

23rd International Nursing Research Congress
July 31, 2012 | Brisbane, Australia



PUBLIC HEALTH HOME VISITING IN MONTANA

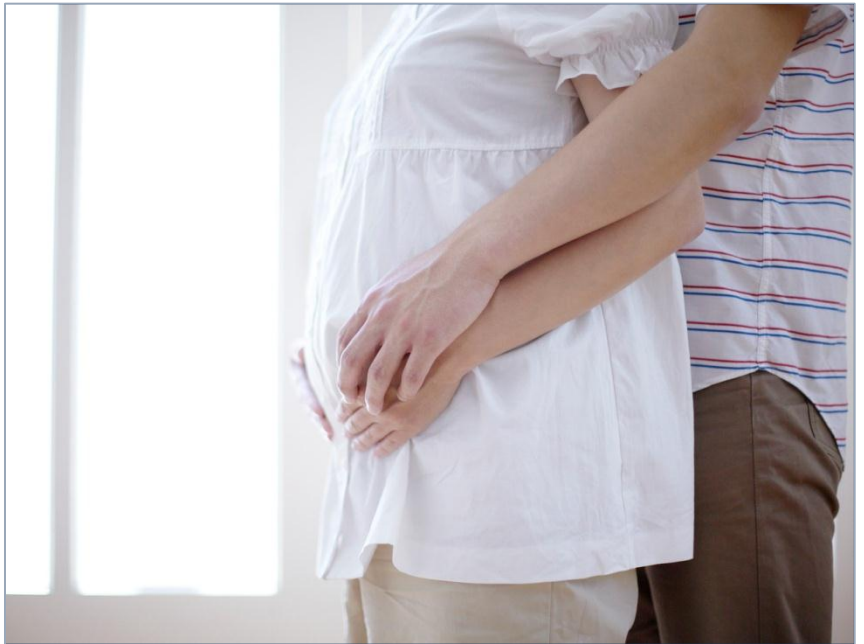
EFFECTS ON LOW BIRTH WEIGHT, PREMATURE BIRTHS AND MEDICAID COSTS

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PURPOSE OF THE STUDY

- Determine if the provision of home visiting affects birth outcomes and Medicaid costs in Montana



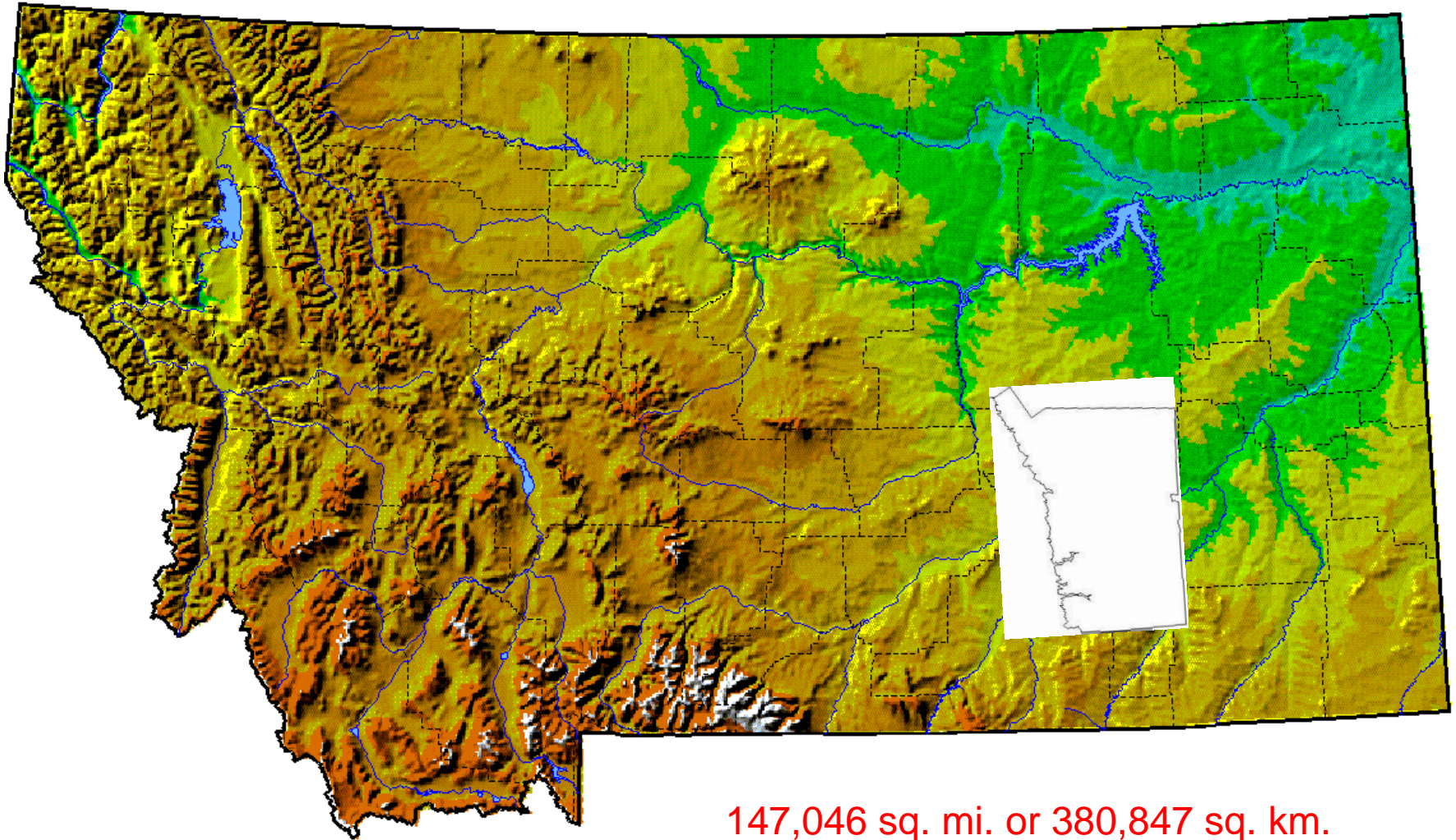


Where in the world is Montana?



MONTANA

MONTANA



147,046 sq. mi. or 380,847 sq. km.
4th largest state in US

THE “LAST BEST PLACE”



THE WAY WE SEE IT

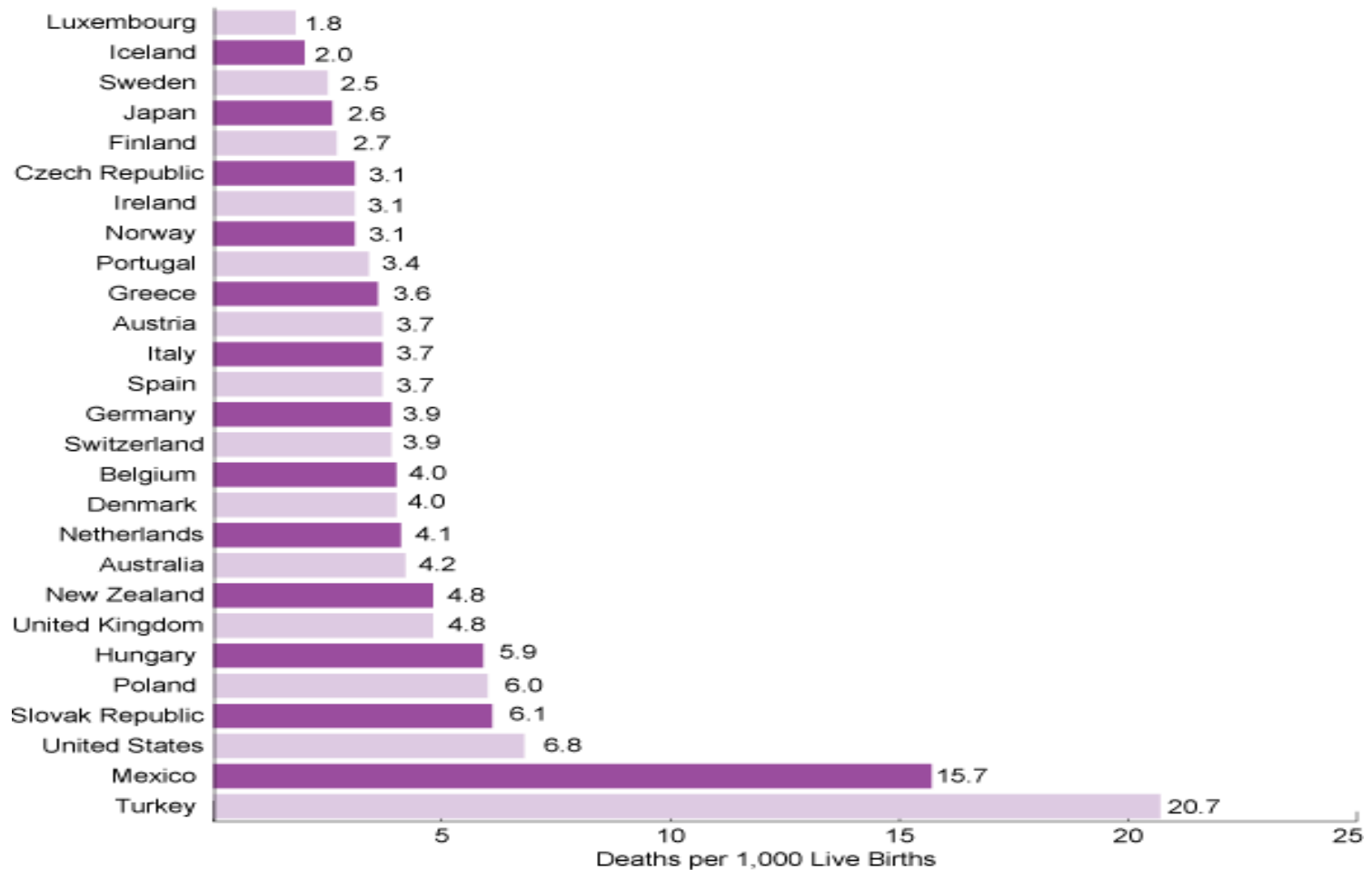


DEMOGRAPHICS

- Population \approx 998,000
 - 90% Caucasian
 - 6% American Indian
 - 3% Multiracial
 - 1% Other
- Births \approx 12,000/year
- IMR = 6.6 deaths /1000 live births
- \approx 80% of the population lives in 7 of the 56 counties
- 45 of 56 counties are designated as frontier with fewer than 6 people per square mile

INFANT MORTALITY AS A MEASURE OF POPULATION HEALTH

International Infant Mortality Rates, Selected Countries,* 2007



**2007 data were not available for all Organization for Economic Co-operation and Development (OECD) countries.*

Source: Centers for Disease Control and Prevention, National Center for Health Statistics. Health, United States, 2010: With Special Feature on Death and Dying. Hyattsville, MD. 2011.
Available at: <http://www.cdc.gov/nchs/hus.htm>. Accessed March 2011.

PUBLIC HEALTH HOME VISITING

- Long history of home visiting to pregnant women and infants in the U.S.
- Home visiting is a recommended strategy for improving health outcomes in the Social Security Act
- Home visiting identified as a tool to address infant mortality and other poor pregnancy outcomes in 1989

IMPACTS OF HOME VISITING FOR MCH POPULATION

David Olds & Associates

Pregnant women who were home visited during pregnancy

- ✓ And smoked, had significantly lower rates of preterm births than smokers who were not home visited (1986)
- ✓ Smoked less (1996)
- ✓ Delayed future pregnancies longer
- ✓ Had fewer behavioral impairments related to alcohol and drug use
- ✓ Had fewer arrests
- ✓ Used significantly fewer public resources (1997)

Donovan & Associates

- ✓ Infants were 2.5 times more likely to die when compared with infants whose families received home visiting (2007)

Cramer, Chen, Roberts & Clute

- ✓ Cost 22% to 31% less than non home visited infants (2007)

SIGNIFICANCE OF THE PROBLEM

- The US IMR requires attention. Home visiting has the potential to address this problem.
- Home visiting is expensive
- Long standing public health programs are rightfully being required to evaluate themselves and make necessary changes
- Evidence based practice requires documentation

STUDY DESIGN, SETTING AND SAMPLE

- Quasi-experimental
- Retrospective
- Field based research, using population based data
- State wide
- High risk women who lived in and delivered a live born singleton infant in Montana in 2006

DATA SOURCES

- All data was from data sources filed with State Department of Health (DPHHS) for mandatory reporting and program compliance
- 2006 Birth Data was used
- Data was linked using an iterative process. Data sources in the Data Set included
 - Montana birth certificates
 - Medicaid claims and
 - PHHV records

INITIAL MISSING DATA ANALYSIS

- 12092 singleton births in the data set
- 17 (0.1%) were missing birth weight (BW) and/or gestational age (GA)
- **12075** selected for analysis

		Deleted Cases n = 17		Cases Selected for Analysis n = 12075	
		n	%	n	%
Maternal Age	Mean	27.6	n/a	26.8	n/a
Maternal Race	Caucasian	13	76.5	10237	84.8
Marital Status	Not Married	5	29.4	4351	36
Maternal Education	< HS	4	23.5	1758	14.6
Residency	Urban	8	47.1	4531	37.5
	Large Rural	3	17.6	3088	25.6
	Small Rural	6	35.3	4450	36.9

AIMS

- 1. Determine the predictive ability of six demographic measures to identify low birth weight and premature births in Montana.**
- 2. Examine the impact of home visiting, after controlling for medical prenatal care, on the incidence of low birth weight and/or premature birth in high risk women Montana.**
- 3. After controlling for adequacy of prenatal care, compare average Medicaid billed charges for infants born to high risk women who did and did not receive home visiting services during their pregnancy.**

ANALYSIS METHODS

AIM 1

Receiving Operation Characteristics Curve

AIM 2

Logistic Regression - to determine at risk women
(preliminary to comparative analyses)

Chi-Square to compare birth outcomes based on receipt of
PHHV services

AIM 3

T-tests for independent means

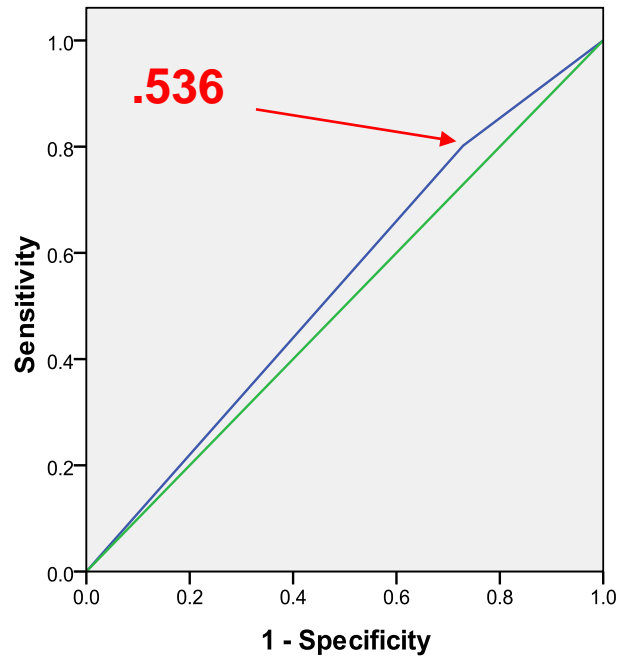
RECEIVING OPERATION CHARACTERISTICS (ROC) CURVE

- Data mining method
- Useful with large sample, where statistical assumptions and sample to population inferences are largely unnecessary
- A type of exploratory data analysis, searching for patterns in data
- Provides a visual output of multiple analysis methods including logistic regression
- Output includes a graph which represents the area under the curve (AUC). The greater the accuracy of prediction, the greater the AUC, with 1.0 being perfect prediction, and chance prediction 0.5

AREA UNDER THE CURVE FOR AGGREGATE VARIABLES

Prematurity

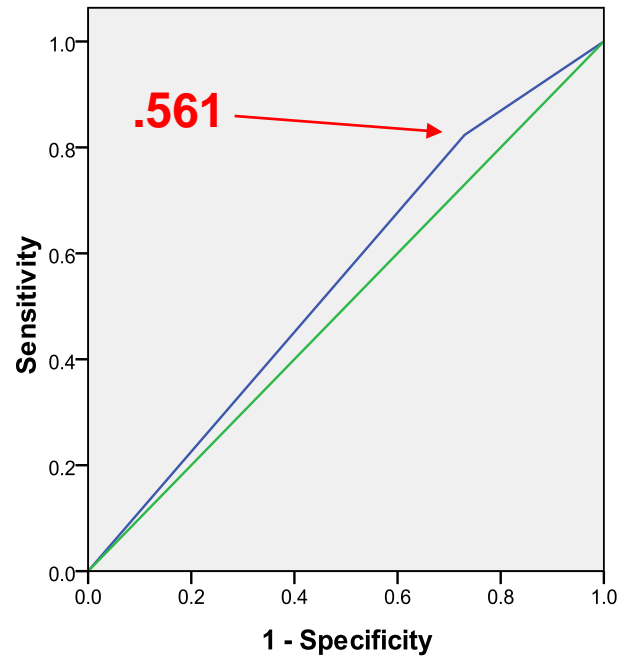
ROC Curve



Diagonal segments are produced by ties.

Low Birth Weight

ROC Curve



Diagonal segments are produced by ties.

LOGISTIC REGRESSION

Phi Coefficient Correlations between Gestational Age and Birth Weight and Risk Factors				
	Gestational Age Phi coefficient	Significance	Birth Weight Phi coefficient	Significance
Maternal Age	.024*	.007	.023*	.011
Maternal Race	.026*	.004	.002	.805
Maternal Education	.019*	.040	.031**	.001
Marital status	.041**	.000	.051**	.000
Residency	.007	.415	.017	.065
Medicaid Birth	.072**	.000	.066**	.000
Maternal Smoking	.028*	.002	.077**	.000
Maternal Drinking	.000	.988	.014	.120
Anemia	-.017	.066	.010	.279
Non-gestational Diabetes	-.053**	.000	-.007	.414
Hypertension, Chronic	.045**	.000	.040**	.000
Previous Small Infant	.072**	.000	.097**	.000
** Correlation significant at the .01 level				
* Correlation significant at the .05 level				
Red Factors display 7 variables with significant correlations to BOTH gestational age and birth weight				

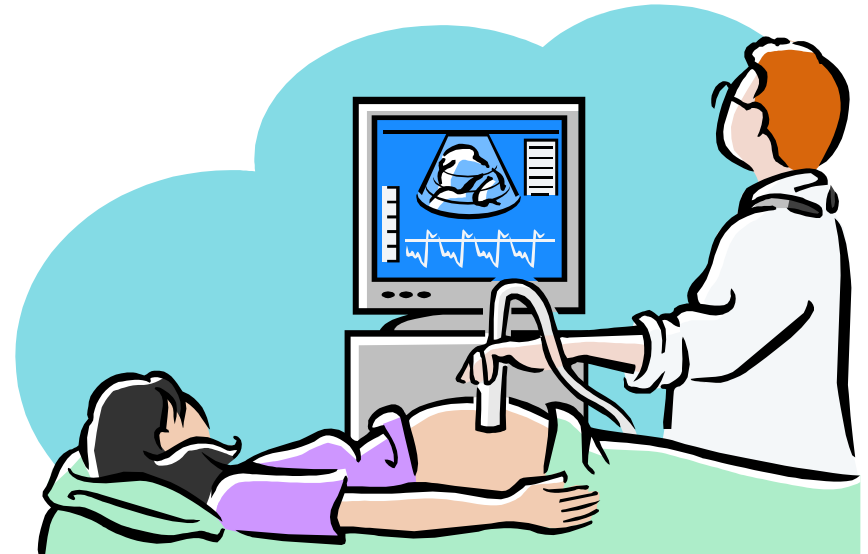
AT RISK POPULATION

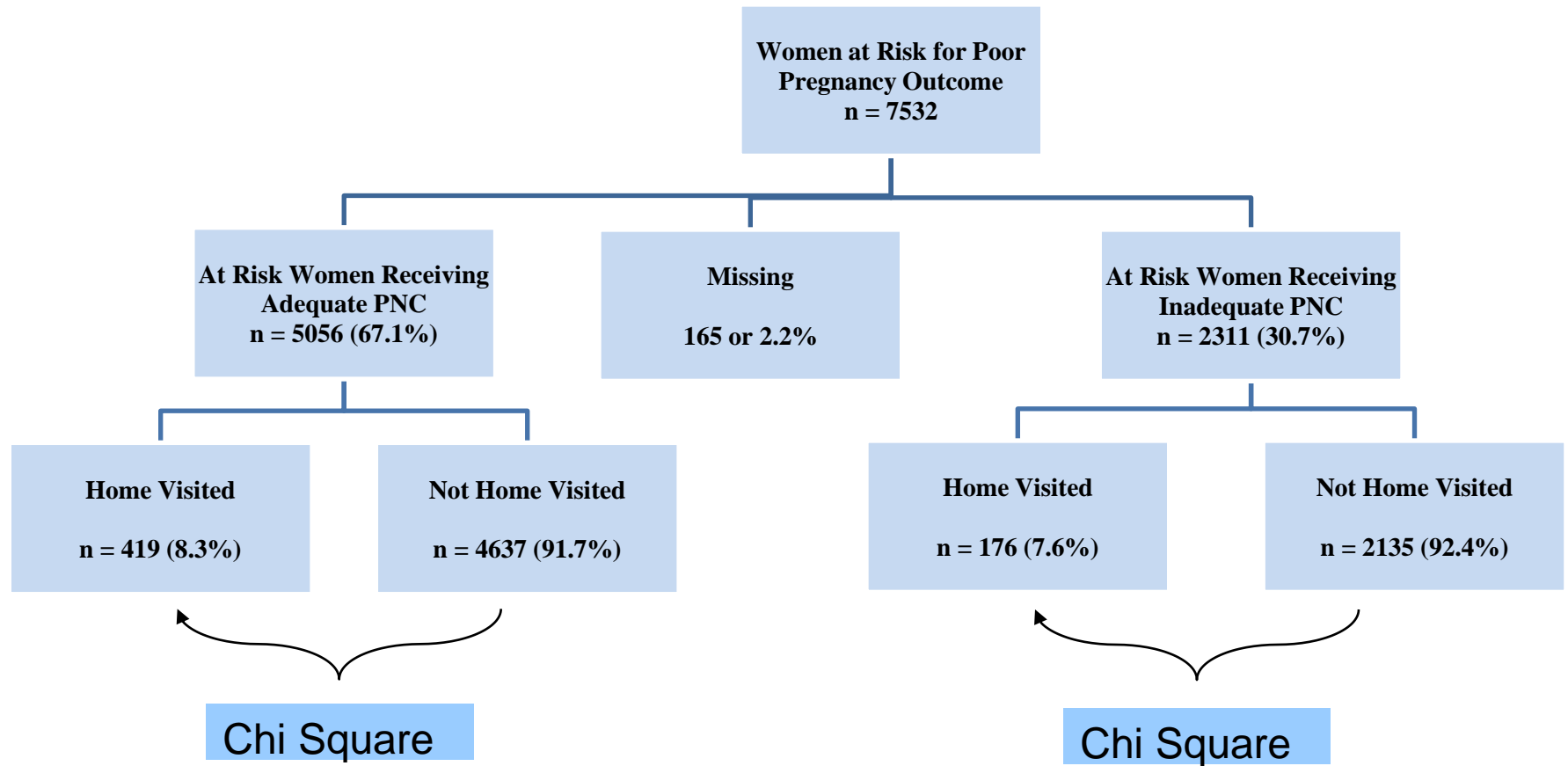
- Of the 12075 singleton births, 7532 or 62.4% were “at risk” based on presence of one or more of these 7 variables
- Of the 7532 “at risk” women
 - 6931 did not receive home visiting services
 - 601 did receive home visiting services

MEDICAL PRENATAL CARE

Adequacy of Prenatal Care Utilization (APNCU)

- Index Inadequate = 0 - 49% of expected visits
- Intermediate = 50 - 79% of expected visits
- Adequate = 80 - 109% of expected visits
- Adequate Plus = $\geq 110\%$ of expected visits





BIRTH OUTCOMES FOR WOMEN WHO RECEIVED ADEQUATE PRENATAL CARE

	Receipt of PHHV Services	
	Yes	No
	<i>n</i> = 419	<i>n</i> = 4637
Yes	49 (11.7%)	507 (10.9%)
No	370	4130
Yes	27 (7.3%)	325 (7.9%)
No	392	4312

Premature

$$X^2_{(1)} = .227, p = .634$$

Low Birth Weight

$$X^2_{(1)} = .189, p = .663$$

Differences between groups were not statistically significant

BIRTH OUTCOMES FOR WOMEN WHO RECEIVED INADEQUATE PRENATAL CARE

	Receipt of PHHV Services	
	Yes	No
	<i>n</i> = 176	<i>n</i> = 2135
Yes	14 (8.0 %)	146 (6.8 %)
No	162	1989
Yes	8 (4.5%)	143 (6.7 %)
No	168	1992

Premature

$$X^2_{(1)} = .314, p = .575$$

Low Birth Weight

$$X^2_{(1)} = 1.234, p = .267$$

Differences between groups were not statistically significant

MEDICAID COSTS?

- Because of the nature of the assessment, it was important to examine costs of infants who were eligible for the entire 12 months of their lives
- Over 4,000 of the babies born to the 7532 at risk women were eligible for Medicaid for 12 months
- T-test performed to examine costs between those whose mothers did and did not receive home visiting services

ANALYSIS CHALLENGE

- Very large range of costs
 - First Month of Life - \$0 to \$293,689
 - First Year of Life - \$0 to \$640,175
- Analysis Decision
 - Set min and max at \$1,000 and \$12,000
 - Analysis of excluded cases demonstrated cases did not differ significantly on demographic factors

MEDICAID COSTS FOR INFANTS BORN TO AT RISK WOMEN WHO RECEIVED ADEQUATE PNC

		Infant Costs > \$1,000 and < \$12,000		
	PHHV Received	<i>n</i>	<i>mean</i>	<i>SD</i>
Infant One Month Costs	Yes	293	\$1,457	\$1,123
	No	2074	\$1,392	\$1,201
Infant One Year Costs	Yes	294	\$3,159	\$1,800
	No	2089	\$2,890	\$1,918

Differences between groups were not statistically significant

MEDICAID COSTS FOR INFANTS BORN TO AT RISK WOMEN WHO RECEIVED INADEQUATE PNC

		Infant Costs >\$1,000 and < \$12,000		
	PHHV Received	<i>n</i>	<i>mean</i>	<i>SD</i>
Infant One Month Costs	Yes	120	\$1,544	\$1,353
	No	1001	\$1,487	\$1,348
Infant One Year Costs	Yes	120	\$2,967	\$1,790
	No	1020	\$3,119	\$2,090

Differences between groups were not statistically significant

SUMMARY OF AIMS

1. Demographics alone did not adequately predict prematurity and low birth weight birth.
2. The incidence of prematurity and low birth weight birth was not statistically different based on receipt of home visiting services.
3. Home visiting services did not significantly increase or decrease Medicaid costs for infant care.

LIMITATIONS OF THE STUDY



- Retrospective design
- All risk factors associated with premature and low birth weight birth are not contained within the available data
- Lack of sound dose information

SIGNIFICANCE OF THE RESEARCH TO NURSING

- Be intentional when planning and executing home visiting programs
- Don't accept "good enough" client identification mechanisms - work with providers
- Explore existing data sets, don't generate what you don't need or can't use

PLAN OF RESEARCH

○ Quantitative Analyses Foci

- Dose and program rigor with outcomes
- Health outcome disparities related to rurality
- Long term public health care costs

○ Qualitative Analysis

- Client perceptions re impact of HV

THOUGHT FOR THE DAY

- Statistical significance may mean that individual family improvement or changes in small percentages of families may be lost in analysis (Sweet & Appelbaum, 2004).
- In small population areas, small improvements in health status may have large impacts on a community.

“... research indicates that home visiting holds significant potential to improve birth outcomes, improve child health and development, improve parenting skills, and reduce child maltreatment. Further, cost savings resulting from the improved health, developmental and social outcomes associated with home visiting can make this approach a cost-effective investment for states”

ASTHO 2006



“It is not possible to give underprivileged mothers too much help and support of the right kind”

Gutelius & Kirsch 1975

QUESTIONS?



For more information, please contact me at

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Thank you for coming!

