

**The Impact of Prenatal Care Coordination on Birth Outcomes in Wisconsin**

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**Objectives**

- Discuss the background and purpose of the study
- Review the conceptual framework
- Present the research findings
- Discuss the conclusions and recommendations

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**Background**

- Decreasing rate of infant mortality over past 50 years
- Plateaued at approx. 7 deaths/1,000 births over last ten years
- Increasing disparities between Caucasian and African American infant mortality—Disparity in WI worse than US rate of disparity

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### Background (cont.)

- Leading causes of infant mortality: congenital malformations, disorders related to short gestation and low birth weight, and SIDS
- Prenatal Care Coordination (PNCC) introduced in 1985 as a Medicaid benefit to impact low birth weight and prematurity

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### Challenges in Evaluating PNCC Programs

- Definition of services varies from state to state; program to program
- Service population varies from state to state (universal vs. targeted)

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### Purpose of this Study

To measure the effectiveness of the Wisconsin Medicaid benefit of PNCC and its impact on healthy birth outcomes.

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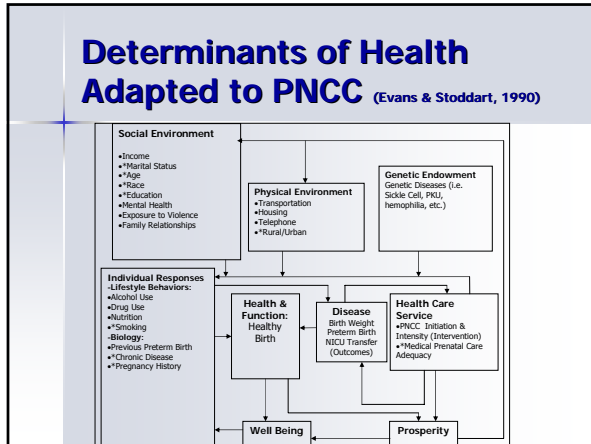
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- ### The Move from Efficacy to Effectiveness
- State-wide studies of PNCC vary
  - Support relationship between PNCC and reduced incidence of LBW: Kentucky, North Carolina, Florida, and Washington
  - Did not support relationship between PNCC and reduced incidence of LBW: Iowa, Tennessee, and Wisconsin

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- ### Research Question
- What effect does PNCC have on birth outcomes?
- Hypotheses 1-4: PNCC or not and relationship with birth weight, low birth weight, preterm birth, & NICU admission
  - Hypotheses 5-8: Intensity of PNCC and relationship with birth weight, low birth weight, preterm birth, & NICU admission

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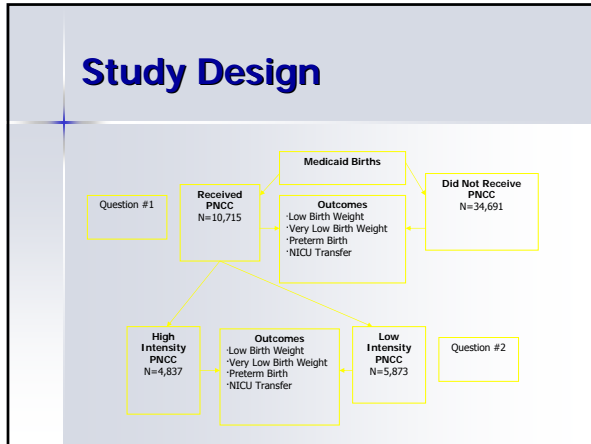
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### Three types of Variables

**Outcome Variables (Dependent):**  
Birth weight, Preterm Birth, NICU Admission

**Intervention Variables (Independent):**  
PNCC, Intensity of PNCC

**Covariates (Determinants of Health)**

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### Outcome Variables

- Birthweight: Normal, low birth weight (<2500 gms), and very low birth weight (<1500 gms)
- Preterm Birth: < 37 weeks gestation
- NICU Transfer: Yes or No

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**Intervention Variables**

- PNCC Services: Yes or NO
- Intensity: Four groups
  - Early entrance (< 16 weeks)/high intensity ( $\geq 4$  hours)
  - Early entrance (<16 weeks)/low intensity (< 4 hours)
  - Late entrance ( $\geq 16$  weeks)/high intensity ( $\geq 4$  hours)
  - Late entrance ( $\geq 16$  weeks)/low intensity (< 4 hours)

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**Covariates (Determinants of Health)**

- Social: Age, Race, Education, Marital Status
- Physical: Urban/Rural
- Individual Response: Smoking, Medical History, Pregnancy History
- Health Care: Medical Prenatal Care Adequacy

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**Sample**

- All Medicaid births in WI in 2001 & 2002 (N = 45,406)
- Total # of women who received PNCC = 10, 715 (23.6% of sample)

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### Sample Attributes

- Age: Range 12-50 years (M = 23.87)
- Race: 60% Caucasian; 23% Non-Hispanic Black; 11% Hispanic; 3% Native American; 3% Laotian/Hmong
- Marital Status: 66% Single
- Education: Range None to Graduate Level (M = 12 years)

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### Sample Attributes (cont)

- Geography: 54% Urban; 46% Rural
- Smoking: 30% smoked cigarettes
- Pregnancy History: 33% Primips; 8% 6+ pregnancies
- Medical History: 49% had at least one medical condition
- Medical Prenatal Care: 65% had Adequate care per Kessner index

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### PNCC Intervention

- 52% initiated care at < 16 weeks
- 45% had high intensity service
- 45% of care in public sector agencies; 48% in private sector agencies
- 22% of care provided in homes; 77% of care provided in clinics/offices

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### Data Analysis

- Univariate and bivariate analyses conducted
- Logistic Regression conducted, using one of four birth indicators as outcome variable, PNCC as intervention variable, and eight covariates as part of formula
- Odds ratios and significance used for analyses

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### Results of Question #1: Impact of PNCC

Birth Outcome	Odds Ratio	95% Confidence Interval	Significance
Low Birth Weight	.842	.777, .912	< .0001
Very Low Birth Weight	.709	.587, .855	< .0001
Preterm Birth	.831	.776, .890	< .0001
NICU Admission	.829	.759, .906	< .0001

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### Covariates' Impact on Birth Outcomes (Odds Ratios in Presence of PNCC)

Covariate	LBW	VLBW	Preterm	NICU
Unmarried	1.086	1.352	1.123	1.148
Non-Hispanic Black	1.731	2.134	1.489	1.315
Smoked Cigarettes	1.638	1.350	1.086	NS
6+ Pregnancies	1.289	1.423	1.387	1.301
Medical Condition	1.470	1.707	1.267	1.648
< High School Education	NS	1.184	NS	NS
Late Prenatal Care	NS	NS	1.111	NS
Urban Resident	NS	NS	NS	1.324

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**Results of Question #2:  
Impact of High Intensity  
PNCC Services**

Birth Outcome	Odds Ratio	95% Confidence Interval	Significance
Low Birth Weight	.790	.685, .912	.001
Very Low Birth Weight	.533	.375, .758	< .0001
Preterm Birth	.744	.657, .842	< .0001
NICU Admission	.796	.678, .935	.006

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**Covariates' Impact on Birth Outcomes (Odds Ratios in Presence of High Intensity PNCC)**

Covariate	LBW	VLBW	Preterm	NICU
Non-Hispanic Black	1.667	2.293	1.386	NS
Smoked Cigarettes	1.613	NS	NS	NS
6+ Pregnancies	NS	NS	1.515	NS
Medical Condition	1.534	2.125	1.361	1.849
Late Prenatal Care	NS	NS	1.192	NS
Urban Resident	NS	NS	NS	1.442

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**Other Findings—PNCC Service Levels**

- 24% of the PNCC population had less than 2 hours of service
- New analyses comparing OR of total PNCC and 2+ hours of service
- All OR's significant at < .0001

Birth Outcome	Total PNCC	2+ Hours PNCC
LBW	.842	.822
VLBW	.709	.683
Preterm	.831	.798
NICU	.829	.818

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### Impact of PNCC for Specific Populations

Covariate	LBW	VLBW	Preterm	NICU
Total Population	.842	.709	.831	.829
< 18 years of age	.599	.486	.722	.567
Unmarried	.804	.627	.796	.790
Non-Hispanic Black	.738	.594	.722	.725
Smoked Cigarettes	.874	.686	NS	.750
6+ Pregnancies	NS	NS	NS	.727
Medical Condition	.857	.791	.861	.865

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### Discussion—Impact of PNCC

- PNCC significantly protected against LBW, VLBW, Preterm Birth, and NICU admission (16-29% less likely to happen)
- This happened in a population significantly more at risk than the general population
- More women could benefit from the program (93% had at least one risk factor; only 23.6% of population received PNCC)

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### Discussion—Impact of PNCC (cont)

- Protective effect could be even greater based on evidence from other studies
- Data suggests interventions focused on specific determinants would enhance the protective effect

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### Discussion—PNCC Dosage

- Late initiation/High intensity had significant protective effect on all four birth outcomes
- High intensity also had the same effect
- Early initiation increased risk of VLBW, Preterm birth, NICU transfer
- Sustained intervention is necessary to create relationship that provides emotional support and motivates behavior change

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### Discussion—Additional Findings

- PNCC more effective within social determinant of health populations
- Many women receive far too low a dose of PNCC
- Significant cost savings may be secured through the program

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### Recommendations for Nursing Practice

- Enhance outreach
- Improve engagement
- Focus interventions based on assessment
- Design systems of care with a life cycle and social ecological approach

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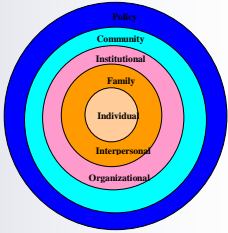
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### Social Ecological Model

- Individual
- Family/  
Interpersonal
- Institutional
- Community
- Policy



The diagram illustrates the Social Ecological Model as a series of concentric circles. From the center outwards, the layers are: Individual (orange), Interpersonal (pink), Family (light blue), Institutional (light green), Community (medium blue), and Policy (dark blue). Each layer is labeled with its corresponding level.

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### Recommendations for Health Policy

- Make PNCC universally available to women on Medicaid
- Restructure reimbursement to reward outreach, engagement, and outcome achievement
- Enhance data systems to monitor outcomes
- Enhance linkages between PNCC Providers, HMO's and medical providers
- Ongoing training and record audits

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### Recommendations for Research

Further analysis of:

- Dosage
- Specific interventions
- Types of providers
- Setting of care provision
- Cost effectiveness
- Random Controlled Studies of Standard vs. Enhanced PNCC

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**Conclusion**

- PNCC is an effective intervention in reducing the risk of LBW, VLBW, and preterm births, and NICU transfers
- The intervention is even more effective when delivered in higher doses
- These findings suggest that WI should expand and enhance PNCC

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**Conclusion (cont.)**

- Provide universal access
- Customize interventions and use evidence-based approaches
- Reward outreach to high risk groups and higher intensity of services
- Maintain an integrated, holistic approach to care
- Assure fidelity of the model

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**Questions & Discussion**

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