Utilizing Mississippi 2007-2011 Linked Birth and Death Data to Explain District Level Variances in Infant Mortality Rates

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BACKGROUND

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Mississippi consistently has the highest rate of infant mortality in the US

2011 Infant Mortality Rate	
Mississippi	**9.4** per 1,000 live births
National average	6.05 per 1,000 live births

MSDH, 2011; Hoyer & Zu, 2012

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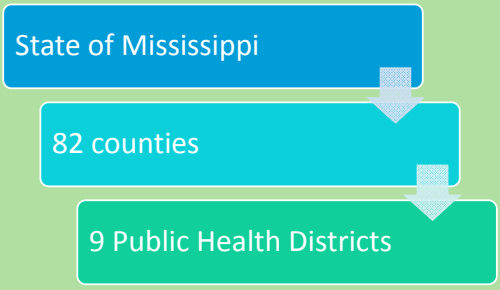

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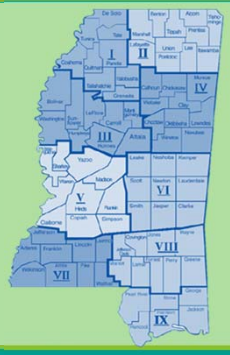
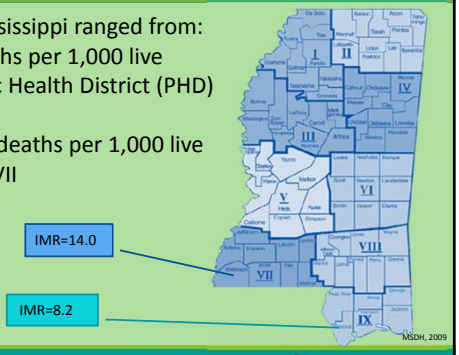
Mississippi Public Health District Map



MSDH, 2009

2011 IMR in Mississippi ranged from:

- 8.2 infant deaths per 1,000 live births in Public Health District (PHD) IX
- To 14.0 infant deaths per 1,000 live births in PHD VII



MSDH, 2009

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METHODS

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Data

Mississippi 2007-2011 linked birth and death certificate data

- 206,406 live-born singleton infant births
  - Included 1,725 infant deaths

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Dependent Variable

Infant death is defined as an infant that died during the first year of life or at < 365 days of age

Independent Variables

- Descriptive infant characteristics
  - Birth weight
  - Significant abnormal conditions of the newborn

Independent Variables

- Descriptive maternal characteristics
  - Marital status
  - Education level
  - Race
  - Tobacco use
  - Significant obstetric procedures
  - Significant complications of labor and delivery
  - Previous number of live births
  - District of residence

Multiple logistic regression

- SAS used to perform analysis
- Goal: find a model where explanatory variables **did not** include District

RESULTS

Type 3 Analysis of Effects			
Effect	DF	Wald Chi-Square	Pr>ChiSq
District	**8**	**10.5511**	**0.2285**
Tobacco use	1	12.3257	0.0004
Birth weight	4	336.3640	<.0001
Marital status	1	4.4233	0.035
Education level	3	21.399	<.0001
Race	2	5.4304	0.0662*
Sig. comp labor& delivery	1	4.5052	0.0338
Sig. abnormal condition newborn	1	53.0387	<.0001
Sig. obstetric procedures	1	0.1093	0.7409*
Previous # live births	1	21.8074	<.0001

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Main effect variables*	Odds Ratio	95% CI
Birth weight		
Less than 1500g	10.96	(7.2-15.55)
1500-1999g	1.90	(1.23-2.93)
2000-2499g	0.34	(0.19-0.64)
2500-3999g	0.28	(0.20-0.39)
4000+ grams	0.50	(0.245-1.03)
Marital status		
Single	1.12	(1.01-1.24)
Married	0.90	(0.81-0.99)
Tobacco use		
Smoker	1.23	(1.09-1.38)
Non-smoker	0.82	(0.73-0.91)
Previous number of live births		
Previous live birth	1.03	(1.02-1.04)
Maternal education		
Less than HS	1.66	(1.34-2.06)
Graduated HS	1.18	(0.94-1.50)
Some college	0.84	(0.62-1.13)
4+ years college	0.61	(0.41-0.90)
Maternal race		
White	1.15	(0.83-1.60)
Black	1.39	(1.00-1.94)
Other	0.63	(0.34-1.17)
Significant complications during labor and delivery†		
None	1.30	(1.02-1.67)
1 or more	0.77	(0.60-0.98)
Significant abnormal conditions of the newborn§		
None	0.63	(0.55-0.71)
1 or more	1.60	(1.41-1.81)
Significant obstetric procedures¶		
None	1.02	(0.89-1.17)
1 or more	0.98	(0.85-1.12)

DISCUSSION

More research needed

- Model was statistically significant ($p<0.0001$)
- **HOWEVER** R^2 shows that model only accounts for approximately **28% of variability** around IMR between the districts

R-Square	0.0257	Max-rescaled R-Square	0.2791

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Implications for public health

- Identification of other significant factors that result in district-level infant mortality rates could inform efforts to reduce infant deaths.
- District-specific data could identify strategies best suited for the specific needs of the districts, rather than only statewide "blanketed" approaches to infant death reduction

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