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Perinatal Periods of Risk Analysis (PPOR)

A State-Level Analysis: Phase 1 and 2 Kansas, 2005-2009

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Acknowledgement

- Carol Gilbert, MS and Laurin Kasehagen, MA, PhD at CityMatCH <http://www.citymatch.org/>
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- Kansas Blue Ribbon Panel on Infant Mortality and Connie Satzler (and her staff) <http://kansasinfantmortality.org/>
- All Bureau of Family Health staff (especially Linda Williams, Debbie Richardson, Joseph Kotsch, Jamey Kendall, Marc Shiff and Dave Thomason)

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Infant Mortality in Kansas

U.S. 2008, 2009 preliminary data
Source: Bureau of Epidemiology and Public Health Informatics, KDHE; National Center for Health Statistics

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The Problem

Infant Mortality Rate Trends Kansas and U.S., 2000-2009



U.S. 2008, 2009 preliminary data
Source: Bureau of Epidemiology and Public Health Informatics, KDHE; National Center for Health Statistics



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The Problem

Infant Mortality Rate Trends Kansas and U.S., 2000-2010



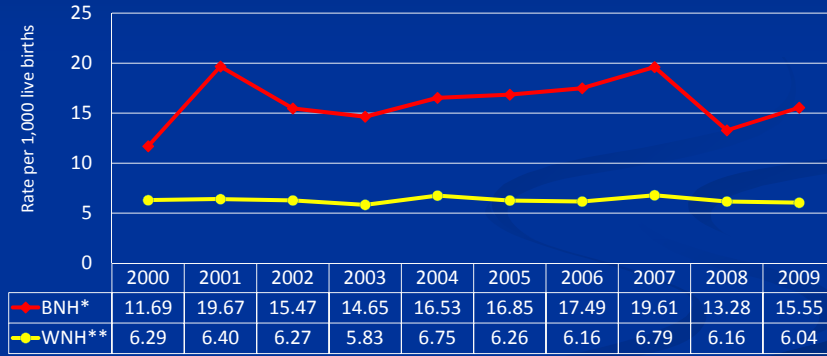
U.S. 2008, 2009 preliminary data
Source: Bureau of Epidemiology and Public Health Informatics, KDHE; National Center for Health Statistics



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The Problem

Infant Mortality Rate Trends by Non-Hispanic Black and Non-Hispanic White Kansas, 2000-2009



*BNH= non-Hispanic black; **WNH=non-Hispanic white
Source: Bureau of Epidemiology and Public Health Informatics, KDHE

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The Problem

Infant Mortality Rate Trends by Non-Hispanic Black, Non-Hispanic White and Hispanic Kansas, 2000-2010



*BNH= non-Hispanic black; **WNH=non-Hispanic white
Source: Bureau of Epidemiology and Public Health Informatics, KDHE

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What We're Doing

- The Kansas Blue Ribbon Panel on Infant Mortality
 - <http://kansasinfantmortality.org/index.asp>
 - Releases updated recommendations (Apr 2011) and actionable logic model (Oct 2011)
- Office of Minority Health, Center for Health Equity and Kansas SIDS Network launch – 3 month awareness campaign (Sep- Infant Mortality, Oct – SIDS, Nov – Prematurity)

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What We're Doing

- Center for Health Equity and Kansas SIDS Network develop the Quick Card to raise awareness of the seriousness of infant mortality in Kansas.
- SIDS Network of KS expands Safe Sleep Education outreach
- Sedgwick County FIMR releases first annual report

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What We're Doing

- Healthy Communities Wyandotte releases recommendations – Oct 2011
- March of Dimes provides grants to Saline, Sedgwick, Shawnee and Geary counties to establish community collaboratives that will address birth disparities through prenatal care and community health partnerships

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Purpose

- A recommendation from the Kansas Blue Ribbon Panel on Infant Mortality
- Describes the Perinatal Periods of Risk (PPOR) approach to analyze resident fetal and infant death data in Kansas for the period 2005-2009.

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Purpose

- Gain greater insight into the underlying factors contributing to Kansas' fetal and infant deaths.
- Data to Action: Results offer important information that can be used to develop community-based prevention strategies related to racial/ethnic disparities in infant mortality rate (IMR).

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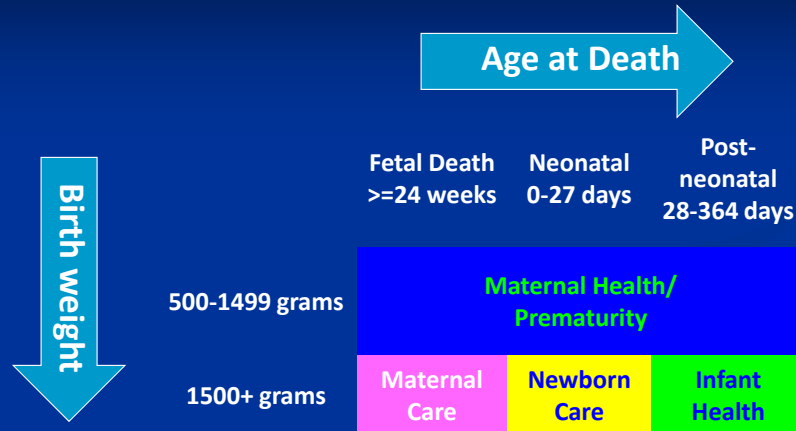
Methods

- Perinatal Periods of Risk (PPOR) approach
 - Phase 1: identifies populations and periods of risk with excess mortality
 - Phase 2: explains excess mortality and identifies important risk factors

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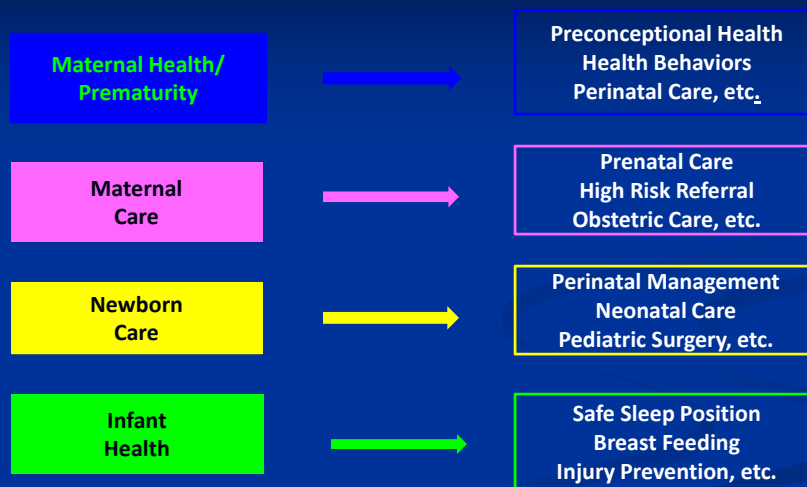
The Perinatal Periods of Risk



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PPOR Intervention Model



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Data Sources

- Bureau of Epidemiology and Public Health Informatics, Kansas Department of Health and Environment
 - Fetal death certificate data
 - Live birth certificate data
 - Linked birth-death cohort data

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Study Population

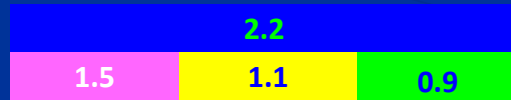
- Fetal deaths 2005-2009
 - 24 weeks or greater gestational age
 - 500 grams or larger
- Live births 2005-2009
 - 500 grams or larger
- Linked birth and death data 2005-2009
 - 500 grams or larger
- Residents of Kansas at time of birth

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Reference Group

- External: USA 2000-2002 Reference Group
 - Defined by maternal characteristics
 - 20 or more years of age
 - 13 or more years of education
 - Non-Hispanic white women
 - Residents of the US at the time of baby's birth



Total Fetal-Infant Mortality Rate = 5.7

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Phase 1

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Overall PPOR Map of Fetal-Infant Deaths Kansas, 2005-2009

		Age at Death			
		Fetal Death	Neonatal	Post- neonatal	Total
Birth weight	500-1499 grams	290	279	71	640
	1500+ grams	424	302	467	1193
		714	581	538	1833
Denominator	Fetal Deaths 714	+	Live Births 205,338	=	206,052

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Fetal-Infant Mortality Rate Kansas, 2005-2009

		Age at Death			Overall Rate
		Fetal Death	Neonatal	Post- neonatal	
Birth weight	500-1499 grams	3.1			
	1500+ grams	2.1	1.5	2.3	
Period rates add up to overall rate					9.0

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Calculating Excess Rates Kansas, 2005-2009

	Maternal Health Prematurity	Maternal Care	Newborn Care	Infant Health	Fetal-Infant Mortality
Kansas	3.1	2.1	1.5	2.3	9.0
Minus					
USA Reference Group*	2.2	1.5	1.1	0.9	5.7
Equals					
Excess Mortality Rates	0.9	0.6	0.4	1.4	3.3

*USA 2000-2002 Reference Group

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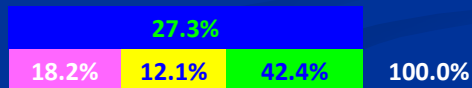


Displaying Excess Mortality Kansas, 2005-2009

Excess Fetal-Infant Mortality
Rate=3.3



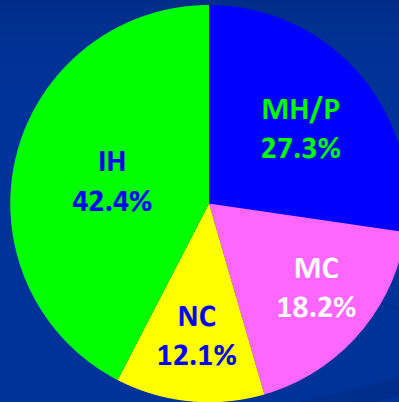
Excess Mortality



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Kansas Excess Mortality Kansas, 2005-2009



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Non-Hispanic White Kansas, 2005-2009

		Age at Death			Total
		Fetal Death	Neonatal	Post-neonatal	
Birth weight	500-1499 grams	190	176	35	401
	1500+ grams	270	222	301	793
		460	398	336	1194
Denominator		Fetal Deaths 460	+	Live Births 147,560	= 148,020

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Fetal-Infant Mortality Rate Non-Hispanic White Kansas, 2005-2009

		Age at Death			Overall Rate
		Fetal Death	Neonatal	Post-neonatal	
Birth weight	500-1499 grams	2.7			8.0
	1500+ grams	1.8	1.5	2.0	
Period rates add up to overall rate					

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Calculating Excess Rates Non-Hispanic White (WNH) Kansas, 2005-2009

	Maternal Health/ Prematurity	Maternal Care	Newborn Care	Infant Health	Fetal-Infant Mortality
WNH	2.7	1.8	1.5	2.0	8.0
Minus					
USA Reference Group*	2.2	1.5	1.1	0.9	5.7
Equals					
Excess Mortality Rates	0.5	0.3	0.4	1.1	2.3

*USA 2000-2002 Reference Group

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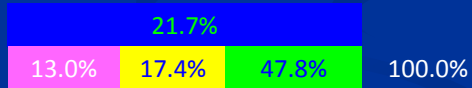


Displaying Excess Mortality Non-Hispanic White Kansas, 2005-2009

Excess Fetal-Infant Mortality
Rate=2.3



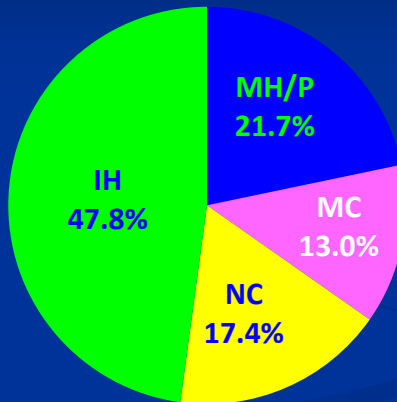
Excess Mortality



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Non-Hispanic White Excess Mortality Kansas, 2005-2009



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Non-Hispanic Black Kansas, 2005-2009

		Age at Death			
		Fetal Death	Neonatal	Post-neonatal	Total
Birth weight	500-1499 grams	40	38	20	98
	1500+ grams	54	24	55	133
		94	62	75	231
Denominator =		Fetal Deaths 94	+	Live Births 14,004	14,098

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Fetal-Infant Mortality Rate Non-Hispanic Black Kansas, 2005-2009

		Age at Death			
		Fetal Death	Neonatal	Post-neonatal	Overall Rate
Birth weight	500-1499 grams	7.0			
	1500+ grams	3.8	1.7	3.9	
Period rates add up to overall rate				16.4	

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Calculating Excess Rates Non-Hispanic Black (BNH) Kansas, 2005-2009

	Maternal Health/ Prematurity	Maternal Care	Newborn Care	Infant Health	Fetal-Infant Mortality
BNH	7.0	3.8	1.7	3.9	16.4
Minus					
USA Reference Group*	2.2	1.5	1.1	0.9	5.7
Equals					
Excess Mortality Rates	4.8	2.3	0.6	3.0	10.7

*USA 2000-2002 Reference Group

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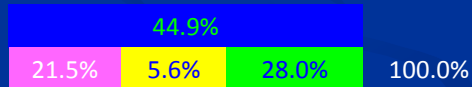


Displaying Excess Mortality Non-Hispanic Black Kansas, 2005-2009

Excess Fetal-Infant Mortality
Rate=10.9



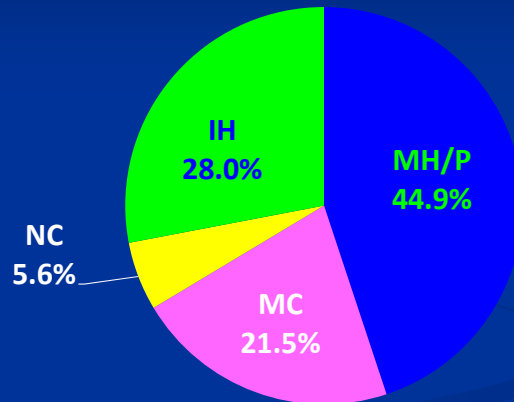
Excess Mortality



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Non-Hispanic Black Excess Mortality Kansas, 2005-2009



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Hispanic Kansas, 2005-2009

Age at Death

		Fetal Death	Neonatal	Post-neonatal	Total
Birth weight	500-1499 grams	42	49	13	104
	1500+ grams	80	43	87	210
		122	92	100	314
Denominator =		Fetal Deaths 122	+	Live Births 32,832	32,954

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Fetal-Infant Mortality Rate Hispanic Kansas, 2005-2009

		Age at Death			Overall Rate
		Fetal Death	Neonatal	Post-neonatal	
Birth weight	500-1499 grams	3.2			9.5
	1500+ grams	2.4	1.3	2.6	
Period rates add up to overall rate					

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Calculating Excess Rates Hispanic Kansas, 2005-2009

	Maternal Health/ Prematurity	Maternal Care	Newborn Care	Infant Health	Fetal-Infant Mortality
Hispanic	3.2	2.4	1.3	2.6	9.5
Minus					
USA Reference Group*	2.2	1.5	1.1	0.9	5.7
Equals					
Excess Mortality Rates	1.0	0.9	0.2	1.7	3.8

*USA 2000-2002 Reference Group

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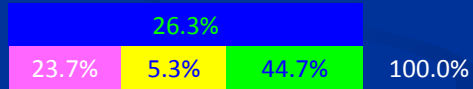


Displaying Excess Mortality Hispanic Kansas, 2005-2009

Excess Fetal-Infant Mortality
Rate=3.9



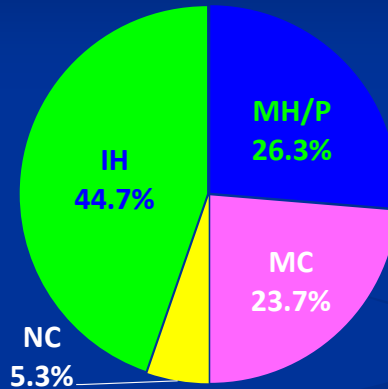
Excess Mortality



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Hispanic Excess Mortality Kansas, 2005-2009



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Phase I: Summary

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Excess Fetal-Infant Mortality Rates Kansas, 2005-2009

	Maternal Health/ Prematurity	Maternal Care	Newborn Care	Infant Health	Excess Fetal-Infant Mortality
Kansas	0.9	0.6	0.4	1.4	3.3
White NH*	0.5	0.3	0.4	1.1	2.3
Black NH*	4.8	2.3	0.6	3.0	10.7
Hispanic	1.0	0.9	0.2	1.7	3.8

*NH = non-Hispanic

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Calculating excess number of deaths from fetal-infant mortality rates Kansas, 2005-2009

Formula:

Estimated number of excess deaths = Rate*Denominator/1000

Race/Ethnic Group	Overall Excess Mortality Rate	Live Births and Fetal Deaths	Multiply	Number of Excess Deaths
Kansas	3.3	206,052		680
White NH*	2.3	148,020		340
Black NH*	10.7	14,098		151
Hispanic	3.8	32,954		125

*NH=Non-Hispanic

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Estimated Excess Number of Deaths Kansas, 2005-2009

	Maternal Health/Prematurity	Maternal Care	Newborn Care	Infant Health	Excess Fetal-Infant Mortality
Kansas	185	124	82	288	680
White NH*	74	44	59	163	340
Black NH*	68	32	8	42	151
Hispanic	33	30	7	56	125

*NH = non-Hispanic

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Phase 2

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Excess Fetal-Infant Mortality Rates Kansas, 2005-2009



	Maternal Health/ Prematurity	Maternal Care	Newborn Care	Infant Health	Excess Fetal-Infant Mortality
Kansas	0.9	0.6	0.4	1.4	3.3
White NH*	0.5	0.3	0.4	1.1	2.3
Black NH*	4.8	2.3	0.6	3.0	10.7
Hispanic	1.0	0.9	0.2	1.7	3.8

*NH = non-Hispanic

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Part A: Infant Period

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Underlying cause of death

- Birth defects (Q00-Q99)
- Infections (A00-B99, G009, J180 and J189)
- Injuries (V01-Y89)
- Perinatal conditions (P00-P96)
- Sudden Infant Death Syndrome (SIDS) (R95)
- Other ill-defined and unspecified causes of mortality (R99), and other causes.

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Part A: Infant Period



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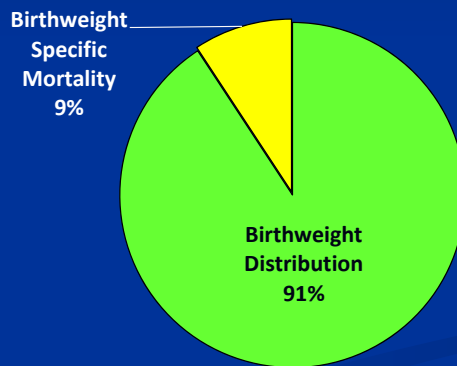
Part B: Maternal Health/Prematurity Period

Kitagawa Analysis

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Components of the Excess Fetal Infant Mortality Rates (FIMR) in non-Hispanic Black Kansas, 2005-2009



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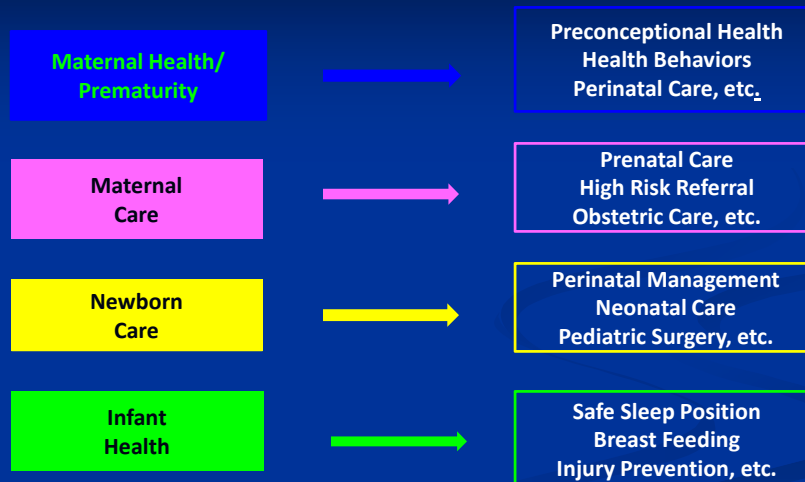


Conclusion

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PPOR Intervention Model



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Conclusion

- Opportunities for intervention to reduce excess fetal-infant death vary according to the mother's race/ethnicity.
- Excess mortality in the Maternal Health/Prematurity risk period due primarily to high rates of VLBW births call for targeted interventions for improving preconception health of non-Hispanic black mothers in particular.

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Conclusion

- This could involve improving the overall health of women in general. Or, a more targeted approach could focus on women of reproductive age with chronic diseases, previous poor outcomes, or poorly managed chronic diseases and ensuring better well-woman care and receipt of prenatal care (maternal health/prematurity issues).

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Conclusion

- Excess mortality in the Infant Health risk period suggests the need for targeted interventions to better provide and monitor infant care, especially of non-Hispanic black and Hispanic infants, in the post-neonatal period. This may include promotion of breastfeeding and safe sleep practices, and prevention of life-threatening injuries.

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Conclusion

- The excess fetal infant deaths among non-Hispanic blacks and Hispanics in the Maternal Care risk period highlights the importance of improving access to and utilization of prenatal care services and referrals for high-risk pregnancies.

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Conclusion

- To significantly impact Kansas overall IMR, community-specific, tailored prevention efforts on prematurity, safe sleep, and injury prevention may be necessary.

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Public Health Implication

- Complex factors necessitate a multi-pronged approach to reduce Kansas' overall IMR and collaborative efforts of community members, public health, and the medical community.

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- Perinatal Periods of Risk (PPOR) materials from CityMatCH website.
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Thank you!

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