIDS rates by race, MS 1999-2008



	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Total	1.4	1.4	1.3	1.3	2.2	1.6	2.2	1.5	1.2	1.2
White	1.1	1.0	1.2	1.1	1.5	1.4	2.0	1.1	1.1	1.2
Nonwhite	1.8	2.0	1.3	1.5	3.2	2.0	2.3	1.9	1.4	1.2

Infant mortality by Kotelchuck Index, MS 2008



Infant mortality research

- Several studies have been undertaken
- Needed for justification of funding, innovative interventions

Findings from Linked Data

- Retrospective cohort study using linked birth & death certificate files for MS infants, 1996-2003 (n=341,780).
- A population of (n=297,418) non-Hispanic white & black singleton live-born infants studied
- Assessing relationship between chronic conditions and IM, LBW, PTB

Table 1. Live Births, Preterm Births, Low Birth Weights and Infant Deaths Among Infants by Selected Characteristics: Mississippi, 1996-2003 Birth Cohort

	Live Births	Preterm Births	Low Birth Weights	Infant Deaths
	(n = 295,701)	(n = 45,695)	(n = 25,464)	(n = 2,207)
Characteristic[a]	**n (%)**	**n (%)**	**n (%)**	**n (%)**
Maternal Characteristics:				
Race				
Black/Non-Hispanic	141,426 (47.8)	27,423 (60.0)	16,526 (64.9)	1,406 (63.7)
White/Non-Hispanic	154,275 (52.2)	18,272 (40.0)	8,938 (35.1)	801 (36.3)
Age Group (yrs)				
11-17	22,995 (7.8)	4,609 (10.1)	2,698 (10.6)	247 (11.2)
18-24	136,765 (46.2)	21,306 (46.6)	12,564 (49.3)	1,128 (51.1)
25-34	115,541 (39.1)	16,262 (35.6)	8,239 (32.4)	691 (31.3)
35+	20,400 (6.9)	3,518 (7.7)	1,963 (7.7)	141 (6.4)
Education level				
Less than High School	77,104 (26.1)	13,917 (30.5)	8,500 (33.4)	789 (35.8)
High School	97,210 (32.9)	15,517 (34.0)	8,778 (34.5)	777 (35.2)
College	121,387 (41.0)	16,261 (35.6)	8,186 (32.2)	641 (29.0)
Marital Status				
Not Married	140,848 (47.6)	26,007 (56.9)	15,759 (61.9)	1,376 (62.4)
Married	154,853 (52.4)	19,688 (43.1)	9,705 (38.1)	831 (37.6)

	Live Births	Preterm Births	Low Birth Weights	Infant Deaths
	(n = 295,701)	(n = 45,695)	(n = 25,464)	(n = 2,207)
Characteristic[a]	**n (%)**	**n (%)**	**n (%)**	**n (%)**
Initiation of Prenatal Care				
1st Trimester	241,065 (81.5)	34,710 (76.0)	19,699 (77.4)	1,638 (74.2)
2nd Trimester	44,507 (15.0)	8,566 (18.8)	4,423 (17.4)	426 (19.3)
3rd Trimester	7,341 (2.5)	1,405 (3.1)	675 (2.6)	59 (2.7)
No care	2,788 (0.9)	1,014 (2.2)	667 (2.6)	84 (3.8)
Tobacco use				
10+ cigarettes/day	24,146 (8.2)	3,626 (7.9)	2,950 (11.6)	257 (11.6)
1-9 cigarettes/day	12,934 (4.4)	2,067 (4.5)	1,517 (6.0)	128 (5.8)
None	258,621 (87.5)	40,002 (87.5)	20,997 (82.5)	1,822 (82.6)
Previous Small Infant	3,688 (1.2)	1,473 (3.2)	1,130 (4.4)	89 (4.0)
Maternal Medical Conditions:				
Diabetes	7,319 (2.5)	1,429 (3.1)	631 (2.5)	73 (3.3)
Hydramnios/Oligohydramnios	3,180 (1.1)	871 (1.9)	798 (3.1)	109 (4.9)
Hypertension	19,950 (6.8)	5,446 (11.9)	4,220 (16.6)	187 (8.5)
Infant Characteristics:[b]				
Birth Weight				
LBW: < 2,500 grams	25,464 (8.6)	16,012 (35.0)	25,464 (100.0)	1,213 (55.0)
Normal: ≥ 2,500 grams	270,237 (91.4)	29,683 (65.0)	n/a	994 (45.0)
Gestational Age				
PTB: < 37 weeks	45,695 (15.4)	45,695 (100.0)	16,012 (62.9)	1,194 (54.1)
Term: ≥ 37 weeks	250,006 (84.6)	n/a	9,452 (37.1)	1,013 (45.9)

Table 3. Adjusted Odds Ratios for Preterm Birth (PTB), Low Birth Weight (LBW) and Infant Death Among Infants by Selected Factors: Mississippi, 1996-2003 Birth Cohort

	PTB	LBW	Infant Died[a]
Characteristic	OR (95% CI)[b]	OR (95% CI)[b]	OR (95% CI)[b]
Maternal Characteristics:			
Race			
Black/Non-Hispanic	1.6 (1.5-1.6)	2.1 (2.0-2.1)	1.7 (1.6-1.9)
White/Non-Hispanic	1.0 (referent)	1.0 (referent)	1.0 (referent)
Age Group (yrs)			
11-17	1.1 (1.0-1.2)	1.2 (1.2-1.3)	1.2 (1.0-1.4)
18-24	1.0 (0.9-1.0)	1.1 (1.0-1.1)	1.1 (1.0-1.2)
25-34	1.0 (referent)	1.0 (referent)	1.0 (referent)
35+	1.2 (1.2-1.3)	1.3 (1.2-1.4)	1.1 (0.9-1.3)
Education level			
Less than High School	1.2 (1.1-1.2)	1.2 (1.2-1.2)	1.4 (1.2-1.6)
High School	1.1 (1.1-1.1)	1.1 (1.1-1.1)	1.2 (1.1-1.4)
College	1.0 (referent)	1.0 (referent)	1.0 (referent)

	PTB	LBW	Infant Died[a]
Characteristic	OR (95% CI)[b]	OR (95% CI)[b]	OR (95% CI)[b]
Marital Status			
Not Married	1.1 (1.1-1.2)	1.2 (1.2-1.2)	1.1 (1.0-1.3)
Married	1.0 (referent)	1.0 (referent)	1.0 (referent)
Maternal Risk Factors:			
Initiation of Prenatal Care			
1st Trimester	1.0 (referent)	1.0 (referent)	1.0 (referent)
2nd Trimester	1.2 (1.2-1.2)	0.9 (0.9-1.0)	1.1 (1.0-1.2)
3rd Trimester	1.1 (1.1-1.2)	0.8 (0.7-0.9)	0.9 (0.7-1.1)
No care	2.7 (2.5-2.9)	2.4 (2.2-2.7)	3.1 (2.5-3.9)
Tobacco use			
10+ cigarettes/day	1.1 (1.1-1.2)	2.1 (2.0-2.2)	1.8 (1.5-2.0)
1-9 cigarettes/day	1.1 (1.0-1.1)	1.7 (1.6-1.8)	1.4 (1.2-1.7)
None	1.0 (referent)	1.0 (referent)	1.0 (referent)
Previous Small Infant	3.5 (3.3-3.8)	4.6 (4.3-5.0)	3.0 (2.4-3.7)
Maternal Medical Conditions:			
Diabetes	1.2 (1.1-1.3)	0.8 (0.7-0.9)	1.4 (1.1-1.7)
Hydramnios/Oligohydramnios	1.8 (1.7-2.0)	3.1 (2.8-3.4)	4.4 (3.6-5.3)
Hypertension	2.1 (2.0-2.2)	3.2 (3.1-3.4)	1.2 (1.0-1.4)

Post-Katrina assessment of access to reproductive health care

- To document impact of Hurricane Katrina on disaster-affected women's access to reproductive healthcare
- Pilot of toolkit developed by CDC/DRH
- Women (n=108) approached randomly while visiting clinic

Post-Katrina assessment of access to reproductive health care

- Nearly 90% indicated no interruption in method during immediate post-disaster period
- Unexpected finding -- nearly 40% reported receive FP at local ER or UCC

Post-Katrina assessment of access to reproductive health care

- Education needed to achieve optimal utilization of FP services in the Mississippi Gulf Coastal communities
- Further study -- assess use of ER for FP in rest of state

MS Coroner Survey

- MS Coroner qualifications: age 21 years, high school diploma or equivalent, and valid voter registration
- Informal survey to assess the consistency of MS coroners' practices in accurately identifying SIDS cases

MS Coroner Survey

- Findings compared with published guidelines and MS law
- Discrepancies in protocol identified
- 1/3 reported sometimes/never perform infant death scene investigations

MS Coroner Survey

- Inadequate investigation [and subsequent misdiagnosis] of suspected SIDS cases compromises MS vital statistics data
- Significant public health implications -- public health decisions, practice, & funding allocations based on vital statistics data

SIDS Knowledge among AA women

- Disparity b/w white & nonwhite birth outcomes
- All demographic, socioeconomic backgrounds @ risk for SIDS
- AA population bears disproportionate burden

SIDS Knowledge among AA women

- 3rd leading cause of Mississippi infant mortality
- Nonwhite rate 2-3 x's white rate
- Series of 6 focus groups
- Assess knowledge of SIDS & risk factors among AA women

SIDS Knowledge among AA women

- Weaknesses in education materials
- Discussion of death/dying "unlucky"
- Participants recommended focus on bright, happy images with messages of "saving lives."

Evaluation of CHW use among high risk women

- Pilot program in 2 Mississippi communities
- Peer educators
- CHW worked to connect high risk minority women and infants with the healthcare system

Evaluation of CHW use among high risk women

- Success derived through use of culturally sensitive peer educators with whom women could closely relate
- Interviews with CHWs affirmed participants more likely to comply with recommended interventions with peer support

Prenatal care utilization

- Retrospective cohort study of 96-03 linked birth/death files
- Assessed PNC utilization by Kotelchuck Adequacy of PNC Utilization Index along with other maternal factors

Prenatal care utilization

- Found that ~ 1 in 5 MS women received < adequate PNC & ID'd racial disparities in utilization of PNC
- Black women:
  - delayed entry into care
  - received too few visits
  - more likely to have either "inadequate" or "no" care compared to white women

Prenatal care utilization

- Among women with medical conditions, black women 2x as likely to receive inadequate care compared to white women.
- Study highlighted need for public health interventions that promote utilization of prenatal and preconception healthcare practices

MS Physician strategies

- Linked birth/death data for 96 to 07
- To describe MS infant mortality, teen pregnancy trends, strategies for improving maternal and infant health in MS

MS Physician strategies

- Analysis underscored need for extensive action, including redefining the way MS delivers care to women of child-bearing age
- Cited economics, ethics as guiding principles for redesigning primary care for high-risk women

MS Physician strategies

- Keeping families healthy not only the best economical strategy, but also simply the “right thing to do”
- Recommended assisting women to set, achieve personal goals for reproductive health as priority consideration for MS MDs

What to do? What to do?

Problem: Many Mississippi babies die very small & very young despite prenatal care

Hypothesis: Mississippi women are not healthy enough to achieve a full term, normal weight delivery

Solution: Intervention PRIOR to conception

Method: IPC for small population with highest risk for poor delivery outcomes

CDC Recommendations for IPC

- Improve knowledge, attitudes, behaviors
- Assure all women of childbearing age in the U.S. receive preconception care services
- Reduce risks & disparities

MIME & DIME

- Preconception / interconception care pilot programs
- Rural vs. Urban communities
- Delta Infant Mortality Elimination
- Metro Infant Mortality Elimination

Role of Health Department

- Lead agency & grant applicant
- Oversight & primary leadership
- Contractual & logistical arrangements
- Local level support services:
  - Case management & outreach
- Data analysis & evaluation
- Policy development

Partnering organizations

- University of MS Medical Center – principal recruitment site & service provider.
- Healthy Linkages – referral service for identification of medical homes.
- Division of Medicaid – data source.

Partnering organizations

- World Health Organization Collaborating Center for Reproductive Health – technical assistance.
- Federally qualified community health centers – primary care medical homes.

IPC intervention package

- Individualized interpregnancy care plan based on assessments of medical/ social risks for subsequent poor pregnancy outcomes;

- Provision of primary health care & dental services in accordance with care plan for 24 months;

IPC intervention package

- Assistance in achieving a woman's desire for subsequent pregnancies & need for optimum child spacing (ideally 18-20 months);
- Provision of appropriate social services & community outreach in each woman's community.

Problems & solutions

- Expansive & rural geographical area
- Limited funding
- Limited resources
- Communication
- Transportation

Project evaluation

- On-going surveillance combined with evaluation at the project's end
- Acceptability and delivery of the IPC service package indicators followed on an on-going basis
- Health & Reproductive outcomes evaluated at project's end
- Cost-benefit analysis to compare cost savings to costs of program

Goal for policy change

- Medicaid lost 6 weeks post-partum
- No primary care during interim before subsequent pregnancies so poor chronic disease management
- Goal: Primary care for poverty-level Mississippi women who deliver VLBW
- Format: Medicaid waiver

Strategies to effect policy change

- Cost analysis - Reduced Medicaid $$
  - >60 % of MS births paid by Medicaid
- High risk pregnancy care
- High risk infant care
- High costs of long term morbidities & developmental delays

Strategies to effect policy change

- Low number of qualified women (n= ~800)
- Low cost of primary care
- It’s the right thing to do

Questions?

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