Chart Summary of Literature Review: Facts on the Effectiveness of Prenatal Care Coordination:
To what extent does evidence suggest enhanced prenatal care services contribute to producing healthy birth outcomes?

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Reviews of Multiple Trials

Study	Definition of PNCC Intervention & Sample	Specific Criteria for Measurement	Theoretical Framework	Outcomes Measured	Results	Comments
Support during pregnancy for women at increased risk of low birthweight babies. Hodnett, ED; Fredericks, S. Cochrane Pregnancy and Childbirth Group, Cochrane Database of Systematic Reviews. 2003;(3):CD000198.	Programs may include advice and counseling (about nutrition, rest, stress management, alcohol and recreational drug use), tangible assistance (e.g. transportation to clinic appointments, help with household responsibilities), and emotional support. The programs may be delivered by multidisciplinary teams of health professionals, by specially trained lay workers, or by a combination of lay and professional workers.	Randomized trials of additional support during at-risk pregnancy by either a professional (social worker, midwife, or nurse) or specially trained lay person, compared to routine care.	Searched the Cochrane Pregnancy and Childbirth Group trials register (30 January 2003). Sixteen trials involving 13,651 women were included.	Multiple outcomes measured using double data entry and additional information gathered from RCT researchers.	Only consistent result was that highest risk pregnant women have a reduced likelihood of caesarean birth and an increased likelihood of elective termination of pregnancy.	Pregnant women need the support of caring family members, friends, and health professionals. While programs which offer additional support during pregnancy are unlikely to prevent the pregnancy from resulting in a low birthweight or preterm baby, they may be helpful in reducing the likelihood of caesarean birth.

Single Journal Articles

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Evaluation of a pregnancy outcome risk reduction program in a local health department. Tavris D. Healy-Haney N. Anderson IM. Wisconsin Medical Journal. 99(2):47-51; 2000.	This study assesses the effectiveness of the Waukesha County Public Health Department's Prenatal Care Coordination Program (PNCC) in reducing self-reported risk factors for adverse pregnancy outcomes in pregnant clients, through assessment, preventive counseling, and follow-up.	There were 166 clients enrolled in the program. They received up to three follow-up visits, with 83 seen at the 12-week follow-up, 106 seen at the 24-week follow-up, 74 seen at the 38-week follow-up, and 151 unduplicated clients received at least one follow-up.	None identified.	Drinking, smoking, nutrition.	Mean alcohol intake decreased from 9.6 drinks per month at baseline to none by the 38-week follow-up visit. Mean cigarette smoking decreased from 12.8 cigarettes per day to 2.4. Street drug use decreased almost completely. There were statistically significant increases in milk, meat, fruit, bread, and vegetable consumption, and folic acid and multi-vitamin supplementation.	This is a program evaluation for PNCC in Waukesha, Wisconsin. Although it is not a clinical trial, it is included in this review because of locality, and because it pertains to this current program evaluation.

[1] This summary incorporates information from a review of literature "Prenatal Care Coordination: A Comprehensive Review" August 6, 2004, completed by Julie A. Willems Van Dijk, Public Health Officer Marathon County, Wisconsin.

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A randomized trial of nurse specialist home care for women with high-risk pregnancies: outcomes and costs. Brooten D, Youngblut JM, Brown L, Finkler SA, Neff DF, Madigan E. The American Journal of Managed Care. 7(8):793-803;2001.	Control women received usual prenatal care. Intervention women received half of their prenatal care in their homes, with teaching, counseling, telephone outreach, daily telephone availability, and a postpartum home visit by nurse specialists with physician backup.	A sample of 173 women (and 194 infants) with high-risk pregnancies (gestational or pregestational diabetes mellitus, chronic hypertension, preterm labor, or high risk of preterm labor) were randomly assigned to the intervention group (85 women and 94 infants) or the control group (88 women and 100 infants).	Randomized control trial. Controlled among groups for age, marital status, education, and health insurance status.	The intervention group had lower fetal/infant mortality vs. the control group (2 vs. 9), 11 fewer preterm infants, more twin pregnancies carried to term (77.7% vs. 33.3%), fewer prenatal hospitalizations (41 vs. 49), fewer infant rehospitalizations (18 vs. 24), and a savings of more than 750 excess hospital days and $2,496,145	Lower infant mortality, fewer preterm births, more twin pregnancies carried to term, fewer prenatal hospitalizations, and cost savings of $2.5 million compared to the control group.	This model of care provides a reasoned solution to improving pregnancy and infant outcomes while reducing healthcare costs.
The effects of Florida's Medicaid eligibility expansion for pregnant women. Long SH, Marquis MS. American Journal of Public Health. 88(3):371-76;1998.	Article discusses success of expanded Medicaid program in Florida (up to 150% FPL from 133% FPL). Analyses utilized matched birth/death records, hospital discharge data, Medicaid eligibility records, and county health department records.	Various program and birth outcomes. Birth outcomes include LBW, VLBW, and IMR. Study compares predicted outcomes calculated from 1988-89 data to predict 1991 outcomes.	Concurrent and longitudinal study design. Four comparison groups, 1) eligibility expansion group; 2) Medicaid eligible women receiving aid to families with dependant children (AFDC); 3) uninsured women and women with other non private third party insurance; 4) low income but with private insurance mothers.	Medicaid Expansion.	Compared to predicted change, expansion group had a lower percent initiation in third trimester entry (7.3 vs. 4.7), lower LBW infants per 1000 (67.2 vs. 60.6), higher VLBW per 1000 (8.9 vs. 9.2); and lower infant deaths per 1000 (6.9 vs. 6.5).	95% CI's are not reported, significance is assessed across groups at different times. One way to remove barriers to office based care is to accompany eligibility expansion with fee increases for prenatal care services.
Outcomes of enhanced prenatal services for Medicaid eligible women in public and private settings. Simpson L, Korenbrot C, Greene	Comprehensive Perinatal Services Program (CPSP) in California MA population. Services include assessment of psychosocial, nutritional, health	Multi center study in rural and urban areas. Evaluation occurs across service areas.	Comparative study, no specific framework stated.	Various maternal and program characteristics; LBW and preterm are outcome indicators.	Odds for LBW varies by service location. Compared to Private physicians, adjusted odds ratios for LBW and Preterm are 2.13 (1.47-3.09) and 2.50 (1.77, 3.53), respectively in health department clinics.	Adjusted for prenatal care use, outcomes were still better for women seen in private physicians' offices than for women seen in public health department clinics, community clinics, or private hospital clinics.

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J. Public Health Reports. 112(2):122-132;1997.	education, individual counseling, and risk assessment, clinical care.					
A performance indicator of psychosocial services in enhanced prenatal care of Medicaid eligible women. Wilkinson DS, Korenbrot C, Greene J. Maternal and Child Health Journal. 2(3):131-43;1998.	Additional psychosocial services in addition to MA services. These include face to face assessments for social support, attitudes of pregnancy, history, goal setting and care plan development, AODA, housing, education, financial and material resources.	Intervention includes 27 sites and 3,467 women.	Comparative study, no specific framework stated.	LBW, preterm birth.	Women who received at least one psychosocial assessment each trimester of care had lower odds for LBW (0.49; 0.34-0.71) and Preterm birth (0.53; 0.40-0.72) than women with inadequate services.	The effect did not depend on the credentials of the provider or the practice setting type. Adequacy of psychosocial services according to a practice guideline appears to meet a fundamental criterion for a performance indicator.
Primary case management and birth outcomes in the Iowa Medicaid program. Schulman ED, Sheriff DJ, Momany ET. American Journal of Public Health. 87(1):80-84;1997.	Physician care management, adequate prenatal care, early entry, enhanced services.	Compares managed care with fee-for-service in seven Iowa counties.	This study used a longitudinal design, with the seven demonstration counties composing the managed care group and seven matched counties with fee-for-service (FFS) systems serving as quasi-experimental controls.	Kessner adequacy of prenatal care, trimester of initiation, population percent receiving enhance services, LBW/VLBW, GA, DRG assessment	There were no significant differences between groups in mean gestational age or birthweight; however, there was an increase of very-low-birthweight babies in both groups.	
Explaining variation in birth outcomes of Medicaid eligible women with variation in the adequacy of prenatal services. Homan RK, Korenbrot C. Medical Care. 36(2):190-201;1998	Use of services (adequate visits, onset of care, first source of care), adequacy of support service assessment (psychosocial, health education, and nutritional risks). This was assessed across different providers.	Measured in a variety of settings: community clinics, health department, public and private hospitals, and private physicians. Total of 27 Medi-Cal Sites in California.	Comparative study, no specific framework stated.	Various maternal characteristics; LBW and preterm BW are outcome indicators.	Adherence to adequate support service delivery (psychosocial, health education, and nutrition) for low income women is associated with better birth outcomes.	Adequacy of support did not explain variation in risk adjusted birth outcomes among individual sites, however.
A comparison of low birth weight among Medicaid patients of public health departments and other providers of prenatal care in North Carolina and Kentucky	In addition to a standard package of services, ancillary services such as nutritional support, linkage to WIC, and other health education components.	Measurement compares services received in public health departments to services received	Comparative study, no specific framework stated.	Maternal characteristics, adequacy of prenatal care, LBW, VLBW, IMR, WIC	Lower odds of infants being LBW for women in Medicaid who received PNC at local health departments compared to similar Medicaid women receiving services elsewhere.	Births with no prenatal care are excluded. Could not adjust for AODA, other characteristics. Limited to birth certificate data.

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Buescher PA, Ward NI. Public Health Reports. 107(1):54-59;1992.		from other Medicaid service providers.		enrollment percent	Women under 18, odds of LBW and VLBW are for white women (1.5, 1.78), and for black women (1.35, 1.45). Odds of smoking also higher.	
Effects of home visiting program on prenatal care and birthweight: a case comparison study. Poland ML, Giblin PT, Waller JB, Hankin J. Journal of Community Health. 17(4):221-229;1992.	To council and assist pregnant women with health and social services, housing, food, transportation, and other basic necessities.	Of 650 women in case group, 111 Detroit women receiving at least three visits, had singleton delivery during the two years of the program were matched with 111 women from Hutzel Hospital prenatal clinic.	Case comparison study. Of 650 women in case group, 111 Detroit women receiving at least three visits, had singleton delivery during the two years of the program were matched with 111 women from Hutzel Hospital prenatal clinic.	Race, employment, marriage, late entry to PNC, age, parity. Birth outcomes include Kessner index, weeks pregnant, number of visits, birthweight in grams.	Patient group had a significantly higher enrollment of African American women than in control group (92% vs. 83%, $p<0.001$). Treatment group had lower Kessner index (1.6 vs. 1.9, $p<0.01$); higher number of visits (8 vs. 6.5, $p<0.01$); and higher birthweight in grams (3273 vs. 3125, $p<0.05$).	Paraprofessionals conducted home visits. Although there were more visits in the treatment group, the amount of prenatal care itself did not contribute significantly to differences in birthweight.
Reducing low birthweight by resolving risks: results from Colorado's Prenatal Plus program. Ricketts SA, Murray EK, Schwalberg R. American Journal of Public Health. 95(11):1952-1957;2005.	Care coordination, nutritional counseling, and psychosocial counseling.	3,569 MA eligible women in Prenatal Plus Program.	Comparative study, no specific framework stated.	LBW of infants and number of resolved risks in the mother from entry to delivery.	Rate of LBW in women was lowered with quitting smoking (8.5% vs. 13.7%) and among women with adequate weight gain (6.7% vs. 17.2%), versus mothers who did not resolve risk. Women resolving all risks had a 7.0% rate of LBW, versus 13.2% of women who resolved no risks.	Interventions are more likely to influence birth outcomes if they are targeted to the resolution of specific risks. Receiving at least 10 Prenatal Plus visits were more likely to resolve their risks than were women with fewer visits.
A public health nursing early intervention program for adolescent mothers: outcomes from pregnancy through 6 weeks postpartum. Koniak-Griffin D, Anderson NL, Verzemnieks I, Brecht ML. Nursing Research. 49(3):130-8;2000.	To evaluate the effects of an early intervention program (EIP) that uses a public health nursing model on health and social outcomes of adolescent mothers and their children and on the quality of mother-child interaction. Intense and comprehensive home visitation by public health nurses and preparation-for-motherhood classes were provided to adolescents in the EIP.	Health outcomes were determined on the basis of medical record data. Other measures included maternal self-report on selected behaviors, nurse interviews, and the Nursing Child Assessment Teaching Scale	Case control design.	Various measures identified, used chart review.	The early findings of this study demonstrate that pregnant adolescents benefit from both traditional and more intense public health nursing care in terms of prenatal and perinatal outcomes. The EIP was associated with decreased infant morbidity during the first 6 weeks of life.	Long-term outcomes for the EIP are being evaluated.

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Improving the delivery of prenatal care and outcomes of pregnancy: a randomized trial of nurse home visitation. Olds DL, Henderson CR, Tatlebaum R, Chamberlin R. Pediatrics. 77:16-28;1986.	Three basic intervention activities included parent education, enhancement of informal support systems, and linkage with community services Sample included Primiparas who were teens, low SES, or unmarried Randomized into four treatment groups—1) no treatment; 2) free transportation; 3) nurse home visitation during pregnancy and 4) nurse home visitation throughout pregnancy and the first two years of life	Detailed curriculum for health teaching and program protocols were provided care coordinators. Nurses kept track of time spent on each intervention and case reviews were done to assure compliance with protocol.	Randomized clinical trial. Conceptual elements discussed included the value of home visiting and the continuum of care from prenatal to postpartum periods.	Utilization of community resources Increased social support Increase paternal support Support person in L & D (L & D nurse records) Dietary intake (24 diet records & 24 diet recall—converted to nutrient-adequacy ration (NAR)) Smoking (Serum cotinine assays) Gestation (physical/neurologic exam, ultrasound readings < 28weeks, calculation of LMP) Low Birthweight	More aware of community services (p=.01), attended childbirth classes (p=.01), received more WIC vouchers (p=.03) Talked more frequently with social supports about stresses of pregnancy (p=.02) Reported fathers showed more interest in pregnancy (p=.02) P=.01 Improvement in diet (p=.04) Decrease by 4 cigarettes/day (p=.0001) No overall treatment effects, but improved for adolescents and smokers. No overall treatment effects, but improved for adolescents and smokers.	Landmark study conducted prior to Federal initiation of PNCC First evaluation of home visiting model (vs. clinic model) There were 20 cases with maternal or fetal conditions predisposing to preterm deliver were removed in order to minimize the number of cases unalterable by the home-visiting services.
The Johns Hopkins Adolescent Pregnancy Program: an evaluation. Hardy JB, King TM, Repke JT.	Definition included four aspects: 1) team approach coordinated through an individual case manager; 2) health, pregnancy, nutrition, and parenting	Clearly defined program protocols No measurement of how well	Non-randomized comparison group study in Baltimore. Analysis used bivariate	Weight gain Frequency of anemia	Program participants gained 5 lbs. more than controls (p=.0001) Program participants had a lower frequency (p=.002)	Discussed that age is not the direct correlate of LBW. Referenced other studies that suggest maternal weight gain, smoking, and prepregnancy weight are stronger indicators for adolescents.

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Obstetrics & Gynecology. 69(3 pt 1):300-306;1987.	education; 3) psychosocial support linking adolescents and their families to community services; 4) evaluation component to monitor progress Sample: Adolescents < 18 years of age (N=1488; 744 in intervention group and 744 in control group). Both groups had similar demographic characteristics.	participant needs were filled.	analysis of differences of means using t-tests and chi square	Frequency of pre-eclampsia Prenatal visits Average Birthweight Low Birthweight VLBW Neonatal deaths	Program participants had a lower frequency (p=.002) Program participants had more visits (p=.006) Birthweight mean 45 gms. Higher Fewer LBW (p=.0006) Fewer VLBW (p=.02) Fewer deaths (1.2% among controls; 0.4% among program)	After the study, the control group was integrated with the program with a subsequent increase in LBW from 9% to 18%. After six months (and initiation of program protocols with new clients), LBW rates returned to 9%.
Birth weight outcomes in a teenage pregnancy case management project. Korenbrot CC, Showstack J, Loomis A, Brindis C. Journal of Adolescent Health Care. 10(2):97-104;1989.	Defined program as a community-based network of specialized services to address the educational, psychosocial, and clinical needs of pregnant and parenting teens. Case management was a primary strategy including repetitive counseling and coordination of agencies offering services to teens. Sample included 400 pregnant teens 18 years or younger living in San Francisco Compared to 2000 teen births in two years before project	Utilization of specific program services was compared to birth outcomes in a San Francisco program.	Non-concurrent study design; compares current treatment group to past treatment group with a re-structured program, focusing only on teen births.	Birthweight Low Birthweight Service Utilization patterns	Program had mean birthweight 114 gms. higher than controls (p<.0001) LBW rates for program participants was lower than controls (8.1% vs. 12.0%, p=.05) High utilizers of program services had better birth weights Comparisons from program population to comparison group found program group to be significantly younger and larger % of black mothers. Program participants also had more male babies. All differing demographics were controlled for in the analysis.	Births of < 500 gms. or > 4,000 gms. were eliminated. Only singleton births were included.
Piecing together the crazy quilt of prenatal care. Machala M, Miner MW. Public Health Reports. 106(4):353-360;1991.	Public health, WIC, physician, and hospitals created an integrated system of care for low income women. PHN met with each woman monthly at the WIC Clinic and did at least one prenatal and	Birthweight, cost of care, no prenatal care.	None discussed, descriptive study of an intervention in one district of Idaho..	Low Birthweight VLBW Costs	Dropped from 6.6% in 1988 to 6.1% in 1989 to 5.6% in 1990 Decreased by 50% from 1989 to 1990 Decrease of 1,000 newborn intensive care unit days for an estimated savings of $300,000	Increased PHN satisfaction, however no tests of significance included.

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	postpartum home visit. Areas discussed include family planning, coordination of care, prenatal care, health promotion, transportation, referral to community services, childbirth education, and client advocacy			Drop-in Deliveries (no prenatal care)	Decreased from 170 in 1989 to 70 in 1990	
The impact of home visits on enrollment patterns in pregnancy-related services among low-income women. Bradley PJ, Martin J. Public Health Nursing. 11(6):392-398;1994.	Care coordination provided by teams consisting of a RN, Social Worker, and four indigenous community health workers Individualized risk assessment and plan of care is created. Primary strategies include education, social support, referral, and counseling Sample included 381 participants of whom 310 remained in the program until the birth of their infant.	Review of risk assessment forms and client record. Study area focuses on two inner city neighborhoods in Indianapolis	Author designed conceptual model; a retrospective descriptive study. Care coordination team and patient interact with each other. This leads to increased enrollment in pregnancy related services and decreased risk behaviors which both lead to improved pregnancy outcomes. Demographic characteristics are a mediating factor for pregnancy outcomes.	Utilization of specific pregnancy related resources—Prenatal care, WIC, Medicaid, Food Stamps	All four categories showed significant improvement in utilization. McNemar statistic used to compare program utilization before and after care coordination team interventions. Bivariate analysis was used to compare group who completed pregnancy in program (N=310) and those who dropped out (N=71) and no significant differences were identified.	While this study can not "prove" care coordination caused increased utilization, it was noted that there was a pronounced increase in utilization in the month that followed PNCC enrollment. Authors also recommend the need to target highest risk women for early admission into PNCC programs.
Use of public health nursing services: relationship to adequacy of prenatal care and infant outcome. Baldwin KA, Chen SC. Public Health Nursing. 13(1):13-20;1996.	The content of the PHN intervention is not specifically described. Study focused on timing and quantity of prenatal PHN contacts. Study sample was split into three groups: 1) PHN services only (N=506) 2) WIC services only (N=304) 3) Non-PHN and Non-WIC (N=403) All subjects were first pregnancies, live births, single births delivered in 1987 or 1988.	Trimester of initiation of prenatal care and # of PHN contacts were used as independent variables.	Historical cohort study in three Illinois counties. Clinical need is determined by modifying variables such as maternal age, marital status, race, education, prenatal care, & WIC status Use of Resources is determined by timing and quantity of PHN contact, quantity, and	Relationship of PHN Contact with Adequacy of MD Care Relationship of PHN Contact with infant birth outcomes—birthweight and gestational age	The odds ratio for first trimester PHN contact with adequate medical care is 0.42 (protective). PHN contact and timing were not significant in predicting birthweight or gestation. Chi square and ANOVA tests were used to determine significant differences among the three cohort groups. Logistic regression analysis was then used to determine the relative odds for adequate MD care. Linear multiple regression was used to determine the relationship	There were significant differences between the three cohort groups in all areas except # of prenatal medical contacts with the Non-PHN, Non-WIC group more likely to be older, married, higher educated, white, and receiving adequate medical care. Study design did not account for client behaviors (smoking, nutrition, etc.) Average # of PHN visits was only 3.6/client. Reasons for such a low # of visits should be explored. Also low entry in the first trimester should be further explored.

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	Power analysis indicated a sample size of 235 in each group was necessary to detect a relative risk of two.		adequacy of prenatal MD contact. Outcomes are determined by infant health status. Each Concept of the theory also has empirical indicators.		between PHN contacts and infant birthweight and gestational age.	
Issues inherent in measuring the impact of care coordination on pregnancy outcomes. Bradley PJ, Martin J. Public Health Nursing. 13(4):276-285;1996.	Purpose of the study was to examine a care coordination adequacy index would outperform a simple count of home visits in predicting birthweight. Care coordination provided by teams consisting of a RN, Social Worker, and four indigenous community health workers Individualized risk assessment and plan of care is created. Primary strategies include education, social support, referral, and counseling Sample included 381 participants who delivered between July 1, 1990 and January 1, 1992	Data was retrieved from chart records. Care coordination adequacy was based on the onset and # of home visits made to the client based on the length of her gestation. Using the framework of the Kessner Index, adequacy was categorized as adequate, intermediate, or inadequate care coordination.	Retrospective descriptive study in Indianapolis. Previously described in Bradley & Martin, 1994.	Comparison of # of home visits with birth outcomes Comparison of care coordination adequacy with birth weights	# of home visits did not predict birthweight when controlling for gestation, tobacco use, parity, infant gender, and marital status. Lowest birth weights were found in inadequate group. This was considered a spurious finding due to all third trimester admissions being in this group. When results for intermediate and adequate were collapsed into one group, this variable was significant ($p<.05$) in predicting birthweight	Experimental designs are difficult to carry out on entitlement programs. Encourage first trimester enrollment, as evaluation of the results of PNCC can not be fully determined if women are not in the program at this time. Also need to study comparative quality of home visits conducted by paraprofessionals with professionals, the spacing of care and what determines an optimal home visit, and the interaction between participant and care coordination worker that makes the intervention successful.
The effects of nursing case management on the utilization of prenatal care by Mexican-Americans in rural Oregon. Thompson M, Curry MA, Burton D. Public Health Nursing. 15(2):82-90;1998.	Rural Oregon Minority Prenatal Program (ROMPP): The program emphasized facilitation and advocacy. Nursing case manager conducted an assessment of personal and social resources and biomedical status. Emphasis on facilitating access to prenatal care and other community resources. Primarily delivered by home visitation. Team of PHN and	Adequacy of prenatal care and number of Emergency Department visits. Focus is on Mexican American women in rural Oregon.	Quasi-experimental retrospective study. Community Environment interacts with the woman, the intervention, and the outcomes. The Woman is influenced by the Community Environment, demographic	Adequacy of prenatal care measured by APNCU index Mean number of emergency department visits	No significant differences No significant differences	Cultural barriers to preventive care were discussed. Some clients may have seen ROMPP staff as substituting for prenatal care. Financial barriers to care were significant as 54% of ROMPP participants were undocumented immigrants with no access to Medicaid.

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	bilingual/bicultural outreach worker (OW) 100 women of 124 had 3 ROMPP visits, the minimum needed for study inclusion Comparison data was secured from 100 matched birth certificates		characteristics, and biomedical status. She influences the intervention which influences the outcomes.			
Medicaid managed care partnerships to improve perinatal outcomes. Leppert PC, Burtner C, Raines D. Journal of Public Health Management and Practice. 4(1): 82-88;1998.	Describes a linkage between a managed care HMO and a case management program for prenatal women in two clinics. PNCC included outreach, risk assessment, care planning, coordination of care, nutritional assessment and education, health education, linkage with community resources, prenatal care, and after hours emergency consultation.	Caesarian section rate, low and very low birthweight, early entry into program.	Program evaluation of a Rochester NY program.	C-Section rates LBW VLBW % entering prenatal care in the first trimester	Program began in 1994. Results compared 1993 to 1994 to 1996 rates: 1993: 20.8% 1994: 14.2% 1996: 15.9% 1993: 7% 1994: 5% 1996: 6.9% 1993: 3% 1994: 1.3% 1996: not reported 1993: 68.5% 1994:68.5% 1996: 76% No statistical analysis was reported.	Noted that community involvement was a great aspect of program. Noted parents were empowered and were recruiting each other to become part of program.
Increasing access to prenatal care: an evaluation of minority health coalitions' early pregnancy project. Jewell NA, Russell KM. Journal of Community Health Nursing. 17(2):93-105;2000.	Minority health coalitions developed prenatal care coordination projects. The primary goal of the projects was to eliminate cultural barriers and conduct outreach to pregnant women for early entry into prenatal care. PNCC included supportive care, health education, transportation, and advocacy.	No specific intervention measures were discussed.	Matched sample descriptive study in Indiana. Cultural beliefs around prenatal care access and utilization were discussed.	Adequacy of Prenatal Care (APNCU) Utilization of Prenatal care (Kessner) Fetal growth curves used to measure gestational appropriate weight	Significant for project women at $p<.01$ Significant for project women at $p=.001$ No significant differences.	Project women were in poorer health, yet they did not have more LBW babies. Authors conclude "cultural brokering" is a positive intervention.

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	Sample was 95 project mothers who were matched with 188 women identified via birth certificates.			Other findings	No differences in maternal weight gain, cigarette smoking, drinking, drug use. Project women did use WIC at a higher rate (p=.001). Project women also had higher rate of chronic diseases. Chi square and t tests were used to compare project and non-PNCC women	
Measuring comprehensive case management interventions. Development of a tool. Issel LM. Nursing Case Management. 2(4):132-138;1997.	Women who had received case management services were invited to participate. Postpartum women must have delivered within one month and pregnant women must have been receiving case management for at least four months. Case managers made home visits, coordinated services, monitored the use of health and social services, and provided education on topics related to pregnancy, health, and use of community resources.	Case managers are part of the woman's environment and interact with her and elements of her environment in ways that change the context within which the woman functions and lives.	Qualitative study using a social-ecological approach in central Texas.	A change in health or well being Study based on the perceptions of women who received this service. Women described interventions. Primarily they noted coordination of services or providing information. They did not confuse case management with medical care.	Women mentioned improvement in emotional well being, learning outcomes (especially about caring for self and baby), lifestyle behaviors (particularly taking better care of self), financial situation (particularly receiving Medicaid and other financial help and assistance with getting things), service utilization (particularly medical care), and improvements in physical health	Limitations: self report and small sample "Success" of PNCC may need to be redefined to include intermediate outcomes that are necessary to achieving long-term and sustained health and well-being. Greater attention to psychological care and to the relationship between psychological status and birth outcomes.
The interconception health promotion initiative: a demonstration project to reduce the incidence of repeat LBW deliveries in an urban safety net hospital. Loomis LW, Martin MW. Family and Community Health. 23(3):1-16;2000.	Interconception Health Promotion Initiative's goal was to follow women postpartum during the interconception period to reduce preconceptual risks by reducing or eliminating existing medical, nutritional, psychosocial, and behavioral risks of post-partum women through multidisciplinary and culturally relevant education, counseling, referral, and follow-up prior to the onset of another pregnancy. Interventions were focused	No specific measurements of intervention, general focus on delaying subsequent pregnancy and risk reduction.	Evaluation of a pilot project in Denver. Maslow's hierarchy of needs used to prioritize women's needs. Prochaska's stages of change model.	Reduce high-risk behavior and other risk factors in women who have already had a poor pregnancy outcome and to improve outcomes of subsequent pregnancies	After 3.5 years, only 35 women had become pregnant. All had waited at least three months and 16 had pregnancy intervals > 12 months. 77% initiated care in the first trimester. 26 deliveries –none of which required NICU.	To the extent that LBW is a symptom of years of poor health practices and stress or low SES, even the most comprehensive antepartum programs will have limited success.

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	around increasing internal resilience. Trusting relationships were key. 472 women recruited and 277 accepted.					
A randomized trial of augmented prenatal care for multiple-risk, Medicaid-eligible African American women. Klerman LV, Ramey SL, Goldenberg RL, Marbury S, Hou J, Cliver SP. American Journal of Public Health. 91(1):105-111;2001.	Women were randomly assigned into augmented care or usual care. Augmented care included prenatal care every two weeks by specially trained nurses who also focused on individualized counseling and teaching. Group sessions were also offered at each visit. On-site child care and transportation were also offered. Usual care was prenatal care on the regular ACOG schedule without any enhanced services. Sample included women who sought care at the Jefferson County Department of Health in 1994-96. Eligibility included African Americans eligible for Medicaid, < 26 weeks gestation, at least 16 years old and with a score of 10 or higher on the risk assessment	Gathered from clinic records, special forms prepared for this study and a computerized database that contained information about routine aspects of care and birth outcome data.	Randomized control clinical trial in Alabama.	Perceptions of Received Prenatal Care Knowledge of Risks and Health-Promoting Behaviors Birth Outcomes	Augmented group consistently ranked care higher Multiparous women said care was better than first pregnancy Decreased time at clinic for augmented care (due to decreased waiting times) Number of visits higher in augmented care (by design) 69% of those with risks in augmented care reported behavior change as opposed to 48% in usual care (not significant) 92% in augmented were told how much weight to gain vs. 77% in usual Smoking cessation was reported more often in augmented, but not significant. No significant differences in birth weight, LBW, mean gestational age. Fewer pre-term babies, fewer C-sections, and fewer NICU days in augmented (none significant)	To detect differences in birth outcomes would have required the power of a study with five times the sample size which was fiscally impossible. Usual care was good care which limited contrasts. Many women entered mid-second trimester, limiting effect of augmented care.
Improving pregnancy outcomes and reducing avoidable clinical resource utilization through telephonic perinatal care coordination. Little M, Saul GD, Testa K, Gazaiano C.	ROSEBUD telephonic case management. Treatment clients were contacted every 7 to 14 days to assess their pregnancy status and offer support and teaching related to pregnancy and their diagnoses. Written materials were also sent. Clients could also	No specific measurement discussed.	None stated, evaluation of a telephone based case management approach.	Mean birth weights Mean gestational age Financial costs	Treatment group infants had significantly higher birth weights when intervening variables were controlled. No significant difference in groups. Based on an analysis of costs, it was determined that for every dollar spent on	30% of potential study candidates did not participate for various reasons. Larger sample size with greater power might have demonstrated differences in gestational ages. Subgroup analysis could not be done due to sample size.

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Lippincott's Case Management. 7(3):103-112;2002.	call as needed. Controls received two calls throughout pregnancy. Sample included 50 controls and 61 women in the treatment group				ROSEBUD, $4.08 was saved. Statistical tests included t-tests, chi-square, MANOVA, MANCOVA, Spearman's correlations, and nonparametric tests.	
An evaluation of the impact of maternity care coordination on Medicaid birth outcomes in North Carolina. Buescher PA, Roth MS, Williams D, Goforth CM. American Journal of Public Health. 81(12):1625-1629;1991.	"Baby Love Program" helped eligible women receive medical, psychosocial, nutritional, and resource need services; provided social and emotional support; promoted healthy behaviors. Sample included all Medicaid eligible women were eligible for Baby Love. 15,526 women received PNCC and 34,463 did not receive PNCC	Claims paid for care coordination Did compare outcomes of women who received less than 3 months of PNCC vs. those who received more than 3 months of PNCC	Non-randomized case comparison study of Medicaid births in North Carolina in 1988 and 1989 through linking MA billing and birth certificate data.	LBW VLBW Infant Mortality Newborn medical care costs WIC participation	Non-PNCC moms had 21% higher rate of LBW; 62% higher rate of VLBW, and 23% higher infant mortality rates. The average cost of medical care for the baby in the first 60 days was $277 higher for Non-PNCC babies and WIC participation was substantially lower. Other risk factors (age, race, SES, etc. were similar in both groups) Descriptive comparison supplemented by logistic regression analysis	At the same time the PNCC intervention was offered, Medical Assistance eligibility was increased to 100% of the Federal poverty level. Multiple gestation and births with no prenatal care were excluded from the analysis
The Minnesota Prenatal Care Coordination Project: successes and obstacles. Skovhold C, Lia-Hoagberg B, Mullett S, Siiteri RK, Josten L, Vanman R, McKay C, Oberg CN. Public Health Reports. 109(6):774-782;1994.	Article discusses the implementation of MN's PNCC program and barriers encountered Risk Assessment based on Creasy Risk Assessment. Measures medical, obstetric, and psychosocial factors. Other services include care planning, care coordination, health education, and nutrition education. Two models were introduced—a medical model centered in clinics and a public health model centered in the community.	Process data was solicited through telephone surveys of providers and four community site visits, medical record reviews, analysis of claims data, and analysis of other documents.	Qualitative study design to evaluate a Minnesota program.	# of women risk assessed % of MDs completing risk assessment # of women receiving services Increase in MD participation Increased understanding of role of other providers, including PHN	1,242 in 1989 to 2,875 in 1990 1989: 48% 1990: 89% Grew from 923 in 1989 to 1,950 in 1990 1989:33% 1990: 45%	Obstacles: Despite program, MA women still had unmet needs. Guidelines were inconsistently implemented. Case management and referral was time consuming. Dissatisfaction with reimbursement rates.
Evaluation of a program for prenatal care case management. Piper JM, Mitchel EF, Ray WA.	Project HUG: Clients were assigned a care coordinator (a registered nurse or a social worker). The coordinator	HUG case management was measured by reimbursed	Program evaluation of a Tennessee program. Unconditional Logistic	Program utilization by high risk mothers	6% of the sample received HUG services (Median initiation 96 days following LMP; mean # of visits of 5.6)	Study included single live births or fetal deaths Women who enrolled in Medicaid late in pregnancy were excluded since they were unable to access HUG services

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Family Planning Perspectives. 28(2):65-68;1996.	completed a baseline assessment and created a plan of care. Key strategies included identifying care providers, scheduling visits, assisting women with transportation, referring women to nutrition programs, following up on missed appointments, and providing health education. Sample included 66,051 Medicaid women with a birth from July, 1989 through December, 1991 identified via linked Medicaid-vital records files. HUG enrolled clients = 3,859; Non-HUG clients = 62,192	Medicaid claims.	regression was used to assess the association between enrollment in HUG and study outcomes.	Prenatal vitamin use Utilization of prenatal care (via Kessner index) Rate of preterm births and VLBW	HUG participants 79% more likely to have filled vitamin prescription (Odds ration of 1.79) Hug participants 29% less likely to have inadequate prenatal care (odds ratio of 0.79) Both vitamin use and utilization of prenatal care were statistically significant better for black HUG participants than white participants There was no significant improvement in Preterm birth or VLBW deliveries.	Authors note it is ethically difficult to withhold services to conduct randomized trials. Post-hoc evaluations create difficulty in controlling variables that may confound outcomes. Authors note that only a small % of the population was served. Also data about nutrition, health behavior, and intercurrent complications of pregnancy were missing. Need more prospective studies and a stronger focus on social and behavioral risk factors.
Primary care case management and birth outcomes in the Iowa Medicaid program. Schulman ED, Sheriff DJ, Momany ET. American Journal of Public Health. 88(8):1262-63;1998.	This study compared primary care case management (PPCM) and fee-for-service (FFS) recipients of Medicaid. PPCM is a physician care manager model. The MD functions as a gatekeeper to other services. Demonstration counties for PPCM were compared to seven match FFS counties.	No discussion	Program evaluation of an Iowa program. Longitudinal design with quasi-experimental controls.	Adequacy of Prenatal Care using Kessner Index LBW/VLBW Gestational Age	FFS clients had higher rates of adequate prenatal care than PPCM. This appears largely related to earlier entry into PNC by the FFS group. FFS group had slightly larger decrease in LBW babies, but both groups had a doubling of VLBW babies. There were no differences between the groups.	Study did not investigate health promotion intervention or risk factors. It does suggest that prenatal care alone may not predict birth outcomes. Further investigation into the increasing rate of VLBW babies is indicated.
Cost effectiveness of a high-risk pregnancy program. Alexander JW, Mackey MC. Care Management Journals.	Multidisciplinary team of nurse case management, nutrition and social work services, care by a medical specialist, and delivery at a risk-appropriate hospital.	Used diagnostic related group codes to measure effectiveness.	Program evaluation, longitudinal analysis over 7 years of a "southeastern state."	Various DRG codes measured	Vaginal deliveries with complicating diagnoses (DRG 372) remained at 10%. C-section delivery with complications also remained around 10%. Because the # of women who delivered rose over the 7 years, this steady state actually saved	Qualitative surveys with both patients and staff indicated how helpful the PNCC program was to them.

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1(3): 170-174;1999.	PNCC included risk assessment, client interviews, referrals, service plans, documentation, and follow-up at clinic visits, by telephone, or through home visits.			Cost effectiveness	money. DRG 386 (Extreme immaturity/respiratory distress) and DRG 387 (Premature with major problems) showed a significant decrease. A cost savings of $3,814,501 from 1988-1992 in real $$ or $7,244,961 in current dollars.	
The impact on clients of a community-based infant mortality reduction program: the National Healthy Start Program Survey of Postpartum Women. McCormick MC, Deal LW, Devaney BL, Chu D, Moreno L, Raykovich KT. American Journal of Public Health. 91(12):1975-77;2001.	Healthy Start Program (HSP) provides obstetric and case management services to highest risk women in 15 geographically defined disadvantaged communities. 1347 clients of HSP and 1329 non-clients were interviewed 2 months after delivery	Focused on Healthy Start clients.	Selected Healthy Start program areas from around the country. Cross sectional study of WIC participants those areas.	Success at enrollment into HSP Experience of pregnant HSP clients compared with that of other pregnant residents	HSP were higher risk—following factors were significantly different for HSP vs. Control: Younger age, less education, African American, Single, Less likely to have planned pregnancy, Received more teaching, case management, WIC services, food stamps, AFDC, currently using birth control, and less likely to rate their infant's health as less than excellent.	Noted that two month follow-up was fairly short after pregnancy and made it difficult to measure long-term impacts on infant health or health services utilization.
Effects of psychosocial risk factors and prenatal interventions on birth weight: evidence from New Jersey's HealthStart program. Reichman NE, Teitler JO. Perspectives on Sexual and Reproductive Health. 35(3):130-7;2003.	Initial risk assessment through personal interview. Plan of care was developed. All data was recorded on a standardized form from which study data was extracted. Sample included 90,000 New Jersey women who were enrolled in the comprehensive prenatal care program, HealthStart.	Independent variables grouped into four categories: social, demographic, psychosocial, medical/obstetric.	Retrospective cross sectional design. Measured relationships between psychosocial risk factors, early prenatal care, prenatal interventions, and birth outcomes.	Birthweight by different behaviors	Smoker & LBW: Odds ratio 1.4 Hard drug user & LBW: OR 1.7 Alcohol and LBW: OR 1.2 Nutrition interventions reduced odds ratios (protective effect) Home visits, substance abuse treatment, and smoking cessation did not lower odds ratios for LBW babies (probable reflection of the most at-risk women receiving these services.	Those at highest risk received appropriate interventions; however, the mean for birth weight and the odds ratio for LBW both worsened with more intensive intervention. Selection bias is very possible due to non-randomization design. WIC services did show significant reduction in LBW.

Other Resources

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CDC Community Guide http://www.thecommunityguide.org/pregnancy/	The website is under development, and currently no information is available.	Infant mortality	No information currently available	No information currently available	None stated.	This is a good resource for EBPs, and will be useful once information is available.
Evaluation of the Wisconsin Prenatal Care Coordination Projects. Middleton, Middleton, Jakpor. Wisconsin Department of Health and Family Services document, 1992.	Definition: comprehensive and ongoing risk assessment, efforts to ensure prenatal medical and WIC appointments were kept including transportation, nutrition education and health promotion, assistance with referrals as needed, and encouragement and support of behavior modifications in smoking and alcohol use. Sample: Treated group included 1,040 PNCC clients with single births before 1/1/92. Control included 10,073 women from the Medicaid control population.	Three models were used: One-stop shopping, home visits, and mentor model (peer support). No separate measurement/analysis for a single model.	Wisconsin statewide matched case control study. Cases matched with Medicaid control group.	Many outcomes measured, significant and non-significant findings are included.	Compared to Medicaid population, PNCC made significant contributions to preterm birth less than 37 weeks (36%), infant death (67%), smoking during pregnancy (36%), and entry in the first trimester (32%). Page 125. No significant changes among groups for low birthweight births, but significant reduction for mothers with less than 12 years of school (pg 117).	Women in PNCC had significantly higher rates of risk factors than women not in PNCC.
An Evaluation of Early Experience Under the Medicaid Prenatal Care Coordination Program. Tyson. Wisconsin Department of Health and Family Services document, 1997.	Definition: PNCC as a Medicaid assistance program provides assistance in locating and coordinating appropriate health and social services. Program attributes include outreach activities, risk assessment, developing a care plan, referral and follow up.	Measures include birth outcomes and costs related to births.	Program evaluation	Distribution, need for PNCC services, service intensity (in time from assessment to delivery), BW, GA, Crown Heel, APGAR scores.	Measured birth outcomes for all PNCC and early PNCC versus the comparison group. No significant results seen when comparing "all". For "early" LBW, GA, and Crown Heel length were all significantly improved over the comparison ($p<0.1$).	Only 30% of women assessed in their first trimester. Found "little difference between women receiving PNCC services and an equally high risk comparison group in their ability to receive prenatal care, their birth outcomes and their Medicaid costs." Improvements were found with the PNCC early entry group.
Aurora Sinai PNCC comparison. Milwaukee hospital document.	None stated	None stated	Hospital based evaluation	Average length of stay, hospital cost, NICU days and cost; cost, NICU days,	PNCC seems to cut length of stay and cost in half.	Need more information.
St. Vincent's Hospital	None stated	None stated	Hospital based evaluation	Age of entry, delivery method,	Higher entry of mothers <15 than expected.	This is a single study of a Milwaukee based hospital in Wisconsin. It is not the quality of a peer reviewed

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PNCC program effectiveness: comparing teen mothers in PNC to those not in PNC. Milwaukee hospital document.				birthweight, live/stillborn, normal vs. NICU number and cost.	No change in delivery method, birthweight, live/stillborn. Approximately 50% reduction in actual versus expected NICU baby entry as compared to mothers w/o PNCC. Excluding outlier, PNCC reduced NICU charges from $16,911 to $11,146.	publication.
Notes on Prenatal PNCC Services, Prenatal Care, and Birth Outcomes in Selected Milwaukee Zip Code Areas. Miller, R. Internal DHFS document.	This document focuses on Medicaid births in 14 Milwaukee Zip codes. Compares births with PNCC to births without PNCC. Years of analysis are 2000 and 2001.	Numbers of births and deaths; if PNCC services are associated with infant mortality, adequacy of prenatal care, LBW/prematurity.	Non-randomized comparison groups.	Utilization	76% of births in these Zip codes were to Medicaid mothers. Only 23% of Medicaid births were to mothers receiving PNCC. PNCC had slight reductions in IMR (10.8 PNCC vs. 12.9 No PNCC), higher adequate Kessner index (57.4% PNCC vs. 55.5% No PNCC), lower % LBW (11.0% vs. 11.8%) and VLBW (1.7% vs. 2.9%), and lower preterm births (14.2% vs. 15.4%).	There is potential for selection bias because assignment to groups is not randomized. Factors influencing provision of service may contribute to outcomes more than the service itself (confounding factors). Age groups are not given, so cannot assume age distributions are similar in PNCC and No PNCC group.