The Impact of Prenatal Care Coordination on Birth Outcomes in Wisconsin

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Objectives

- Discuss the background, purpose, and significance of the study
- Review the conceptual framework and key literature related to this study
- Present the research findings
- Discuss the conclusions and recommendations

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

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

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)

Purpose of this Study

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

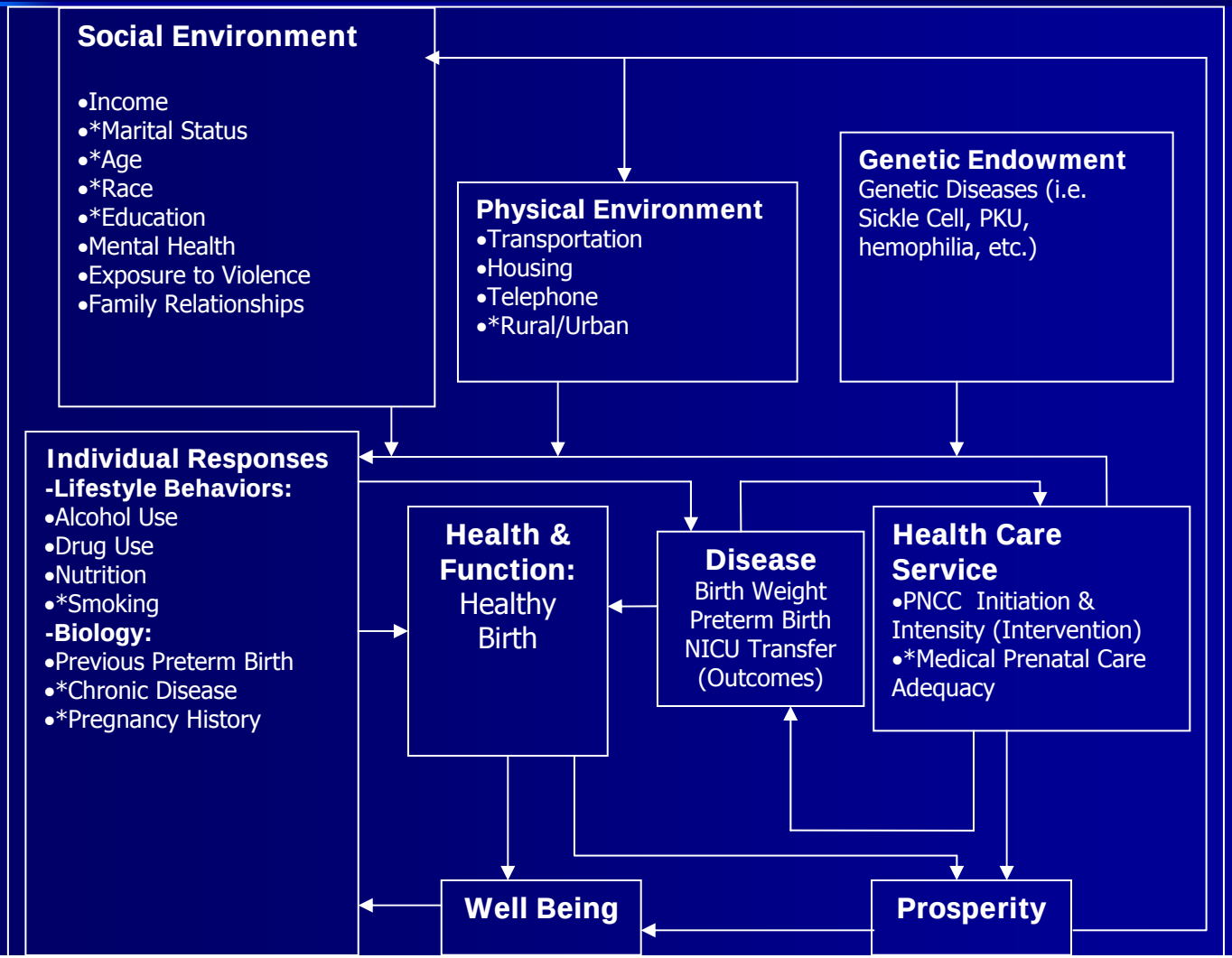
Significance

- Link the evaluation to Wisconsin's goals and objectives for PNCC
- Disaggregate the effect on different levels of birth weights—normal, low, and very low
- Also measure the effect on other birth outcomes—preterm birth and NICU admission
- Measure the effect of intensity of service on birth outcomes

Significance (cont.)

- Explore relationships between determinants of health (moderating variables) and effect of the program on birth outcomes
- Contribute to the development of nursing as a profession

Determinants of Health Adapted to PNCC (Evans & Stoddart, 1990)



Social Environment

- More likely to seek support from family & friends, have a labor support person, and involve father of baby (Olds et al., 1986)
- Receiving psychosocial assessment & intervention reduced risk of LBW baby (Wilkinson et al., 1998)
- Single women who received PNCC less likely to deliver LBW baby (Baldwin et al., 1998)

Social Environment (Cont)

- Teen mothers who receive PNCC have reduced rates of LBW births (Hardy et al., 1987; Korenbrot et al, 1989; Olds et al., 1989; Baldwin et al., 1998)
- Significant improvement for African American women in Baldwin et al. study, but not in three smaller studies (Jewell & Russell, 2000; Klerman, et al., 2001; Thompson et al., 1998)

Physical Environment

- One stop shopping reduced # of LBW babies and "drop-in" deliveries (Michala & Miner, 1991)
- Transportation resources key need of women who receive PNCC (State of WI, 2006)

Genetic Endowment

No studies were reviewed that addressed this determinant

Individual Response-Biology

- Reductions in kidney infection (Olds et al, 1986)
- Reduction in incidence of anemia (Hardy et al., 1987)
- Reduction in preeclampsia (Hardy et al., 1987)
- Reduction in subsequent premature birth (Loomis & Martin, 2000)

Individual Response-Lifestyle

- Smoking: Significant reductions noted by Olds et al.; Middleton & al.; Ricketts et al. (2005) noted reduction in smoking and correlation with LBW
- Alcohol: Limited study

Individual Response-Lifestyle (Cont.)

- Nutrition: Increased weight gain (Olds), higher weight gains (Hardy), increased vitamin use (Piper et al, 1996), link between nutrition and LBW (Ricketts, 2005), increased utilization of WIC (Bradley & Martin, 1994; Olds et al.; Reichman & Teitler, 2003).

Health Care—Medical Prenatal Care

- More medical prenatal visits (Hardy)
- Reduction in delayed care or no care (Middleton; Tyson, 1997)
- Increased rate of adequate care (Baldwin & Chen, 1996; Jewell & Russell; Poland et al., 1992; Piper et al., 1996; Baldwin et al., 1998)

Health Care-PNCC

- Women who received phone calls had higher mean birth weights (Little et al., 2002)
- PNCC provided by paraprofessionals resulted in higher birth weights than controls (Poland et al., 1992)

Health Care—PNCC Dosing & Adequacy

- Bradley & Martin (1996)

Classified cases as adequate, intermediate, or inadequate

# of visits did not predict birthweight

Intermediate and Adequate/intermediate were significant predictors of birthweight

Limitations: Low # in adequate group; selection bias

Further study recommended

Health Care—PNCC Dosing & Adequacy

- Baldwin & Chen (1996)

Looked at timing and initiation of PHN contact

1st trimester PHN contact protective for adequate medical prenatal care and significant for predicting gestational age, but not for birthweight

# of visits not a predictor for birthweight, gestational age, or adequate medical prenatal care

The Move from Efficacy to Effectiveness

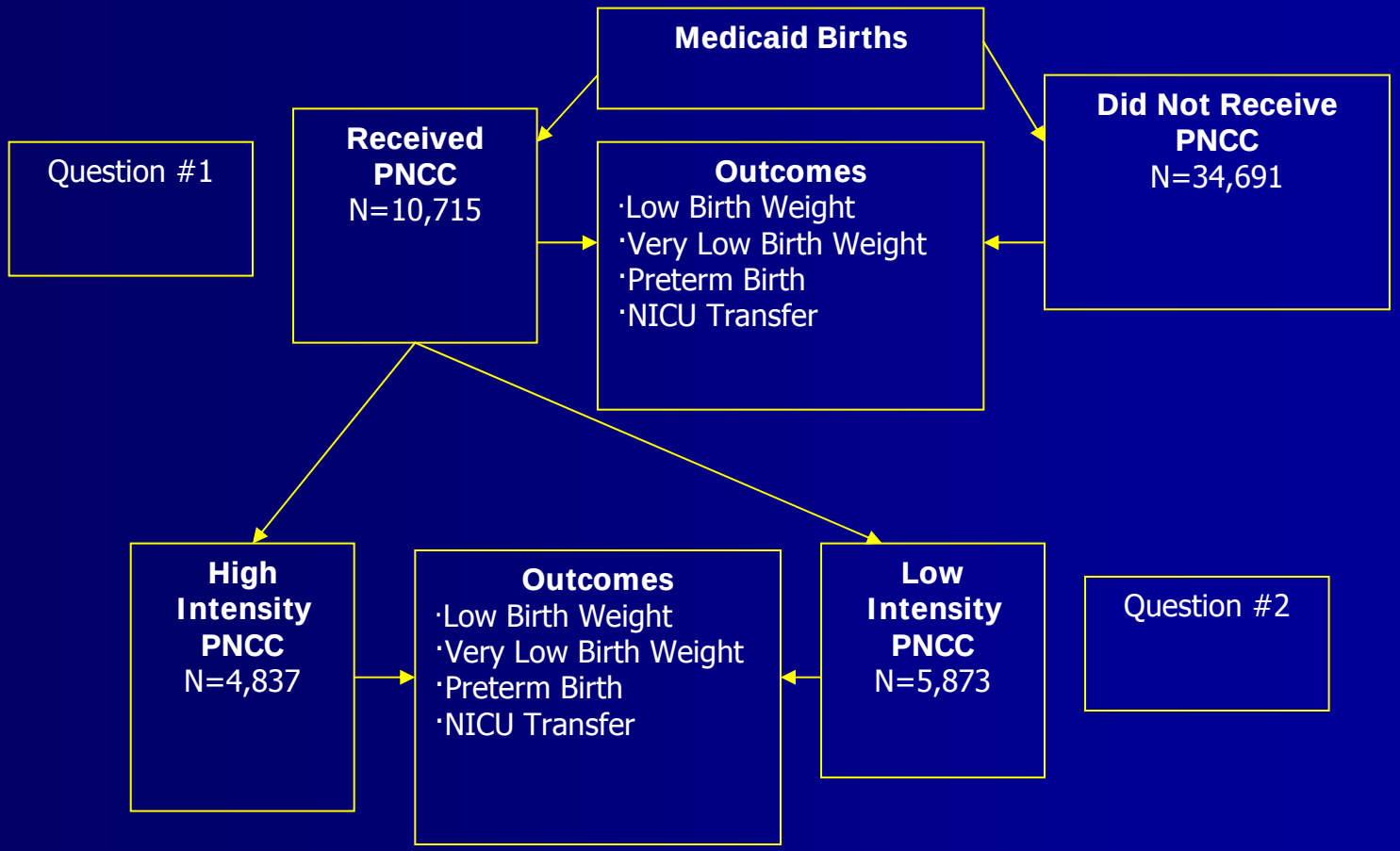
- State-wide studies of PNCC vary
- Support relationship between PNCC and reduced incidence of LBW: Kentucky, North Carolina, Florida, and Washington
- Did not support relationship between PNCC and reduced incidence of LBW: Iowa, Tennessee, and Wisconsin

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

Study Design



Three types of Variables

Outcome Variables (Dependent):

Birth weight, Preterm Birth, NICU Admission

Intervention Variables (Independent):

PNCC, Intensity of PNCC

Covariates (Determinants of Health)

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

Intervention Variables

- PNCC Services: Yes or NO
- Intensity: Four groups

Early entrance (< 16 weeks)/high intensity (≥ 4 hours)

Early entrance(<16 weeks)/low intensity (< 4 hours)

Late entrance (≥16 weeks)/high intensity (≥ 4 hours)

Late entrance (≥16 weeks)/low intensity (< 4 hours)

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

Sample

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

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)

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

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

Data Management

- Upon finalization of IRB approval and completion of Data Use Agreements with State of WI, data were electronically transferred to researcher
- All data were de-identified
- All data were encrypted
- Frequencies were compared to assure a full transfer

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

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

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

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

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

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

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

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

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

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)

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

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

Discussion—Additional Findings

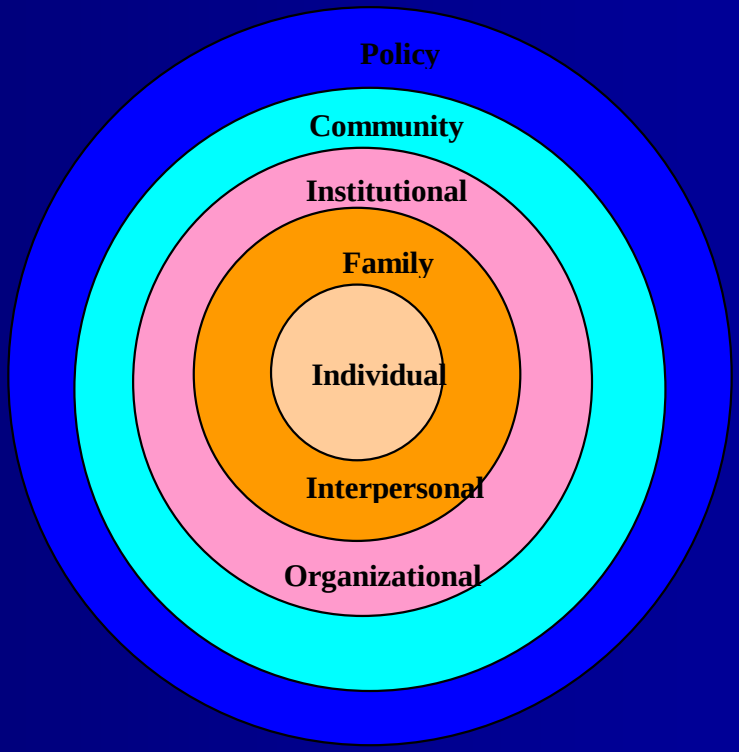
- PNCC more effective within social determinant of health populations
- Many women receive far too low a dose of PNCC
- Significant cost savings may be secured through the program

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

Social Ecological Model

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



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

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

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

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

Questions & Discussion

Thank You!

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