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WASHINGTON STATE UNIVERSITY
COLLEGE OF NURSING

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



THE IMPORTANCE OF BIRTH OUTCOMES TO THE HEALTH OF THE PUBLIC

- The U.S. infant mortality rate is high among industrialized nations (Hamilton et.al., 2007)
- Disorders related to short gestational age and low birth weight accounted for 36.5% of infant deaths in the U.S. in 2004 (MacDorman & Assoc, 2007)
- Improving birth outcomes and decreasing the incidence of infant mortality are Healthy People 2010 goals (DHHS, 2007)

WHY HOME VISITING?

- The Sheppard-Towner Maternity and Infant Protection Act of 1921 committed funds to nurse home visiting for pregnant women and infants
- Home visiting is included as a preferred service strategy for pregnant and postpartum women in the 1935 Title V of the Social Security Act
- Home visiting identified as a tool to address infant mortality and other poor pregnancy outcomes in the 1989 National Commission to Prevent Infant Mortality Report
- The 2010 Affordable Care Act includes \$1.5 billion earmarked over 5 years to provide home visiting services for the MCH population

RESEARCH FINDINGS REGARDING MCH HOME VISITING

David Olds - Reported that home visited women

- ☑ Smoked Less
- ☑ Had fewer behavioral impairments related to alcohol and drug use
- ☑ Delayed future pregnancy
- ☑ Used significantly fewer public resources
- ☑ Had fewer arrests

- ☑ And, if smokers, had significantly lower rates of preterm births

MORE RESEARCH FINDINGS

Donovan & Associates

- ☑ Infant mortality rates were 2.5 times higher in non home visited babies (2007)

Cramer, Chen, Roberts & Clute

- ☑ Health and social service costs were 22% to 31% lower for home visited babies compared to non home visited (2007)

SIGNIFICANCE OF THE PROBLEM

- Home visiting is expensive
- Long standing public health programs are rightfully being required to evaluate themselves and make necessary changes
- Montana has health and access issues that have the potential to be positively impacted by PHHV

STUDY DESIGN

- Quasi-experimental
- Retrospective
- Case controlled
- Field based research, using population based data

SETTING AND SAMPLE

- Montana - state wide
- High risk women who lived in and delivered a live born singleton infant in the state in 2006

DATA SOURCES

- All data was from data sources filed with 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

- 12,092 singleton births in the data set
- 17 (0.1%) were missing BW and/or GA
- 12,075 selected for analysis

		Deleted Cases n = 17		Cases Selected for Analysis n = 12,075	
			%		%
Maternal Age	Mean	27.6	n/a	26.8	n/a
Maternal Race	Caucasian	13	76.5	10,237	84.8
Marital Status	Not Married	5	29.4	4351	36
Maternal Education	< HS	4	23.5	1,758	14.6
Residency	Urban	8	47.1	4,531	37.5
	Large Rural	3	17.6	3,088	25.6
	Small Rural	6	35.3	4,450	36.9

AIM 1

- **Determine the predictive ability of six demographic measures to identify low birth weight and premature births in Montana.**
 - **Hypothesis:** Women who are less than twenty years of age or greater than thirty four years of age, are non-Caucasian, have less than or equal to a high school education, are unmarried, who live in rural or frontier communities, or who have a public payer source (Medicaid) are more likely to experience poor birth outcomes, specifically low birth weight and/or premature births.

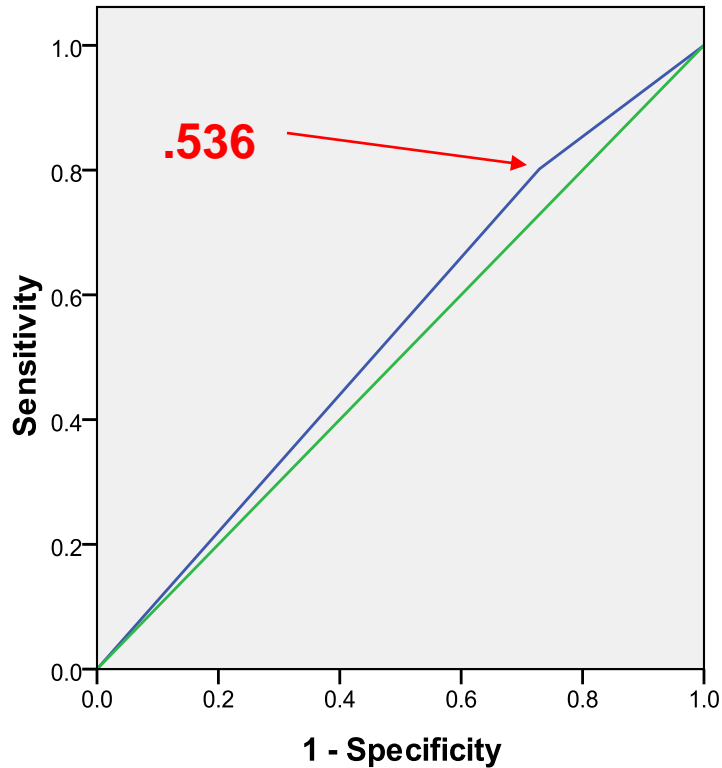
PREDICTIVE CAPACITY OF INDIVIDUAL VARIABLES FOR PREMATURITY AND LBW

Variable	Prematurity		LBW	
	Area	Significance	Area	Significance
Maternal Age	.518	.064	.521	.073
Maternal Race	.517	.075	.502	.875
Marital status	.536*	.000	.554*	.000
Maternal Education	.512	.205	.524**	.039
RUCA region	.506	.529	.517	.145
Medicaid Birth	.563*	.000	.571*	.000
<p>** Significant at $p \leq .05$ * Significant at $p \leq .001$</p>				

PREDICTIVE CAPACITY FOR AGGREGATE VARIABLES

Prematurity

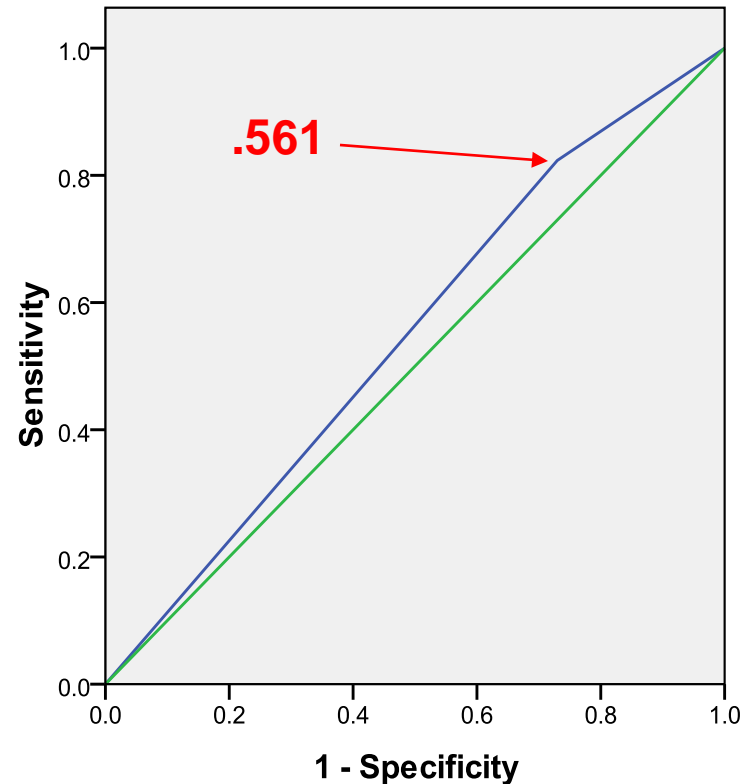
ROC Curve



Diagonal segments are produced by ties.

Low Birth Weight

ROC Curve



Diagonal segments are produced by ties.

AIM 1 SUMMARY

- Based on the uninspiring ROC results, the inconsistencies in findings between ROC and follow up logistic regression and post hoc testing, the hypothesis was rejected
- Demographics, alone, are not useful predictors of prematurity and low birth weight birth

AIM 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.**
 - **Hypothesis:** High risk women receiving home visiting services and adequate prenatal care will have lower incidences of low birth weight and premature compared to high risk women who did not receive home visiting services and/or adequate prenatal care in Montana.

LOGISTIC REGRESSION VARIABLES

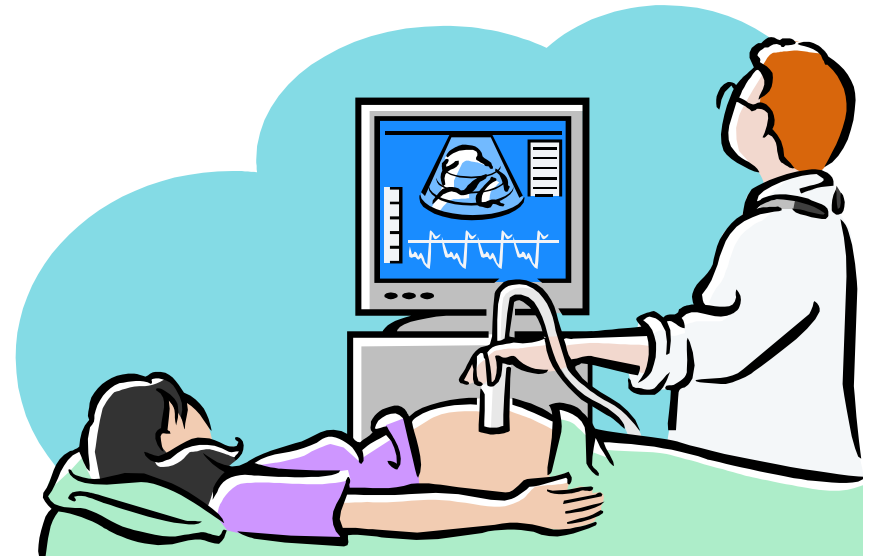
Phi Coefficient Correlations between Gestational Age and Birth Weight and Risk Factors				
	Gestational Age Phi coefficient	Significance	Birth Weight Phi coefficient	Significance
Maternal Age	.024*	.007	.023*	.011
Maternal Race	.026*	.004	.002	.805
Maternal Education	.019*	.040	.031**	.001
Marital status	.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 significant correlations to BOTH gestational age and birth weight				

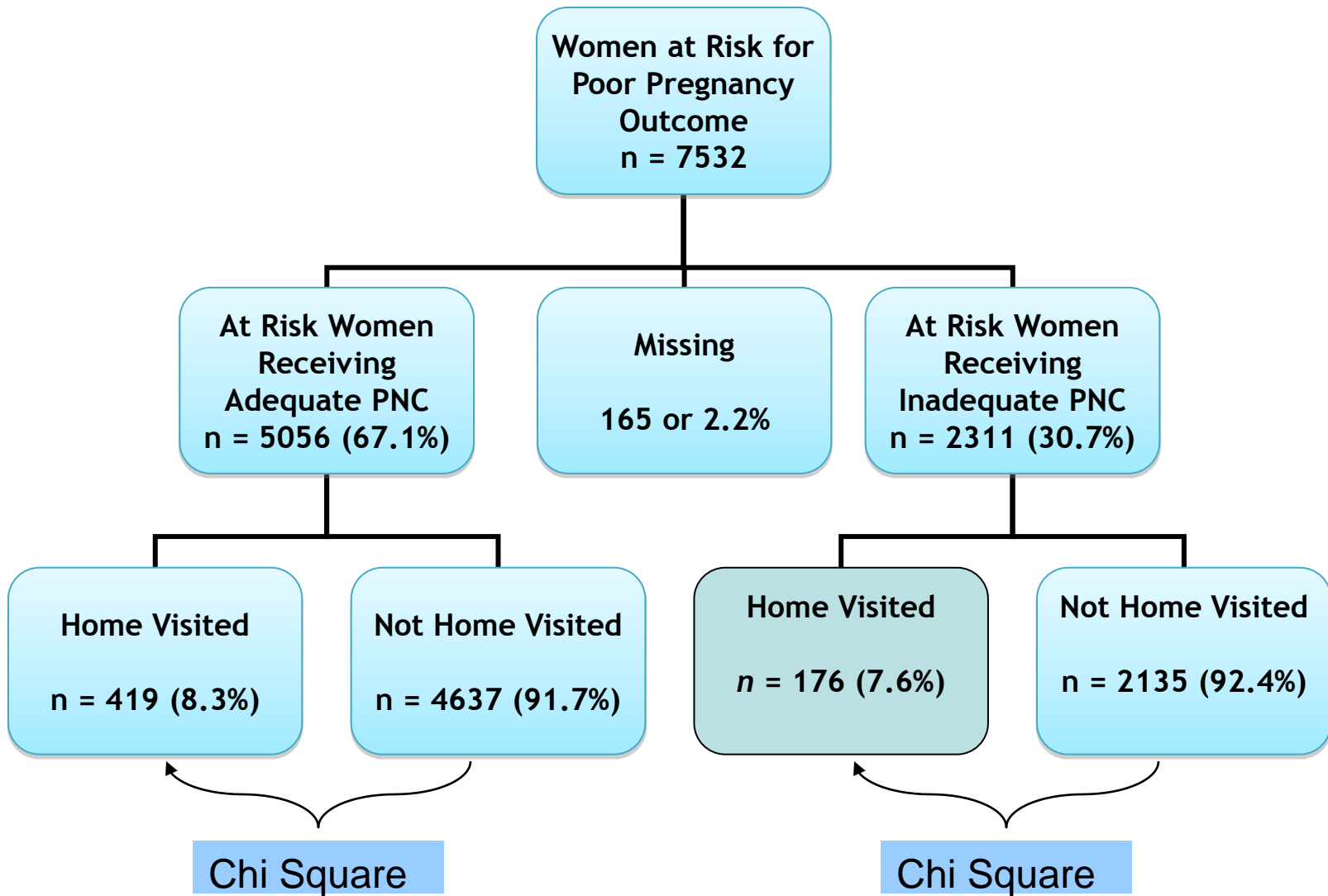
AT RISK POPULATION

- Based on presence of one or more of the seven risk factors significantly correlated with both premature and LBW birth, 7,532 or 62.4% of the 12,075 singleton births, were considered “at risk.” Of those
 - 6931 did not receive home visiting services
 - 601 did receive home visiting services

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 <i>n</i> = 419	No <i>n</i> = 4637
Premature	Yes	49 (11.7%)	507 (10.9%)
	No	370	4130
Low Birth Weight	Yes	27 (7.3%)	325 (7.9%)
	No	392	4312

Differences between groups were not statistically significant

BIRTH OUTCOMES FOR WOMEN WHO RECEIVED INADEQUATE PRENATAL CARE

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

Differences between groups were not statistically significant

SUMMARY OF AIM 2

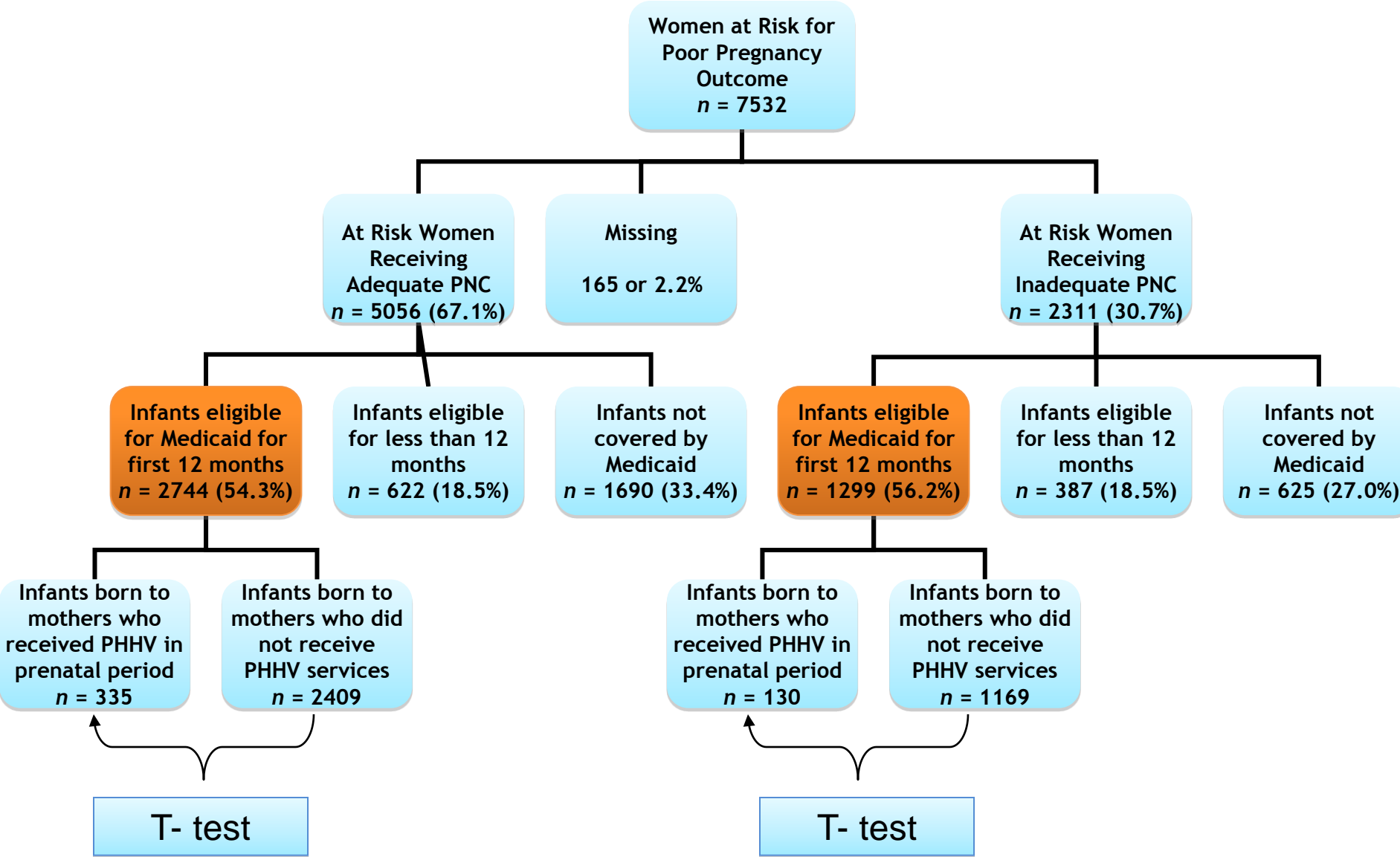
- No statistically significant findings between birth outcomes of women who did and did not receive PHHV services
- Women who received PHHV services received significantly more medical prenatal care visits than women who did not receive PHHV services
- Hypothesis that home visiting improved birth outcomes (premature and LBW births) was not supported

AIM 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.**
 - **Hypothesis:** The Medicaid billed charges during the first year of life for infants whose mothers received home visiting services during pregnancy will be lower than the Medicaid billed charges for infants whose mothers did not receive home visiting services.

POPULATION ASSESSED

- 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
- Medicaid eligibility is reassessed at least every two months, and infants may have become ineligible based on family income



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

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

Differences between groups were not statistically significant

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

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

Differences between groups were not statistically significant

SUMMARY OF ANALYSIS 3

- The hypothesis that PHHV services decrease infant Medicaid costs was not supported
- Higher costs may be attributable, in part, to Targeted Case Management payments

WHAT WAS LEARNED

- Prediction of poor pregnancy outcomes is a complex issue - demographics used in conjunction with health and pregnancy history improve predictability of risk
- In the present study, home visiting was not associated with improved pregnancy outcomes
- In the present study, home visiting was also not associated with decreased Medicaid costs for infants

WHAT WAS ALSO LEARNED

- Other outcomes measures should be examined and captured for analysis
 - Life course
 - Infant health
 - Other cost savings measures
- The linked data set is a useful tool, worth continued development

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

- Addresses an important issue in public health nursing, using existing data in the field setting
- Uses a design that allows for good statistical power due in part to large sample size
- The Affordable Care Act dedicated \$1.5 billion to new and expanded evidenced based home visiting over the next 5 years.


RESEARCH POTENTIAL

- Assess validity and reliability of HV data
- Aggregate years to increase analytic power
- Quantitative Analyses Foci
 - Tobacco cessation impact on outcomes
 - Dose and program rigor with outcomes
 - Health outcome disparities using RUCA
 - Long term Medicaid costs
- Qualitative Analysis
 - Client perceptions re impact of HV

THOUGHTS 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 states such as Montana, small gains may result in large changes for a community.

A close-up photograph of a person's hands, palms up, holding a small, light-colored starfish. The hands are slightly wet, and the starfish is resting on the fingers. The background is a soft, out-of-focus grey.

**“... 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?

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Thank you for coming!



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