COMPARISON OF CERTIFIED NURSE-MIDWIFERY AND NON-CERTIFIED NURSE-MIDWIFERY CARE MANAGEMENT SYSTEMS

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July 7, 1992
Date

To the Dean for Graduate Studies and Research:

I am submitting herewith a dissertation written by Sally E. Cook entitled "Comparison of Certified Nurse-Midwifery and Non-Certified Nurse-Midwifery Care Management Systems." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Nursing.

Judith McFarlane, DrPH
Major Professor

We have read this dissertation
and recommend its acceptance:

Accepted

Leslie M Thompson
Dean for Graduate Studies and
Research

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DEDICATION

To the late Donna Kinsey and her stillborn daughter, Alissa: Their plight and untimely demise influenced my personal and professional commitment to effective and efficient maternity care.

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ABSTRACT

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This was an evaluation of the major objective of an interagency program to demonstrate effective and efficient maternity care through the implementation of an interagency nurse-midwifery (CNM) system. Antepartum records of 100 health center clients meeting study criteria were audited and data on the number of antepartum visits conducted were used to measure care variables. One-way analysis of variance revealed significantly more effective and efficient care management within CNM systems than Non-CNM systems, according to scores on the Antepartum Data Base Scale (ADBS), scores on the Antepartum Complication Management Scale (ACMS), Referral Management Scale (RMS), client clinic attendance, and the number of visits conducted ($p \leq .05$). No significant differences were found as measured by non-scheduled absence from clinic, and the Newborn Outcome Scale (NOS). No significant correlations between the NOS scores and the scores on the ADBS, ACMS, and RMS ($p > .05$) were found using multiple regression. The findings indicated the program objective was attained.

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CHAPTER 1

INTRODUCTION

Maternity care, especially begun early in pregnancy, has been demonstrated to be effective in preventing low birthweight and improving pregnancy outcomes (Institute of Medicine, 1988). Barriers to care have potential to limit the client's access effective and efficient comprehensive health care (Institute of Medicine, 1988). When barriers are encountered, the client's health, as well as that of her unborn/newborn infant, may be compromised.

This study is an evaluation of the major objective of an interagency pilot program funded by a block grant from the U.S. Department of Maternal and Child Health to the Texas State Health Department (see Appendix A). The objective evaluated is the demonstration of three health care agencies to cooperatively manage (provide and coordinate) effective and efficient maternity care.

The aim of this cooperative effort was to decrease local health care system barriers to maternity care through the implementation of an interagency certified nurse-midwifery care management system. The certified nurse-midwifery system was designed to co-exist with

existing interagency physician-nurse maternity care management systems. In this study, the focus of maternity care management was limited to care received in the antepartum (prenatal) period.

Problem of Study

This study was designed to answer the question: Will maternity clients receive more effective and efficient antepartum care when care is managed within certified nurse-midwifery management systems than clients who do not receive care managed within certified nurse-midwifery management systems?

Rationale for Study

In the recent past, concern about the failure to significantly decrease the infant mortality rate in the United States has resulted in a more organized effort to analyze the problem (Brecht, 1989; Institute of Medicine, 1988; Public Health Service, 1989). During this evaluation process, significant barriers to preventive health care for pregnant women and their infants were identified which may contribute to the current high infant mortality rate (Institute of Medicine, 1988).

Barriers to health care have been attributed to problems resulting from (a) individual behaviors and

beliefs, (b) lack of financial resources, and (c) inadequate and uncoordinated health service systems (Institute of Medicine, 1988). Inadequate and uncoordinated health service systems were reported to result in flawed, fragmented, and extremely complex maternity care systems. An inadequate and uncoordinated health care system may impair the ability of pregnant women to access the array of programs and resources that do exist. An inadequate and uncoordinated system may also potentiate barriers to care which result from individual client behaviors, beliefs, and lack of financial resources especially for the medically indigent.

The Institute of Medicine (1988) recommended the removal of barriers to care through the implementation of long-term and short-term strategies. The long-term strategies would focus on the reorganization of the nation's maternity health care system. Some of the short-term strategies would serve to strengthen existing maternity care systems by simultaneous actions to (a) remove financial barriers to care; (b) assure adequate system capacity for all women; and (c) improve policies and practices that determine continuity and coordination of available maternity care programs/systems. One of the specific strategies recognized by the Institute of Medicine (1988) with potential to reduce identified

barriers to adequate health care for pregnant women was the utilization of certified nurse-midwives (CNMs).

The American College of Nurse-Midwives (ACNM) defined a certified nurse-midwife as "... an individual educated in the two disciplines of nursing and midwifery, who possesses evidence of certification according to the requirements of the American College of Nurse-Midwives" (ACNM, 1978, p. 1). Nurse-midwifery practice as defined by the ACNM is cited below.

> Nurse-midwifery practice is the independent management of care of essentially normal newborns and women, antepartally, intrapartally, postpartally, and/or gynecologically, occurring within a health care system which provides for medical consultation, collaborative management, or referral and is in accord with the Standards for the Practice of Nurse-Midwifery as defined by the American College of Nurse-Midwives (ACNM, 1987a, p. 1).

Research literature on the outcomes, process, and structure of certified nurse-midwifery care does exist. Thompson (1986) provided an extensive review of research that evaluated nurse-midwifery care from 1925 to 1984. Fifty published studies on nurse-midwifery care from 1929 to 1984 were included in the review. Of the 50 studies reviewed, 25 were related to the process of nurse-midwifery care, 22 presented data on the outcomes of care, and 3 were related to the structure of care. Thompson concluded that

the findings of the studies supported the premise that well-prepared CNMs have demonstrated their abilities to provide safe, acceptable, and accessible primary maternity health care in a variety of practice settings.

Other researchers have continued to document the ability of CNMs to provide safe, acceptable, and accessible care to maternity clients (Brucker & Meullner, 1985; Goldberg, Baisch, & Fox, 1986; Hangsleben & Schamber, 1985; Mayes, et al., 1987; Nichols, 1985; Piechnik & Corbett, 1985; Scupholme & Kamons, 1987; Sweeney, et al., 1985). Several investigators have described the successful integration of CNM care management systems, with mixed client risk status, into complex tertiary health care systems (Mann, 1981; Scupholme & Kamons, 1987; Sharp & Lewis, 1984).

Review of extant literature failed to reveal studies that evaluated the effectiveness and efficiency of maternity care managed within a comprehensive CNM system of care as compared to care managed within a fragmented Non-CNM maternity care system within the same complex, multi-leveled, interagency maternity health care system. A study evaluating the differences between the care management and the pregnancy outcomes of the clients served

in each system has potential to demonstrate more effective and efficient coordination and provision of comprehensive health care to maternity clients. More effective and efficient coordination and provision of comprehensive health care to maternity clients may decrease barriers to health care with the result of improved health outcomes.

Theoretical Framework

The evaluation model proposed and developed by Ralph W. Tyler (1969) provided the theoretical framework for the study (see Fig. 1.). Tyler has been credited with proposing and developing in the 1940's the first theoretical model for the systematic evaluation of educational programs (Guba & Lincoln, 1982; Popham, 1975, 1988; Thomas, 1990; Worthen & Sanders, 1973).

Popham (1975,1988)) described major classes of educational evaluation models grouped by their primary organizing factors. Popham classified Tyler's evaluation model as a goal-attainment model. According to Popham, in a goal-attainment model of educational evaluation, the concept of evaluation is conceived primarily as the determination of the degree to which an instructional program's goals/objectives were achieved. The degree of goal-attainment reflects the degree of program success.

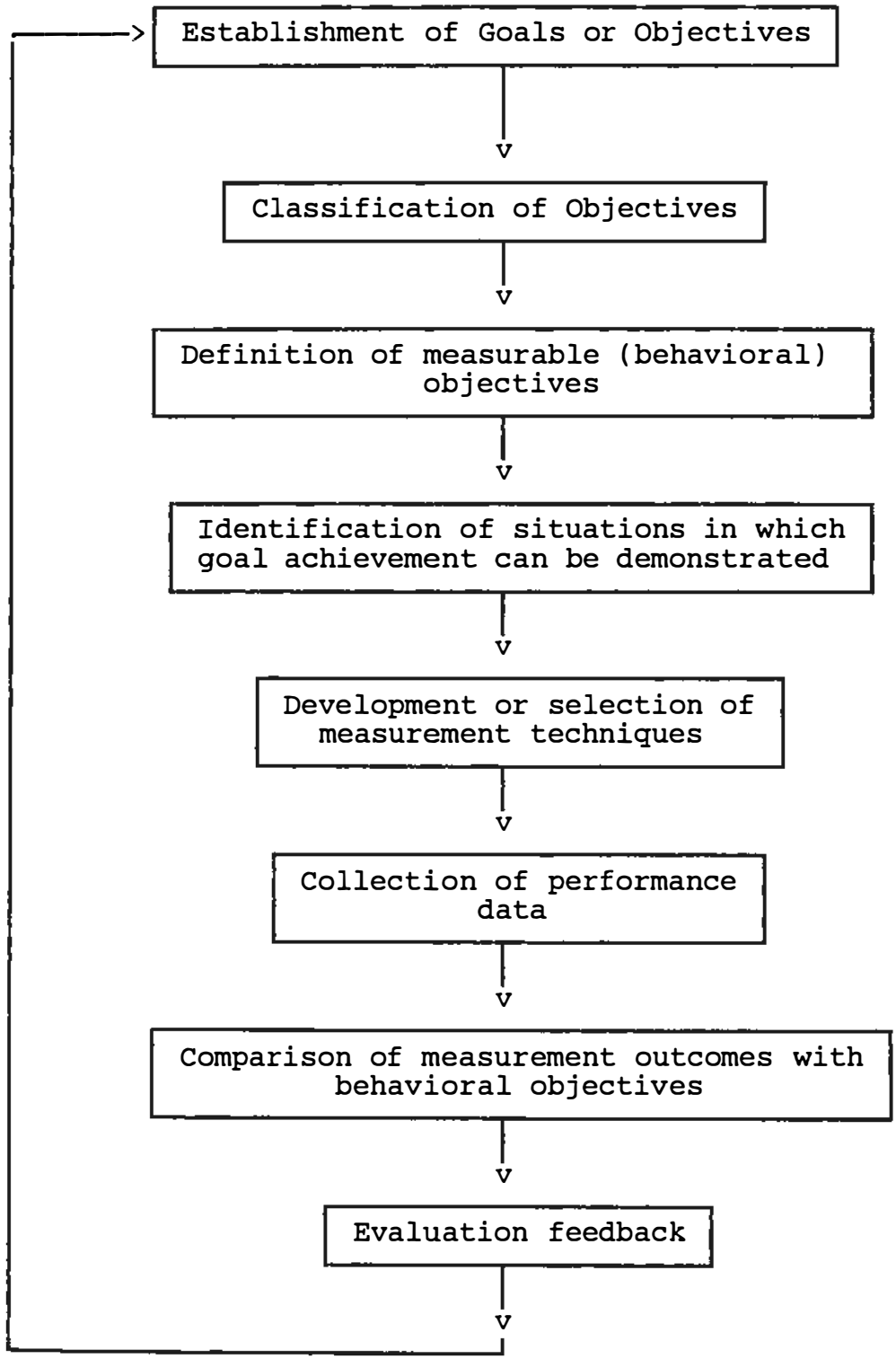

Fig. 1. Tyler's Evaluation Model (Tyler, 1969)

Tyler's formulation of the evaluation process is based on the concept of objectives (Guba & Lincoln, 1982). Tyler (1969) defined evaluation as the process of determining the extent to which the educational objectives of a program are actually being realized. According to Tyler, the major steps in program evaluation are:

(a) to establish broad goals or objectives;

(b) to classify objectives;

(c) to define objectives in behavioral terms;

(d) to find situations in which achievement of objectives can be shown;

(e) to develop or select measurement techniques;

(f) to collect performance data; and

(g) to compare data with specific behaviorally stated objectives.

Tyler (1969) conceptualized evaluation as a recurring process in which evaluation feedback may be used to reformulate or redefine program objectives and program evaluation strategies. In addition, the information gained from evaluation feedback about the degree of goal-attainment may be used by decision-makers to modify, discontinue, and/or continue the program (Worthen & Sanders, 1973).

Application of the Tyler Model to Evaluate the Effectiveness and Efficiency of Two Maternity Care Management Systems

Tyler's model provides a theoretical framework for planning, organizing, and conducting an evaluation study of an educational program. Although originally developed to be utilized in the evaluation of educational programs, Thomas (1990) proposed Tyler's model to be applicable to the evaluation process of health care programs and systems as well. The major steps proposed by Tyler (1969) in program evaluation were adapted and utilized to plan, organize, and conduct this study (see Fig. 2.).

Assumptions

Based on the theoretical framework of this study, the following assumptions applied:

1. Evaluation of a program assumes the prior assessment of the larger system within which the program exists, a decision about goals and objectives to be attained, and the selection of program(s) considered appropriate for meeting those goals and objectives (Alkin, 1973).
2. It is possible to state important goals and objectives before the program begins (Thomas, 1990).
3. It is possible to derive standards for comparing behavioral objectives and measured objectives (Thomas, 1990).

Evaluation Steps	Applied to This Study
1. Establishment of objective.	1. Major objective cited in the grant proposal.
2. Classification of objective.	2. Development of the Problem of Study and the research hypotheses.
3. Definition of measurable (behavioral) objectives.	3. Development of Hypotheses 1,2,and 3.
4. Identification of situations in which goal achievement can be demonstrated.	4. a. Health center statistical records documentation; b. Individual health center maternity client records.
5. Development or selection of measurement techniques.	5. Investigator-developed instruments used to collect and measure data for hypotheses testing.
6. Collection of performance data (application of measurement techniques).	6. Development and implementation of the procedure for collection and treatment of data.
7. Comparison of measurement outcomes with behavioral objectives.	7. a. Statistical analysis of the hypotheses. b. Analysis and interpretation of results.
8. Evaluation feedback.	8. Written report of the evaluation study presented to agencies.

Fig. 2. Application of Tyler's Model to this study.

4. If most or all of the specified objectives have been met, then the program is a success (Thomas, 1990).

Hypotheses

This study was designed to test the following hypotheses:

H_1 Maternity clients will receive more effective and efficient care when care is managed within CNM care management systems than when care is managed within Non-CNM care management systems, according to the following variables:

1. Scores on the Antepartum Data Base Scale
2. Scores on the Antepartum Complication Management Scale
3. Scores on the Referral Management Scale
4. Scores on the Newborn Outcome Scale
5. The number of missed clinic appointments in each system
6. The length of time elapsed between missed appointments and the client's return to clinic

H_2 The CNM care management systems will result in more antepartum visits than the Non-CNM care management systems.

H_3 There will be a positive relationship in both the CNM and Non-CNM care management systems between the scores

on the Newborn Outcome Scale and the following variables:

1. Scores on the Antepartum Data Base Scale
2. Scores on the Antepartum Complication Management Scale
3. Scores on the Referral Management Scale

Definition of Terms

The following definitions of terms were accepted for use in this study:

1. Effective and efficient maternity care: the degree to which comprehensive antepartum health services are effectively and efficiently managed. Comprehensive antepartum health services are effectively managed when the application of the care management process by the care management system results in the adequate and appropriate provision and coordination of health services according to the client's health status and needs (Donabedian, 1966,1968,1982; Institute of Medicine, 1988; Katz & Rosenzweig, 1970; Weidenbach, 1964; Yura & Walsh, 1988). Comprehensive antepartum health services are efficiently managed when the application of the care management process by the care management system results in assisting the client to access the health care system services with a minimum of effort, expense, or waste of client, health care

provider(s), and other health care system resources (Donabedian, 1966,1968,1982; Institute of Medicine, 1988; Katz & Rosenzweig, 1970; Weidenbach, 1964; Yura & Walsh, 1988). The goal of effective and efficient maternity care is to assist the maternity client to access the health services needed to attain, regain, and maintain maximum levels of wellness for herself and her unborn/newborn infant (Institute of Medicine, 1988; Weidenbach, 1964).

Effective and efficient maternity care was operationalized for this study with measurement scores on the following instruments:

a) Antepartum Data Base Scale (ADBS): the degree to which certain standards of antepartum surveillance activities were performed which monitor various indicators of the level of maternal/fetal wellness during visits at the health center (Appendix B).

b) Antepartum Complication Management Scale (ACMS): the degree to which actual/potential antepartum complications were accurately and appropriately identified, managed, and evaluated by the care management system (Appendix C).

c) Referral Management Scale (RMS): the degree to which interagency referrals were accurately and appropriately initiated, managed, and evaluated by the care management system in order to obtain further evaluation and

management of actual/potential antepartum complications (Appendix D).

d) Newborn Outcome Scale (NOS): the gross potential for newborn wellness when the pregnancy terminates (Appendix E).

Effective and efficient care was also operationalized by measurement of the following variables:

a) the amount of antepartum visits conducted: measured as the total number of antepartum visits conducted by a particular care management system in a specific health center within a specified time frame. Visit data were abstracted from monthly health center statistical reports.

b) the degree to which the client decided to participate in the antepartum care management system: measured as the number of missed clinic appointments other than those due to hospitalization or delivery, and the length of time elapsed between missed clinic appointment(s) and the date the client returned to clinic as documented in individual client records (Appendix F).

2. Maternity client: a medically indigent pregnant woman who enters the interagency maternity care system at the county health department. The maternity client is considered to be a maternal/fetal unit.

3. Certified nurse-midwifery care management systems (CNM systems): the health care management systems

within which health services are managed (provided and coordinated) for a specified group of maternity clients. In these care management systems, certified nurse-midwives have primary care management responsibilities for maternity clients.

4. Non-certified nurse-midwifery care management systems (Non-CNM systems): the health care management systems within which health services are managed (provided and coordinated) for a specified group of maternity clients. In these systems, health center physicians and professional nurses have primary care management responsibilities for maternity clients. The degree of primary care authority and responsibility varies between the nurses and physicians dependent on which health center the care management system is located. In County Health Center A, the physician has primary care management responsibilities with care management supplemented by the professional nurse. In County Health Center B, the professional nurse has primary care responsibilities with care management supplemented by physicians.

Limitations

The following limitations of the study were identified:

1. The findings of the study cannot be generalized

beyond the sample because of the lack of randomization in the sampling procedure.

2. The retrospective nature of the data collection may result in distortions of reality related to (a) the actual level of wellness of the maternal/fetal unit that existed in the antepartum period; (b) the actual acquisition of data obtained from the client during the antepartum visit(s) that may not be documented in the client record; (c) the quality and quantity of interactions between and among the client and members of the care management system; (d) the actual planning, implementation, and evaluation of the care management process utilized in the obtainment of care may not be completely documented in the client record; and (e) the actual quality of the newborn outcome.

3. There may be factors, other than those related to the implementation of the care management process presented in the client's antepartum record, that may have affected the client's ability to access comprehensive maternity care and influenced pregnancy outcomes, i.e. client's values, beliefs, genetic composition, financial constraints, time constraints, availability of transportation, etc.

4. Because the hospital records were not available for review, data describing intrapartum and neonatal conditions/outcomes were restricted to information contained

in the health center records. The information in health center records may or may not be complete.

5. Those persons who chose or were assigned to one care management system may represent subgroups with different characteristics than those assigned to or who chose another care management system.

Summary

This study, based on a theoretical framework of Tyler's (1969) model of program evaluation, was designed to evaluate the major objective of an interagency pilot program to decrease system barriers to the provision and coordination of effective and efficient maternity care through the implementation of an interagency certified nurse-midwifery care management system. This study was undertaken to provide feedback information to interagency decision-makers about the degree of program objective attainment in order to modify, discontinue, and/or continue the program. The study was also undertaken to add to the body of knowledge about the process and outcome of CNM and Non-CNM maternity care management systems.

CHAPTER 2

REVIEW OF LITERATURE

In the context of maternity care, health care systems are those networks of publicly and privately funded services which provide women and their unborn/newborn infants with antepartum (prenatal), intrapartum (labor and delivery), postpartum, newborn, and interconceptional care. The concept of maternity care as an organized system of health care did not exist in the United States until the turn of the twentieth century (Schmidt & Wallace, 1988; Thompson, Walsh, & Merkatz, 1990).

In the latter half of the nineteenth century and the first 30 years of the twentieth century, dramatic changes in maternal-child health were seen in the United States. Major reasons for these changes included (a) a decline in the use and the drastic reduction in the number of traditional American midwives; (b) a gain in the number of practitioners and political strength in the medical profession, especially the medical specialty of obstetrics; (c) social action for the welfare of children; and (d) beginning governmental involvement at the federal, state, and local levels in maternal and child health (Schmidt & Wallace, 1988; Tom, 1982).

In 1903, Lillian Wald, a nurse and founder of Henry Street Settlement in New York City, recommended the formation of a federal children's bureau. In 1912, President Taft signed the bill which established the Children's Bureau. The main objective of the Children's Bureau was to investigate and report upon all matters pertaining to the welfare of children and child life among all classes of people (Hogan, 1975; Schmidt & Wallace, 1988; Varney, 1987). One of the first acts of the Bureau was to investigate infant deaths. According to available statistics, the infant mortality rates were appallingly high, approximately 124 per 1,000 births.

In analyzing the data from the first infant mortality study, a link was identified between infant health and maternal health during the maternity cycle. Studies of maternal mortality were then conducted by the Bureau which discovered extremely high maternal mortality rates, with most deaths categorized as preventable. The conclusions of these investigations are credited with the initial establishment of the official recognition of the importance of early and continuous prenatal care in reducing infant and maternal mortality (Hogan 1975; Varney, 1987).

As a result of the studies conducted by the Children's Bureau, a plan for the public protection of mothers and infants was proposed by the Bureau in 1917. The plan

included providing public health nurses for prenatal instruction and service (Hogan, 1975).

It was within the context of this changing maternal-child health environment that nurse-midwifery as a potentially viable maternal-child health care system was conceived and began to evolve in the United States (Hogan, 1975; Litoff, 1982; Tom, 1982; Varney, 1987). Tom (1982) described the first half of the twentieth century as the formative period of nurse-midwifery in the United States.

Clara D. Noyes, in 1912, and Dr. Frederick Taussig, in 1914, were credited with being among the first to publicly espouse the concept of training public health nurses as midwives (Tom, 1982). This was proposed as one approach to solving the problem of inadequate care for mothers and babies in the United States. More recently, increased utilization of certified nurse-midwives (CNMs) was a specific recommendation of the Institute of Medicine (IOM) (1988) as a mechanism for increasing utilization and improving access to comprehensive maternity care for women.

This review of literature is comprised of three major sections. The first section contains an overview of antepartum (prenatal) care in the United States. The second section contains a description of nurse-midwifery in the United States. In the third section, literature evaluating the antepartum care management process is discussed. In the

following sections, the terms antepartum care and prenatal care are used interchangeably. These terms denote outpatient care modalities, the management of which was the focus of this study.

Overview of Antepartum Care

Organized antepartum (prenatal) care in the United States was introduced largely by social reformers and nurses (Schmidt & Wallace, 1988; Thompson, Walsh, & Merkatz, 1990). With local initiatives in Boston, New York City, and Baltimore in the early 1900s, outpatient programs of organized systematic prenatal care demonstrated drastic reductions in the fetal, infant, and maternal mortality rates. Simultaneous actions by many of the same social reformers and public health nurses/workers stimulated the federal government to establish the Children's Bureau in 1912. One of the first actions of the Bureau was to collect data on causes of infant death. Findings of studies in a variety of cities linked infant deaths to lower socioeconomic class and the lack of obtainment of prenatal care. The findings revealed that the infants of women who received prenatal care had a greater chance of surviving until their first birthday.

Passed in 1921, the controversial Sheppard-Towner Maternity and Infancy Protection Act has been described as

the first federal social welfare measure and the first women's bill in the United States (Schmidt & Wallace, 1988; Thompson, Walsh, & Merkatz, 1990). Administered by the Children's Bureau with implementation of programs directed by state boards of child health or welfare, the Act provided federal and state funds for instruction on nutrition and hygiene of pregnancy, well-baby clinics, visiting nurses for pregnant women and new mothers, and education and supervision of traditional midwives in rural settings by public health nurses.

In addition, the Children's Bureau focused its research and education efforts on preventing infant and maternal mortality. The Bureau also set standards for prenatal care by outlining the expected medical and educational components of prenatal visits (Hogan, 1975; Thompson, Walsh, & Merkatz, 1990).

The Value of Prenatal Care

Since the beginning of organized care in the United States, the receipt of prenatal care has been associated with improved maternal-infant health status reflected in decreased maternal-infant morbidity and mortality rates (Institute of Medicine, 1985,1988; Murray & Bernfield, 1988; Poland, Ager, Olson, & Sokol, 1990; Ryan, Sweeney, & Solola, 1980; Quick, Greenlick, & Roughmann, 1981). Although the

exact mechanism(s) has been unclear, a general assumption made by maternity health care professions, professionals, and administrative decision-makers about the value of prenatal care is that increased utilization and receipt of care is positively associated with improved pregnancy outcomes -- care improves outcomes (Alexander & Cornely, 1987; IOM, 1985,1988; Merkatz & Thompson, 1990; Nagey, 1989). Because increased utilization and receipt of prenatal care is associated with improved pregnancy outcomes, it is also believed to be cost-effective.

Objectives of Prenatal Care

Cunningham, MacDonald, and Gant (1989, p.257) stated that "... the objective of prenatal care is to assure that every wanted pregnancy culminates in the delivery of a healthy baby without impairing the health of the mother". Pauerstein (1987) proposed that all prenatal care efforts are undertaken so that the pregnant woman and her fetus arrive at term gestation in good health, well prepared for parturition.

More recently, broader objectives of prenatal care have been proposed by the Public Health Service Expert Panel on the Content of Prenatal Care (Merkatz & Thompson, 1990). The broad objectives of prenatal care proposed by the Panel "... are to promote the health and well-being of the

pregnant woman, the fetus, the infant, and the family up to one year after the infant's birth" (pp.5-6). This broader scope recognized that the objectives of prenatal care are concerned with more than the prevention of maternal and neonatal morbidity and mortality. These objectives included other aspects of the woman's health prior to, during, and after pregnancy and would include the promotion of healthy child development, positive family relationships, and family planning.

Definition of Prenatal Care

The Committee to Study Outreach for Prenatal Care (IOM, 1988, p.23) has defined prenatal care as "... an inexact constellation of procedures and interactions". These procedures and interactions include the provision and coordination of (a) diagnosis of pregnancy; (b) the medical, educational, social, and nutritional services needed to enhance the health and well-being of the woman and fetus during pregnancy; and (c) the counseling and assistance required to plan for labor and delivery, postpartum care for the mother, and pediatric care for the newborn. It was acknowledged that the absence of a clear, universal definition of prenatal care was the cause of much controversy about the content, costs, and effectiveness of care.

The Public Health Service (1989) Expert Panel on the Content of Prenatal Care defined prenatal care as a health service in which care "... consists of health promotion, risk assessment, and intervention linked to the risks and conditions uncovered" (p.10). Prenatal care ideally would begin when conception is first considered and would continue until the beginning of labor.

Components of Prenatal Care

In general, three basic components of prenatal care have been identified (American College of Obstetricians & Gynecologists, 1989; Cunningham, MacDonald, & Gant, 1989; Frigoletto & Little, 1988; Merkatz & Thompson, 1990; Pauerstein, 1987). The three components include (a) early and continuing risk assessment to identify medical/surgical, obstetric, and psychosocial risk factors; (b) health promotion; and (c) medical and psychosocial interventions and follow-up as indicated by maternal-fetal client health status.

Initial risk assessment would occur during the initial comprehensive history and physical examination which would include assessment of results from laboratory tests. Continual risk assessment would occur on subsequent prenatal visits. The identified purpose of initial and continual risk assessment is to detect actual/potential

medical/surgical, obstetric, and/or psychosocial conditions or complications (risk factors) that increase the risk of a nonoptimal or poor health outcome for the maternal-fetal client (Frigoletto & Little, 1988; Selwyn, 1990).

Fletcher and MacPherson (1986) acknowledged that the complications associated with the antepartum period range from simple to complex. The most frequent complications encountered are minor with a transient effect that might seem insignificant at the time. With time, or taken accumulatively, these minor complications might quietly contribute to the development of more serious major complications. Thus, in providing care to pregnant women, the care manager should not overlook the importance of striving to prevent ordinary problems, as they also look to prevent extraordinary catastrophes. The first area for an approach to the prevention of complications would be in the accurate recognition of an actual and/or a potential complication.

Continued assessment for risk factors could assist the care manager in the early detection of actual/potential problems or complications so that an appropriate plan of management could be formulated and implemented. Early detection and management might lessen the effects or resolve the complication/problem before significant sequelae result. Early identification of antepartum complications could also

potentially minimize maternal and fetal/neonatal morbidity and mortality by giving the care manager an opportunity to establish an appropriate plan of management which might include consultation and/or referral for more sophisticated surveillance, evaluation, and/or care management (Donabedian, 1966,1968,1982; Frigoletto & Little, 1988; Selwyn, 1990).

The mechanism for identification of these conditions/complications would be accomplished by systematic implementation of antepartum surveillance activities (Selwyn, 1988). These activities could be performed by the primary care managers (providers) or by others at the managers' direction. These surveillance activities form the obstetric data base from which the care manager assesses (diagnoses) whether the health status of the maternal-fetal client is normal or abnormal. In turn, the assessed health status of the client would determine the appropriate care management plan which should be implemented by the care manager. The plan might include (a) health promotion activities such as health education, counseling, instruction, etc.; (b) immediate interventions (including referrals); (c) additional surveillance activities; and/or (d) a combination of these. In addition, continued surveillance and assessment would be done in order to evaluate the results of the implemented management plan.

The client's health status would be reassessed and need for further implementation of and/or adjustments in the management plan would be determined. The process described above is a component of the care management process synthesized from the medical, nursing, and nurse-midwifery literature which was utilized in this study (Brooks & Madison, 1976; Donabedian, 1966,1968,1982; Hurst, 1983; Johns, 1984; Lawrence & Dorsey, 1976; Neuman, 1982; Varney, 1987; Yura & Walsh, 1988). Concepts related to the care management process were utilized by the investigator to develop the instruments for this study and are discussed in detail elsewhere in this paper. The reader is referred to the Instrument section of Chapter 3 and Appendices B,C, and D for detailed descriptions of management components and instruments.

Antepartum conditions/complications which could place the maternal-fetal client at risk for poor health outcomes would include, but are not limited to, (a) potential genetic abnormalities; (b) abnormal cervical cytology; (c) glucose intolerance; (d) preterm labor; (e) anemia; (f) intrauterine fetal growth retardation; (g) postdates pregnancy; (h) sexually transmitted diseases; (i) pregnancy induced hypertension; (j) abnormal weight gain patterns; (k) abnormal vaginal bleeding; (l) size/dates discrepancy; (m) urinary tract infection; (n) Rh negative/isoimmunization;

(o) compromised fetus; (p) high risk conditions identified on ultrasound; and (q) other abnormal maternal conditions (Cunningham, MacDonald, & Gant, 1989; Pauerstein, 1987). Criterion-indicators which operationally define the recognition and management of the antepartum conditions/ complications cited above were developed by the investigator for use in this study. The reader is referred to Appendix C for further details regarding the recognition and management of these conditions/complications.

Standards of Antepartum Care Management

Standards for antepartum care were initially developed and published by the Children's Bureau (Thompson, Walsh, & Merkatz, 1990). Since 1959, the American College of Obstetricians and Gynecologists (ACOG) has produced a series of professional standards which include recommendations for antepartum care. The standards include aspects that leading obstetricians have agreed are important components of antepartum care (Hemminki, 1988). A collaborative effort by ACOG and the American Academy of Pediatrics has resulted in the development of guidelines for perinatal care including antepartum care (Frigoletto & Little, 1988). Other sources identified as providing standards of antepartum care management, especially for management of specific antepartum

conditions/complications are obstetrical textbooks and literature (IOM, 1988; Klermann, 1990).

Standards of antepartum surveillance activities could be described as being synonymous with the content of prenatal care that would be systematically performed during the initial and subsequent antepartum visits (ACOG, 1989; Cunningham, MacDonald, & Gant, 1989; Frigoletto & Little, 1988; Hemminki, 1988; IOM, 1988; Klermann, 1990; Nagey, 1989; Pauerstein, 1987; PHS, 1989). The content and timing of the various antepartum surveillance activities which have been recommended has come under scrutiny in the recent past (Merkatz & Thompson, 1990; PHS, 1989). However, the standards developed by the American Academy of Pediatrics and ACOG (ACOG, 1989; Frigoletto & Little, 1988) are the most accepted and operationalized standards in professional clinical obstetric practices (Hemminki, 1988; Nagey, 1989). These standards of antepartum surveillance have been incorporated into the Antepartum Data Base Scale developed by the investigator (see Appendix B).

Technical bulletins are also published by ACOG which recommend appropriate management strategies for specific antepartum conditions and complications (ACOG, 1989). These recommendations are based on clinical research and reflect professional practice standards. These recommendations are usually consistent with recommended management cited in the

leading obstetrical texts such as Williams Obstetrics (Cunningham, MacDonald, & Gant, 1989) and Clinical Obstetrics (Pauerstein, 1987). These sources of care management standards were utilized by the investigator to develop criterion-indicators for the recognition and management of the various antepartum conditions/complications included in this study.

Primary Providers of Antepartum Care

Since the early 1900s, it has become expected that physicians, especially obstetricians, control the care and supervision of pregnant women (Thompson, Walsh, & Merkatz, 1990). Since the advent of modern obstetric medicine, the medical specialty of obstetrics and gynecology has served as the standard by which prenatal care is practiced and evaluated (Knoll, 1990). Although obstetrician-gynecologists manage approximately 80% of deliveries in the United States, a substantial amount of antepartum care is provided (managed) by family practice physicians, nurse practitioners, certified nurse-midwives, and registered nurses with special training (Knoll, 1990). Of particular interest in this study is the utilization of certified nurse-midwives.

Description of Nurse-Midwifery in the United States

Tom (1982) declared that nurse-midwifery in the United States is rooted in urban and rural poverty and in home deliveries. Originally, the role of the nurse-midwife in the United States was not conceived to be as a hospital practitioner. Instead, the role of the nurse-midwife was derived from the needs of people who had no or limited access to physician care and delivered at home. While present-day nurse-midwifery practice has been reported to occur in a multiplicity of practice settings and provide the care management of a variety of clientele, the goals of providing safe and effective care to mothers, babies, and families remain unchanged (Rooks & Haas, 1986).

Hogan (1975) identified three organizations, with family health as their common objective, which directly contributed to the development of nurse-midwifery in the United States. They were the Children's Bureau, Maternity Center Association, and Frontier Nursing Service.

The Children's Bureau was investigating, reporting, and setting up federal plans leading to better maternal and child health. At the same time, the Maternity Center Association in New York City was demonstrating what could be accomplished by education of the family, education of the nursing group, and education of the public. Frontier

Nursing Service in Kentucky was demonstrating that nurse-midwives could provide quality maternal and child health care, even in crude circumstances.

In essence, the Children's Bureau showed the need for well-prepared workers (nurse-midwives) and set maternal-child health care standards. Frontier Nursing Service demonstrated what the nurse-midwife could do. In 1932, Maternity Center Association, with assistance from Frontier Nursing, opened the first school in the United States which would produce the much needed, well prepared nurse-midwife (Hogan, 1975).

The first nurse-midwives to practice in the United States, however, were British-trained nurse-midwives. These nurse-midwives were brought to this country in 1925 by Mary Breckenridge, a wealthy American-trained nurse certified by the Central Midwife Board of England (Tom, 1982; Varney, 1987). Breckenridge conceived and developed a plan to provide comprehensive health care including maternity care, for the remote rural people in the Kentucky mountains. Originally known as the Kentucky Committee for Mothers and Babies, the program became the Frontier Nursing Service (FNS) in 1928. The FNS provided health care by utilizing outpost nursing centers staffed by nurse-midwives and backed by a medical director located at a small, local, rural hospital (Varney, 1987).

Through the utilization of a core group of British-trained nurse-midwives and the meticulous keeping of records and tabulation of statistics, Breckenridge was able to demonstrate a substantial improvement in the health of mothers and babies and document what she and her colleagues had achieved (McCool & McCool, 1989). This project began a long association between nurse-midwives and effectively and efficiently managed maternity care.

In 1963, the practice of nurse-midwifery was legally authorized in three states and New York City with legal status in other states largely unknown or unclear (Varney, 1987). By 1984, legal authority to practice nurse-midwifery had been established in all 50 states and the jurisdictions of the District of Columbia, Guam, Puerto Rico, and the Virgin Islands (Rooks & Haas, 1986; Varney, 1987).

Boyer (1990) cited several incidents in which nurse-midwives have been recognized as valid and valuable maternal-infant health care providers. In 1986, the Congressional Office of Technology Assessment concluded the quality of certified nurse-midwifery care to be equivalent to that provided by physicians, and argued that nurse-midwifery services should be expanded. In June of 1988, a special Commission of Health Task Force in New York concluded that nurse-midwifery services were urgently needed in response to the obstetrical crisis in that state. In

August of 1988, the National Commission to Prevent Infant Mortality challenged state universities to expand their training programs for certified nurse-midwives. In October of 1988, the Institute of Medicine recognized the value of certified nurse-midwives and proposed their hospital privileges be increased. Boyer suggested that the credibility of nurse-midwives was being vigorously reaffirmed.

Nurse-Midwifery: A Unique Profession

Diers (1982) identified nurse-midwifery as the oldest of the specialized professional practice roles for nurses. The official definition of a certified nurse-midwife and an analysis of the components which define the profession are presented in this section.

Definition. The current official definition of a certified nurse-midwife was adopted by the American College of Nurse-Midwives (ACNM) in 1978. According to the ACNM (1978),

> A certified nurse-midwife (CNM) is an individual educated in the two disciplines of nursing and midwifery, who possesses evidence of certification according to the requirements of the American College of Nurse-Midwives (p.1).

Professional disciplines. The inclusion of nursing as a prerequisite in the preparation of a CNM has emphasized

the primary focus of the registered nurse. The primary focus of nursing was identified as being on the individuality of patients and meeting their needs, not only through physical care but education, counseling, and supportive care (Varney, 1987).

An internationally recognized profession with practitioners throughout the world, midwifery is considered a distinct profession and is not considered to be a nursing or medical specialty (Diers, 1982). Summarized, a professional midwife has been internationally defined as a person who (a) has successfully completed a recognized midwifery education program; (b) has acquired the requisite qualifications to legally practice midwifery; and (c) has demonstrated the ability to give supervision, care, and advice to women during pregnancy, labor, and the postpartum period, to conduct deliveries independently, and to care for the newborn and infant, obtaining medical assistance when indicated (Varney, 1987).

According to Varney (1987), nurse-midwifery is comprised of education in the two disciplines, nursing and midwifery, that implicitly incorporates components of a third discipline -- medicine. Varney clarified the medical component as specifically normal obstetrics, gynecology, and neonatal medicine. Varney further described nurse-midwifery as encompassing all of midwifery plus components from both

nursing and medicine. Varney concluded that nurse-midwifery was not totally nursing, not totally midwifery, and not totally medicine, but a unique profession in its own right.

Nurse-midwifery practice has been envisioned as functioning as an interdisciplinary bridge between nursing and medicine as it pertains to health care of childbearing women and neonates. In addition, nurse-midwifery has been viewed as an interdisciplinary bridge between the fields of obstetrics, gynecology, and neonatology as the nurse-midwife provides continuity of care (Varney, 1987).

Educational preparation. Nurse-midwifery education programs are located within graduate programs of accredited institutions of higher learning or as non-degree (certificate) programs which have an affiliation with institutions of higher learning. In 1991, there were 34 accredited programs (Roberts, 1991).

Nurse-midwifery education is based upon theoretical preparation in the sciences and clinical preparation for the judgement and skills necessary for health care management of essentially normal women and newborns. The ACNM defined core competencies as the fundamental knowledge, skills, and behaviors expected of a new graduate and identified the core of knowledge and skills basic to preparation for nurse-midwifery practice (American College of Nurse-Midwives, 1985).

To become accredited, nurse-midwifery education programs must have demonstrated their curriculum would lead to achievement of the core competencies. Therefore, although students may graduate with a variety of degrees or diplomas, the consumer is assured that all nurse-midwives have satisfactorily acquired the competencies necessary for safe and effective practice (Conway-Welsh, 1986).

ACNM certification. The preparation of a certified nurse-midwife in the United States would require a registered nurse to complete an ACNM-approved nurse-midwifery education program, meet the eligibility requirements to take the certifying examination, and successfully complete the certifying exam given by the American College of Nurse-Midwives. The individual completing all these requirements would then be eligible to function as a certified nurse-midwife (Foster, 1986). Certification would give official recognition to an individual who has met professional standards for safe practice. The result of the certification process is aimed at protection of the public and differentiation of the well-educated and highly prepared CNM from a nurse who might function as a birth attendant or lay midwife and from other midwives (lay or empirical) whose quality of midwifery education might not be assured. In 48 states, licensure or

authorization to practice as a nurse-midwife requires certification by the ACNM (Foster, 1986; Roberts, 1991).

The Professional Practice of Nurse-Midwifery in the United States

The American College of Nurse-Midwives (ACNM) incorporated in 1955, is the professional organization for nurse-midwives in the United States. Diers (1982) credited the ACNM's diligent actions to distinctively define nurse-midwifery and nurse-midwifery practice including its role in maternal-child health care, scope and standards of practice, core competencies for safe practice, values, and goals as key reasons why certified nurse-midwives have been on the cutting edge of health care system reform. In this section, the definition and characteristics of nurse-midwifery practice are presented and analyzed.

Definition of Nurse-Midwifery Practice. The ACNM has officially defined nurse-midwifery practice in the United States. The definition is presented below.

> Nurse-midwifery practice is the independent management of care of essentially normal newborns and women, antepartally, intrapartially, postpartally, and/or gynecologically occurring within a health care system which provides for medical consultation, collaborative management, or referral and is in accord with the Standards for the Practice of Nurse-Midwifery as defined by the American College of Nurse-Midwives (American College of Nurse-Midwives, 1987a, p 1).

Independent management. Varney (1987) analyzed the concept of independent nurse-midwifery management of care. It was recognized that nurse-midwives managed care independently within established written protocols for practice. Thus, patients who received care managed by a nurse-midwife could possibly never be seen or evaluated by a physician if their course of health was essentially normal. The written protocols were described as defining the practice of the nurse-midwife and providing for medical consultation and referral in a particular health care system. CNMs are required by their professional organization, the ACNM, to always function within a health care system in a team relationship with a physician and would never be independent of physician backup for consultation, collaborative management, or referral.

Scope of nurse-midwifery practice. Varney (1987) noted CNM responsibility for the total management of care to be limited to essentially normal child-bearing women and neonates. It was recognized, however, that if a patient were to develop complications, a CNM could continue to contribute to the management of care. Depending on the severity of the complication and the health care setting, the CNM would consult and collaborate with the physician in the management of the care or would refer the patient to the physician, but could possibly continue to see the patient

for continuity of care. The concept of normal is defined by the CNMs and physicians in a particular practice setting allowing for variance in that definition from practice setting to practice setting. This lack of clarity and stability in normality was conceptualized as resulting at times in a gray zone area of what the nurse-midwife could manage (Varney, 1987).

Varney (1987) recognized limits of nurse-midwifery practice as being established by (a) definitions; (b) official practice standards as stated by the ACNM; (c) local standing orders and policies/protocols; and (d) the nurse-midwife's own limitations of knowledges and capabilities. Summarized, four different types of limits were identified -- professional, local, personal, and legal. All the types of limits were visualized as having certain elastic qualities which, in many circumstances, would allow the nurse-midwife to continue providing and coordinating care in patients with complications in collaboration with the physician.

Standards for the Practice of Nurse-Midwifery. In 1987, the ACNM adopted the revised Standards for the Practice of Nurse-Midwifery (ACNM, 1987b). According to Varney (1987), the philosophy of the ACNM is reflected, the activities of the professional organization are dictated,

and the practice of nurse-midwifery is explicitly defined in the ACNM practice standards. It was recognized that the practice standards did not include a specific list of detailed functions. Varney noted such detailing of functions is developed as appropriate to individual practice settings and outlined in the protocols and standing orders for each practice site.

Management of Care. According to the ACNM (1985), nurse-midwifery practice is based upon a management process that is used in all aspects of care. The graduates of all ACNM accredited nurse-midwifery education programs would possess core knowledges, skills, and behaviors basic to the components of nurse-midwifery care. The ACNM identified components of nurse-midwifery care as antepartum care, intrapartum care, postpartum care, neonatal care, family planning/gynecological care, and common complications related to all of the above areas of care.

Thompson, Oakley, Burke, Jay, and Conklin (1989) have constructed a middle range descriptive theory of the nurse-midwifery process of care. Major concepts of the construct, nurse-midwifery process of care, were derived from the philosophy of the American College of Nurse-Midwives (ACNM). Six major concepts of the nurse-midwifery process of care were ultimately identified. Nurse-midwifery was conceptualized as being (a) safe, (b)

satisfying, (c) respectful of human dignity and self-determination, (d) respectful of cultural and ethnic diversity, (e) family centered, and (f) health promoting. The nurse-midwifery process of care, knowledge, and skills are operationalized in all practice areas through the nurse-midwifery management process (Varney, 1987).

The ACNM (1985;1987b) defined and described the nurse-midwifery management process. The nurse-midwifery management process is described as including three aspects -- primary management, collaborative management, and referral as well as medical consultation.

In the management process, the patient would be continually screened for abnormality with normal being differentiated from abnormal. Varney (1987) acknowledged that nurse-midwives did not pretend to be expert diagnosticians of medical complications. However, the nurse-midwife was expected to begin the process of making a differential diagnosis. It was considered inappropriate for the nurse-midwife to have reported a complication to a physician without some prior evaluation as to the etiology of the problem, and when appropriate, additional data which would assist the physician in the evaluation and treatment of the patient.

Varney (1987) affirmed that there were different types of complications or conditions which the nurse-midwife would

diagnose and treat under the authority of written standing orders or practice protocols. The type of listing would vary from practice setting to practice setting. In other suspected complications, the nurse-midwife would be expected to order laboratory or other adjunctive tests for confirmation of the diagnosis and presentation to the physician for evaluation and treatment.

The concepts cited in the nurse-midwifery management process are congruent with those cited in literature for general concepts related to the management process (Fayol, 1949; Katz & Rosenzweig, 1970) and health care management concepts (Brooks & Madison, 1976; Donabedian, 1966,1968; Johns, 1984; Lawrence & Dorsey, 1976; Neuman, 1982; Yura & Walsh, 1988). The concepts related to the general management process and the health care management concepts, including the nurse-midwifery management process, were utilized by the author to develop the instruments used in this study.

Nurse-Midwifery Evaluation Literature

Articles about the evaluation and success of the utilization of nurse-midwives in maternal-child health care systems in the United States began to appear in the professional literature during the 1950s. Laird (1955) and the Metropolitan Life Insurance Company (1958) were the

first to publish outcomes on nurse-midwifery managed care. These statistical summaries included traditional maternal and infant morbidity and mortality outcomes of pregnancies and homebirths attended by nurse-midwives. These reported outcomes were compared to regional and national mortality rates.

A few years after nurse-midwifery practice was incorporated into hospital settings in the late 1950s, descriptions of the effective use and role of the nurse-midwife on the obstetrical care team were published (Hellman, 1962,1967; Hellman & O'Brien, 1964; Maeck, 1971). The utilization of nurse-midwives was proposed as a safe and appropriate strategy to provide accessible and acceptable maternity care, especially in view of the perceived medical obstetric manpower shortages.

The nurse-midwife was one of the earliest models of expanded role nursing providing primary health care for childbearing women and newborns in the United States (Ernst & Gordon, 1979). The utilization of nurse-midwifery systems of health care to meet the primary health care needs of various sectors of the population has contributed to the need for evaluation of the services provided.

Evaluation of Practice Outcomes of Nurse-Midwifery Care. Nurse-midwifery services have kept statistics on practice outcomes since the first service began in 1925 (Varney, 1987). The American College of Nurse-Midwives (ACNM) has encouraged nurse-midwifery service data collection and has developed guidelines for collection of nurse-midwifery statistics (ACNM, 1982).

The outcomes of nurse-midwifery care (Greener, 1991) were defined as denoting consequences or results that could be attributed to antecedent health care by nurse-midwives. Such outcomes included the maintenance of a client's health state, or a change in the client's current or future health status in the at-risk or ill client. Maternal-infant morbidity and mortality have traditionally been reported as indicators of quality assessment, as have client satisfaction or dissatisfaction with care received, and increased access to care. Specific examples of outcomes of nurse-midwifery care have also frequently included measurement of Apgar scores, birthweight, birth trauma or lacerations, infection, rehospitalization, and incidence of prenatal, intrapartum, postpartum, and/or neonatal complications, procedures, and intervention modalities (Diers & Burst, 1983; Greener, 1991; Thompson, 1986).

Practice outcome statistics have been used to evaluate the safety and effectiveness of nurse-midwifery managed care in a variety of practice settings and client populations. The significance of the early (Laird, 1955; Levy, Wilkinson, & Marine, 1971; Lubic & Ernst, 1978; Meglen & Burst, 1974; Metropolitan LIfe Insurance Company, 1958; Montgomery, 1969; Runnerstrom, 1969; Slome, et al., 1976) and subsequent (Anderson & Greener, 1991; Baruffi, Strobino, & Paine, 1990; Baruffi, et al., 1984a, 1984b; Bell & Mills, 1989; Bennetts & Lubic, 1982; Browne & Isaacs, 1976; Brucker & Meullner, 1985; Cavero, Fullerton, & Bartlome, 1991; Corbett & Burst, 1976; Diers, 1981; Dillon, et al., 1978; Doyle & Widhalm, 1979; Ernst & Gordon, 1979; Goldberg, Baisch, & Fox, 1986; Haire, 1981; Hangsleben, Taylor, & Lynn, 1989; Hangsleben & Schamber, 1985; Heins, Nance, McCarthy, & Effrid, 1990; Hellman & O'Brien, 1964; Holz, Cooney, & Marchese, 1989; Lubic, 1981; Mann, 1981; Mayes, et al. (1987); Nichols, 1985; O'Brien & Gilson, 1987; Piechnik & Corbett, 1985; Reid & Morris, 1979; Rooks, et al., 1989; Ross, 1981; Schorfheide, 1982; Scupholme & Kamon, 1987; Scupholme, McLeod, & Robertson, 1986; Sharp & Lewis, 1984; Smoke & Grace, 1988; Stewart & Clark, 1982; Wingeier, Bloch, & Kvale, 1988) evaluative outcome studies has been that well-prepared nurse-midwives provide childbearing care that

is safe and effective according to evolving medical/ obstetric standards.

Client satisfaction with care received is an outcome of care management. Satisfaction with nurse-midwifery managed care has been reported briefly in a variety of settings with data gained from interviews, questionnaires, scales, increased utilization of services, and increased compliance to prenatal and postpartum visits (Bell & Mills, 1989; Ernst & Forde, 1975; Harvey, Carr, & Bernheine, 1989; Hellman & O'Brien, 1964; Lubic, 1981; Montgomery, 1969; Record & Cohen, 1972; Rising, 1975; Rooks, et al., 1989; Ross, 1981; Schorfheide, 1982; Schupholme & Kamon, 1987; Slome, et al., 1976; Stewart & Clark, 1985; Thompson, 1981; Wingeier, Bloch, & Kvale, 1988). Thompson (1986) concluded that definitive measures of satisfaction are indicated for future outcome studies. In addition, Thompson identified one of the best indicators of satisfaction with nurse-midwifery care might be increased utilization of nurse-midwife services as measured by the number of prenatal and postpartum follow-up visits attended by the women in their care.

The utilization of nurse-midwifery health care systems to effectively increase access to comprehensive maternity care has been well documented (Cavero, Fullerton, & Bartlome, 1991; Diers, 1982; Haire, 1981; Levy, Wilkinson, &

Marine, 1971; Laird, 1955; Lubic & Ernst, 1978; Mann, 1981; Meglen & Burst, 1974; Metropolitan Life Insurance Company, 1958; Montgomery, 1969; Nichols, 1985; Reid & Morris, 1979; Rooks, et al., 1989; Ross, 1981; Schorfheide, 1982; Sharp and Lewis, 1984; Slome, et al., 1976; Stewart & Clark, 1982). In addition, utilization of nurse-midwifery health care systems has been recognized as an effective strategy to increase access to comprehensive maternity care (Boyer, 1990; Diers, 1982; Institute of Medicine, 1988).

Structure studies. Greener's (1991) definition of the structure of nurse-midwifery care relates to the characteristics of the providers of care, their work requirements and resources, and the physical and organizational settings in which they practice. Every study cited in the preceding section on outcome studies also qualifies as describing the structure of nurse-midwifery. In each outcome study, there is a description of the nurse-midwifery practice setting, the professional relationships for medical referral and consultation, criteria for case acceptance and management, and frequently, actual practice policies/protocols are included in the study. In addition, certain authors included documentation on the cost effectiveness of nurse-midwifery care systems (Bell & Mills, 1989; Bennetts & Lubic, 1982; Browne & Isaacs, 1976; Cherry & Foster, 1982; Ernst & Forde, 1975; Lubic, 1975,1981; Metropolitan Life

Insurance Company, 1958; Reid & Morris, 1979; Scupholme & Kamon, 1987; Scupholme, McLeod, & Robertson, 1986; Stewart & Clark, 1982).

Process of care studies. The process of nurse-midwifery care was defined by Greener (1991) as referring to a set of activities and interactions that occur within and between nurse-midwives and clients. In this aspect of care, the content and activities of care which operationalize the philosophy of the care provider are represented by certain behaviors or utilization of procedures by nurse-midwives. In general, the process of nurse-midwifery care can be defined as the way nurse-midwives do the things nurse-midwives do while assisting their clients to attain, maintain, and/or regain maximum levels of wellness (Greener, 1991; Thompson, et al., 1989). Theory building efforts to describe the content and process of the components of the nurse-midwifery process of care have been reported (ACNM, 1986; Fullerton, 1987; Lehrman, 1981; Morten, Kohl, O'Mahoney, & Pelosi, 1991; Thompson, et al., 1989).

Others have contributed to the growing body of knowledge of nurse-midwifery practice theory through studying different components of the nurse-midwifery care process in the antepartum, intrapartum, postpartum, and newborn periods (Andrews, 1981; Baruffi, et al., 1984a, 1984b; Baruffi,

Strobino, & Paine, 1990; Beal, 1984; Bowe, 1981; Church, 1989; Fischer, et al., 1981; Fullerton, 1982; Hangsleben, Taylor, & Lynn, 1989; Hyde, 1989; Lehrman, 1981; Meserve, 1982; Morten, et al., 1991; O'Brien & Gilson, 1987; Roberts, Hammes, & Gundersen, 1986; Roberts, Malasanos, & Mendez-Bauer, 1981; Sibley, et al., 1981; Sweeney, et al., 1985; Thompson, 1981; Wingeier & Griggs, 1991; Yeates & Roberts, 1984). No study was discovered that comprehensively evaluated the operationalized components of the care management process.

Literature Evaluating the Antepartum Care Management Process

Review of extant literature revealed a dearth of studies that evaluated the antepartum care management process. Only two studies were discovered that measured a component of the care management process. In those studies, the effectiveness and efficiency of care management was not evaluated.

In the absence of an agreement on the content of prenatal care and because many of its components are difficult to measure, most evaluation research on the effectiveness of prenatal care services has focused on the quantity of care received and health outcome (IOM, 1985,1988; Klermann, 1990). The IOM recognized the measures used to understand the impact of prenatal care on health

outcomes differ from other types of health care. Most studies of the effectiveness of health care examine provider behaviors. Examples would include such behaviors as adequacy of history taking, appropriateness of tests ordered, and the appropriateness of the procedures conducted. In contrast, studies of the role of prenatal care in pregnancy outcomes usually measure client behaviors. Examples of this would include behaviors such as client initiation of early care, and client compliance to scheduled visits.

Three measures of the quantity of prenatal care are widely used. They include (a) the number of visits made throughout pregnancy (frequency), (b) the trimester or month in which care began (timing), and (c) an index relating the frequency and timing of visits to gestational age (various modified forms exist) (IOM, 1988). Two major limitations have been identified with the use of all three measures. First, none include a precise definition of a prenatal visit. Second, the measures depend on the client's recollection of her prenatal visits or on data abstracted from the prenatal record or birth certificate. These sources could be inaccurate. In addition, counting the number of prenatal visits would ignore the distribution of visits over the pregnancy, obscuring the relationship between prenatal care and preterm delivery. Exceptions to the quantitative measurement approach to prenatal care are

the work of Morehead, Donaldson, and Servalli (1971) and Hughey (1986). These studies evaluated the process of certain aspects of antepartum care.

In a survey of 26 prepaid medical groups providing prenatal care with a total of 25,724 deliveries per year, Hughey (1986) documented differences in prenatal care practice between health care providers. Many prenatal care providers were reported as not adhering to care standards recommended by textbooks, professional groups, or legal precedents. This inconsistency in care provision resulted in diversity in antepartum surveillance activities performed at each prenatal visit and routinely offered during pregnancy. No conclusions were made by the investigator about which surveillance activities should or should not be included in routine prenatal care practices. Care management of particular antepartum problems or complications were not addressed.

Morehead, Donaldson, and Servalli (1971) evaluated the quality of outpatient health care managed in neighborhood health centers. Prenatal care was one area of health care evaluated. Medical record audits were conducted. The degree to which certain standards of antepartum surveillance activities were performed by different types of health care providers in different health care settings were measured. Geographically diverse health centers, group medical

practices, federally-funded Maternal and Infant Care Programs were compared to standards of prenatal care set by several medical school affiliated hospital outpatient departments. The exact classifications of the care providers were not specified. Clinical management and management of complications were not evaluated. Maternal and Infant Care Programs were clearly rated most consistent in adhering to standards of prenatal care surveillance when compared to all other health care facilities in the study. The reason attributed to the high quality of care in the Maternal and Infant Care Programs was that they were recognized as being highly organized, had "professional" staff, and had a broad range of available resources. There was also a wide variation of performance observed within groups of providers not explained by organizational pattern alone.

In the two studies cited above, prenatal care provider behaviors were measured as they related to the performance of the content of antepartum care surveillance activities. These activities have previously been identified by this author as a partial component of the care management process.

The components of the care management process have been synthesized from the medical, nursing, and nurse-midwifery literature. The components encompass (a) comprehensive

assessment of person, environment, and health, including impressions or diagnoses; (b) planning of appropriate interventions which may include consultations and/or referrals; (c) implementation of interventions; and (d) evaluation of interventions and the need for adjustments in and/or continued application of the care management process (Brooks & Madison, 1976; Donabedian, 1966,1968,1982; Hurst, 1983; Johns, 1984; Lawrence & Dorsey, 1976; Neuman, 1982; Varney, 1987; Yura & Walsh, 1988).

Avedis Donabedian (1966,1968,1982) has written extensively on strategies to evaluate the quality (effectiveness and efficiency) of the health care process. He proposed that the assessment of quality must rest on a conceptual and operational definition of what the quality of care means. The criteria of quality were identified as nothing more than value judgements that are applied to several aspects, properties, ingredients, or dimensions of a process of care. It was acknowledged that the definition of quality might be almost anything anyone wished. However, ordinarily, quality would be defined as a reflection of values and goals current in the health care system and in the larger health care environment.

Donabedian (1966,1968,1982) conceptualized health care management as a process of care. The health care process was assessed to be based on the concept of need derived from

professional and client estimates of conditions or situations that require health care.

The health care management process would be initiated when the client recognizes a need for care, decides to seek care, and makes contact with the primary health care professional (Donabedian, 1968). The health professional (physician or other primary health care provider) would then arrive at his/her own estimate of need for care through a process of diagnostic decision-making, and then would determine an appropriate plan of care management. This process would require the participation and cooperation of the client and the primary care professional. Very often, this process would be expanded to include a variety of other health professionals and persons associated with the client. Thus, a complex network of formal and informal interactions are formed, the core of which is the client-primary care professional relationship.

In summary, the health care process was visualized as a set of client behaviors and another set of provider behaviors with complex interactions between them. Two products of these interactions were identified. The products were (a) an intermediate product, the use of health services, and (b) an ultimate product, definable in terms of health outcomes. Donabedian recognized that the characteristics of the larger health care system could

profoundly influence all components of the care management process and the products of the care management process (Donabedian, 1968).

Donabedian (1966,1968,1982) asserted that there are multiple approaches to evaluating the quality of care management. One approach would be the examination of the process of care itself instead of health outcomes. Effectiveness and efficiency (quality) of care was described as an evaluative dimension of the elements and interactions in the care management process. It was concluded that the quality of care could be assessed through evaluative judgements made of care manager(s') decisions and actions (performance) evidenced during the care management process. Effective and efficient care management could be defined by previously selected standards and criteria that operationalize the care process in a specific client situation/condition. The most accurate judgements of care manager performances are derived from standards of care management for specific client situations/conditions (Donabedian, 1966,1968).

The approach to evaluating the effectiveness and efficiency of care management proposed by Donabedian (1966,1968,1982) was utilized to develop the measurement methodology for this study. The reader is referred to the

Instruments section of this paper for more detailed information.

Summary

In summary, review of extant antepartum and nurse-midwifery research literature failed to reveal studies that comprehensively evaluated the effectiveness and efficiency of antepartum care managed within the framework of a care management process. Only two studies were discovered that incompletely measured the content of antepartum surveillance activities. These surveillance activities are one element in a major component of the care management process. Most research on the effectiveness of antepartum care focused on the quantity of care received, not the effectiveness and efficiency (quality) of care management.

Most research which reported the effectiveness of nurse-midwifery care focused on the various indicators of maternal-newborn health outcomes and the incidence of intervention modalities, i.e. inductions of labor, episiotomies, perineal lacerations, forceps deliveries, spontaneous vaginal deliveries, cesarean sections, etc. These outcomes and incidence of intervention modalities were usually compared to local, state, and/or national morbidity and mortality statistics or to various primary maternity

health care provider groups. These groups included private practice obstetrician-gynecologists, family practice physicians, obstetrical and gynecological resident physicians, and other certified nurse-midwives. Satisfaction with and cost-effectiveness of nurse-midwifery care has also been reported in the literature.

Although some studies have evaluated aspects of the nurse-midwifery process of care, no study was discovered which evaluated the implementation of the care management process by nurse-midwives. There was also no study discovered that evaluated effectiveness and efficiency of the implementation of the care management process in maternity care managed within a comprehensive nurse-midwifery system of care as compared to care managed within a Non-CNM maternity care system. Studies were discovered (Donabedian, 1966,1968,1982) in the health care literature which proposed a measurement approach which could be adapted to measure the effectiveness and efficiency of maternity care management.

CHAPTER 3

PROCEDURE FOR COLLECTION AND TREATMENT OF DATA

A four-group, comparison-controlled, quasi-experimental, and evaluative design was used for this study (Green & Lewis, 1986; Waltz, Strickland, & Lenz, 1984; Wilson, 1985). The independent variable was the type of care management system in which the maternity care was managed, i.e. CNM and Non-CNM. The effectiveness and efficiency of care received by the maternity client was the dependent variable and was measured by four instruments including (a) ADBS, (b) ACMS, (c) RMS, and (d) NOS. The dependent variable was also measured by (a) the number of missed clinic appointments; (b) the length of time elapsed between missed appointments and the client's return to clinic; and (c) the number of antepartum visits conducted (See Fig. 3). Because the clients were not randomly assigned to the particular health center and/or care management system, the study is classified as quasi-experimental. To control threats to internal validity, comparison groups were utilized (Green & Lewis, 1986).

The pilot program funded by the grant was implemented in two county health centers. The four groups evaluated

VARIABLES		
I. Independent		Type of care management system
	Measured as:	1. CNM
		2. Non-CNM
		a. physician/nurse
		b. primary nurse
II. Dependent		Effectiveness & efficiency of maternity care
	Measured as:	1. Antepartum Data Base Scale
		2. Antepartum Complication Management Scale
		3. Referral Management Scale
		4. Neonatal Outcome Scale
		5. Number of missed clinic appointments
		6. Interval between missed appointments and return to clinic visits
		7. Number of antepartum visits provided

Fig. 3. Independent and dependent variables.

included (a) County Health Center A, CNM group and Non-CNM group and (b) County Health Center B, CNM group and Non-CNM group.

Extraneous variables such as environmental variables and potential heterogeneous comparison groups, were controlled by study design or by delimitation of the sample. Data to test the hypotheses of this study were collected from health center statistical records and health center records of clients who received maternity care in CNM and Non-CNM systems at the two health centers.

Setting

This study was conducted in a county which is part of a large metropolitan area located in a large south-central state. The served population base exceeded one million people.

Overview of the indigent maternity care system

During the conduct of this study, the vast majority of indigent women in this county delivered at one facility. The facility is operated by the county hospital district which is mandated by board policy to provide care to all county indigent residents. Approximately 15,000 women delivered at this facility annually and it has been estimated that approximately 30% of these women receive late or no prenatal care (see Appendix A).

The prenatal care received would be obtained generally from one of three institutions. These are the county hospital district, the city health department, and the county health department. Deliveries occurred only at the hospital district facility. Maternity care management at the hospital district facility was provided by staff/resident physicians and certified nurse-midwives from the obstetrics and gynecology department in a local college of medicine.

This interagency approach to the provision of maternity care frequently has resulted in fragmented and episodic care. Barriers to prenatal care and their effects due to the characteristics of this interagency system were well recognized in this community and to the agencies involved (see Appendix A). Additional barriers to prenatal care recognized in this system were financial constraints, inadequate number of maternity care providers, and experiences, attitudes, and beliefs of the women who utilize various parts of the system.

Interagency maternity care system of study

The maternity health care system providing the setting for this study was limited to three agencies. They were the county hospital district (hospital), county health department (health department), and college of medicine

(COM). In this health care system, pregnant women initiated and obtained prenatal care at the health department as long as the client remained low risk. If actual/potential antepartum complications or other illnesses/health problems would arise that would necessitate the need for resources beyond the capability of the health department, the client would be referred to the hospital. The client might continue to receive care management at the hospital depending on client condition, or she might be sent back to the health department for continued care. Clients delivered at the hospital facility and might or might not be returned to the health department for postpartum/family planning and/or infant care.

The health department consists of five community health centers. Two of these health centers were targeted for implementation of the interagency pilot program. Although the health centers are administratively under one agency, each health center has its own on-site administrative structure. This administrative structure results in differing management and organizational practices that affect operational efficiency and effectiveness. In addition, physical facilities and resources (human and material) differ in quantity and quality between the centers. All the above factors affect the authority and responsibilities of the licensed personnel that staff the

center. The health department has a board certified obstetrician-gynecologist (OB/GYN) consultant physician who has responsibility for the medical care of the maternity clients in all health centers. In addition, other physicians are contracted by the health department to be responsible for the medical management of clients attending the maternity clinics, i.e. medical diagnosis and treatment. The physicians in the pilot program centers are OB/GYN resident physicians from a college of medicine other than the one that is associated with the hospital. The same physicians staff both of the health centers.

The licensed nurses, professional (RN) and technical (LVN), have differing authority and responsibilities in the two health centers. There has also been a difference in the numbers and mix of nurses who work at each center.

The care management systems within which maternity care had been previously managed consisted of the OB/GYN consultant, physicians, and professional nursing staff. The authority and responsibilities of each member varied from health center to health center. Ultimately, the professional nurse(s) had the authority and responsibility to coordinate intraagency resources and care as well as interagency (referrals) care, although the level and amount of direct and primary care provision may vary. The technical nurses may assist in care provision and perform

technical functions of system ccoordination as designated by the professional nurse. However, the client management authority and responsibilities for coordination were designated to professional nurses. The physicians and professional nurses in centers A and B were authorized to access the resources of the hospital on the client's behalf. This is achieved through a medically and administratively approved interagency referral guideline protocol. The protocol essentially restricts client referral dispositions to four hospital sites.

Center A Non-CNM system. In Center A's non-CNM care management system, the initial history and laboratory tests are performed by nursing personnel. If by history the client is found to have conditions which contraindicate the receipt of care at the health center, the client is referred to the hospital facility for care. Otherwise, the client is scheduled for a physical exam with the clinic physician. After that visit, the client is appointed for follow-up visits according to the client's number of weeks of gestation. A clinic physician conducts the follow-up visits, the professional nurse has varying degrees of direct client contact from none to frequent. The professional nurse is responsible for reviewing client records periodically to ensure the management plans have been implemented, the results of laboratory tests and referrals

are on the record, and if the client has missed appointments, to follow-up and reappoint as is possible. In addition, if the nurses identify abnormal laboratory values, abnormal client conditions or referral results, they are responsible for notifying the client, consulting with the OB/GYN consultant or physician, and/or initiating referral of the client to the appropriate facility for care as indicated by the client situation. The professional nurse may delegate some of these responsibilities to technical nurses or other ancillary clinic staff, but remains responsible for the care provision and coordination. The client does not necessarily see the same physician or nurse each visit.

Center B Non-CNM system. In Center B, the non-CNM care management system is described as predominantly a primary nurse system. Each maternity client is assigned a primary nurse, a registered nurse, when the client calls for the initial appointment. At the initial appointment, the primary nurse obtains the client history and performs a complete physical examination, obtaining all specimens for the initial laboratory tests. The client receives appointments to see the clinic physician at least three times during her antepartum period. When actual/potential complications arise, the primary nurse may (a) refer clients directly to the hospital, (b) consult the OB/GYN

consultant, clinic physician and/or the OB/GYN nurse practitioner at the time of occurrence, (c) or may appoint the client to see the clinic physician for continuous or episodic care management as the client situation indicates. Even when the client receives visits conducted by the clinic physician, the client retains her primary nurse throughout the maternity cycle. The primary nurse manages the care of maternity clients by providing direct care through conducting clinic visits and coordinates the care and utilization of system resources, human and material, as directed by the OB/GYN consultant, the clinic physician and/or his/herself guided by agency/interagency protocols.

CNM system in Centers A and B. The CNMs within the care management systems of Centers A and B are authorized by the three agencies to independently manage the primary health care of the pregnant women who select or are assigned to the CNM system caseload. This authorization enables the CNM to access both the intra- and interagency health care systems of each of the three participating agencies in order to provide and coordinate comprehensive health services to clients. The CNM system is a subsystem of each agency with the ability to interface with all pertinent subsystems within each agency. Through interfacing with the various subsystems, direct care as well as consultations and referrals may be effected.

Authorization for the CNM system to function in this interagency care program is achieved through the medically and administratively approved policies and protocols.

The CNM system is staffed by an interchange of CNMs from the CNM Service which provide approximately one full-time equivalent position (FTE) in each of the two health centers. There is a CNM designated to coordinate the clinical aspects of the pilot program. This person also participates in staffing each health center CNM system.

The CNM system consists of the CNMs who conduct each prenatal visit and are responsible for the primary maternity care management of clients in the system caseload. The CNM system also consists of a multiplicity of levels and sources of physicians within the intra- and interagency health care system. These physicians provide medical direction (back-up), diagnosis, and treatment of clients when consultation and/or referrals are requested by the CNMs as part of the care management process.

Because the CNM system is continuous, CNMs may also consult other CNMs in the Birth Center at the hospital. Clients may be directly referred to the Birth Center where CNMs are able to perform more comprehensive assessment of the client when certain actual/potential complications arise.

The CNM system is supported in varying degrees by the health center nursing and clerical staff. In Center A, an LVN is assigned to provide assistance to the CNMs who are conducting prenatal visits. The LVN provides both clerical and technical nursing support. There is little support or assistance from other Center A personnel. In Center B, the CNM system receives a high level of assistance and support, clerical and nursing, from the health center system.

Setting characteristics of Centers A and B. The physical facilities of the health centers are very different. Clinic A actually shares the building with non-maternity clinics administered by the hospital. There is no exchange of personnel or exam rooms. One side of the building is occupied by the health department and the other side by the hospital district. The facility, as well as the equipment, has been in use for many years. Space is limited, exam rooms as well as office space and waiting areas. The surroundings are stark. In contrast, the facilities of Center B are new, bright, well equipped, and attractive. There is ample space to accommodate all center activities.

In each center, the health department provides community health services, other than maternity, to the medically indigent. Although approximately 85% of clients deliver at the hospital, maternity services are provided to

clients who do not deliver at the hospital facility. These factors, along with personnel shortages in the health centers, add to system strain and have potential to affect the effective and efficient provision and coordination of maternity care.

Data collection setting. The investigator performed audits of maternity client records of each care management system, CNM and Non-CNM, at the health center in which the care was managed. Record audits were performed at a desk in one consistent room designated at each health center. There was minimal contact with clinic personnel. The investigator had limited to no professional or personal knowledge of the care providers.

Population and Sample

The target population consisted of all low-risk, medically-indigent pregnant women who utilized the maternity services of a complex, interagency health care system. The convenience sample was composed of 50 maternity clients from the CNM systems and 50 maternity clients from the Non-CNM systems, who met the criteria for inclusion in the study. There were a minimum of 25 subjects in each of the four study groups for a total of 100 study subjects (see Figure 4).

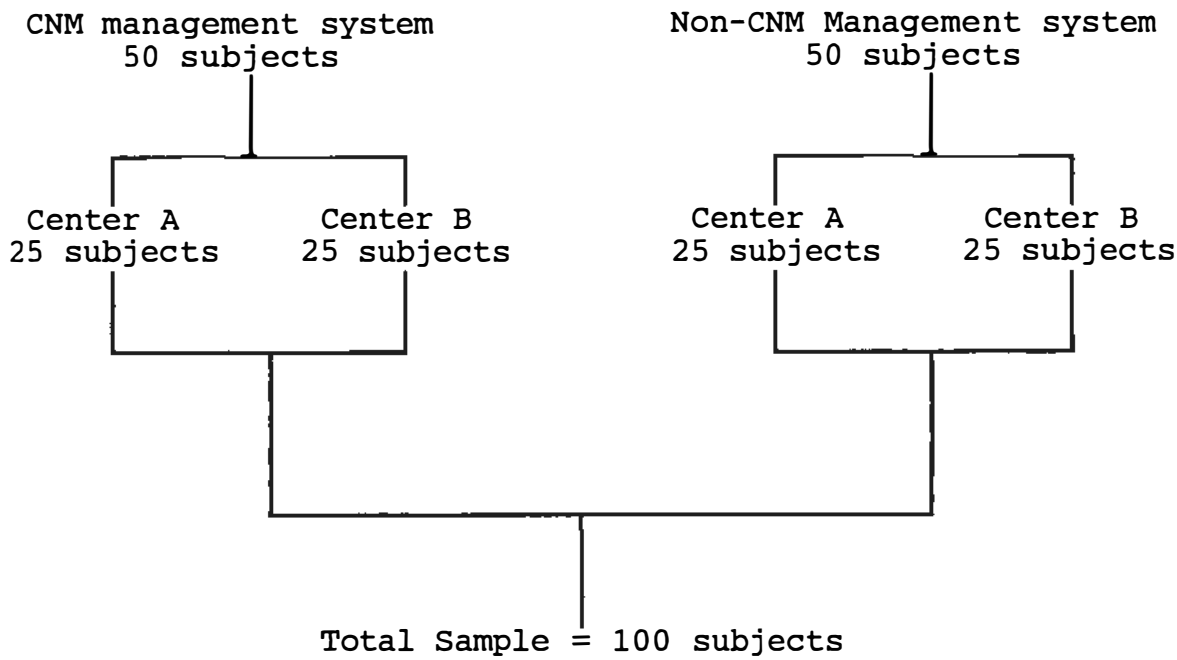

Fig. 4. Composite of Study Sample

For inclusion in the study, the participants met the following criteria:

1. Initiated maternity care at Center A on or after October 1, 1988 or in Center B on or after August 1, 1988.
2. Demonstrated county hospital district eligibility card and delivered at the CHD facility.
3. Had a gestational age of 28 weeks or less at the time of first prenatal visit.
4. Was not transferred from one system of care to another within the health center, i.e., did not begin with CNM then transfer to Non-CNM for remainder of prenatal care

or vice versa. Was included if referred to hospital from health center for evaluation and kept at the hospital.

5. Had no contraindications to CNM or health center care at the initial visit. Absolute contraindications to CNM and/or health center care included but are not limited to:
    1. Essential hypertension
    2. Rh sensitization
    3. Diabetes
    4. Heart disease, excluding grade I and II systolic murmurs
    5. Chronic liver or renal disease
    6. Incompetent cervix
    7. Any severe medical problem (i.e., thyroid disease, convulsive disorder, active tuberculosis, hepatitis, drug addiction, alcoholism, severe psychiatric disorder, history of thromboembolic disease, other).
    8. Multiple gestation
    9. Major illness or operative procedure in current pregnancy
    10. Morbid obesity
    11. High risk due to previous obstetric or gynecologic history

The Non-CNM and CNM appointment books and other client logs and maternity/family planning/newborn client records, as necessary, were reviewed by the health center manager/designee and/or investigator to obtain the names and clinic record numbers of all maternity clients who might be eligible for inclusion in the study. Client records were then reviewed. All clients who met the criteria for inclusion in the study were accepted as study participants.

Protection of Human Rights

Agency approvals were obtained (See Appendix G). The study was exempt from Texas Woman's University Human Subjects Review Committee approval because data collection involved audits of client records. Guidelines from both the agency and the Human Subjects Review Committee were followed to protect the rights of the subjects. Confidentiality and anonymity of subjects were maintained. Each subject was assigned a number and all instruments carried that number. The list of names and numbers were kept by the investigator in a secured place. Only the investigator had access to this information. Data were reported in summary fashion.

There were no known risks for subjects. Subjects were self-selected into or out of the particular care management systems. There was no personal contact between the

investigator and the subjects. There was no perceived benefits to participants. However, there is potential benefit for future clients of the health care system if the capacity of the present system is expanded, and effective and efficient care management is demonstrated.

Instruments

The instruments used in this study were developed by the investigator. They are the Cook Antepartum Care Management Inventory (see Appendices B,C,D, & E) and the Demographic Data Form (see Appendix F).

Cook Antepartum Care Management Inventory

The Cook Antepartum Care Management Inventory (CACMI) is comprised of four instruments. They are the Antepartum Data Base Scale (ADBS); the Antepartum Complication Management Scale (ACMS); the Referral Management Scale (RMS); and the Newborn Outcome Scale (NOS). Each instrument has a Likert-type, summated scale which measures a different aspect relative to effective and efficient management of maternity care. All CACMI instruments are domain and criterion-referenced measures (Waltz, Strickland, & Lenz, 1984).

In an effort to simplify the description and explanation of the CACMI, a comprehensive overview of the conceptual framework, assumptions, administration, scoring,

interpretation, reliability, and validty of the inventory is presented. The purpose, major objective, development, administration, scoring, interpretation, reliability in this study, and validity of each CACMI instrument will then be presented.

Conceptual framework used in the development of the CACMI. Management is described as a universal function which can be defined in terms of various processes the manager performs (Katz & Rosenzweig, 1970). The management process is conceptualized as including the processes of planning, organizing, directing, coordinating, and controlling activities through a systematic information-decision process in order to accomplish system objectives (Fayol, 1949; Katz & Rosenzweig, 1970).

In the management process, unrelated resources from various subsystems within organizations, as well as in other organizations are integrated and coordinated into a total system for objective accomplishment. The manager would accomplish the objectives of the system through coordinating and integrating human and physical resources between the various subsystems (Katz & Rosenzweig, 1970).

An organization is described as an open sociotechnical system with boundaries which separate it from the environment. These boundaries are permeable between the organization and a broader supersystem. Boundaries may

constitute barriers for many types of interactions or may facilitate other types of interactions between people on opposite sides of the system boundaries. When authorized by the organization, a primary management role is that of serving as a linking pin to interface between the various subsystems of the organization and environmental systems. Interfacing helps ensure the integration and coordination of resources and subsystems in order to accomplish system goals (Katz & Rosenzweig, 1970).

One of the main objectives of a health care system is the effective and efficient management (provision and coordination) of client health care (Brooks & Madison, 1976). In health care systems, client care is managed (provided and coordinated) through a variety of client care systems. The goal of the various client care management systems is to assist the client to access and negotiate the health care system in order to utilize the system resources in such a way that maximum levels of client wellness are achieved (Brooks & Madison, 1976; Donabedian, 1968; Lawrence & Dorsey, 1976; Stewart, 1976). This assistance is given through the implementation of a client care management process.

The general management concepts cited above as well as health care management concepts reported in the literature (Brooks & Madison, 1976; Donabedian, 1966,1968,1982; Hurst,

1983; Johns, 1984; Lawrence & Dorsey, 1976; Neuman, 1982; Varney, 1987; Yura & Walsh, 1988) were utilized to conceptualize the major components of the care management process. The components of the care management process encompass (a) comprehensive assessment of person, environment, and health, including impressions or diagnoses; (b) planning of appropriate interventions which may include consultations and/or referrals; (c) implementation of interventions; and (d) evaluation of interventions and the need for adjustments in and/or continued application of the care management process. The Antepartum Data Base Scale, the Antepartum Complication Management Scale, and the Referral Management Scale are designed to measure the degree to which certain aspects of the antepartum care management process were implemented by the health professionals in a particular care management system (see Figure 5). The Newborn Outcome Scale is designed to measure the gross potential for newborn wellness when the pregnancy terminates. This newborn outcome measure may reflect to some degree the results of the implementation of any or all components of the care management process in the antepartum period.

Assumptions. Based on the conceptual framework used for instrument development, the following assumptions applied:

Components of the care management process	Instruments used to measure the component
Comprehensive assessment -- including impressions/diagnoses	ADBS ACMS RMS NOS
Planning of interventions -- including consultations and referrals	ACMS RMS NOS
Implementation of interventions	ACMS RMS NOS
Assessment/Evaluation	ACMS RMS NOS

Fig. 5. Measurement of the care management process.

1. Health care management is conceptualized as a process of care (Donabedian, 1982).

2. There are multiple approaches to evaluating the quality of care management; one approach is the examination of the process of care itself (Donabedian, 1966).

3. The components of the care management process can be specified and measured (Donabedian, 1966,1968,1982).

4. Effectiveness and efficiency (quality) of care is an evaluative dimension of the elements and interactions in the care management process, and can be assessed by evaluative judgements of care manager(s') decisions and actions (performance) evidenced during the care management process.

5. Effective and efficient care management is defined by previously selected normative standards and criteria that operationalize the care process in a specific client situation/condition (Donabedian, 1966).

6. The most accurate judgements of care manager performances are derived from normative standards of care management for specific client situations/conditions (Donabedian, 1966,1968).

Administration. The CACMI instruments are designed to be used by obstetric nursing/medical professionals with advanced educational preparation and experience in outpatient obstetrical management. These professionals would also possess familiarity with the specific health care system in which the instruments are to be utilized. The health professional uses the instruments to abstract information related to aspects of documented maternity care management from the client's outpatient record, then rates the level of care management received by the client. The professional rates the care after comparing documented care management to predetermined criterion-indicators.

Although all CACMI instruments were utilized in this study, the instruments are independent measures. Depending on which aspect(s) of the care management process was being investigated, studies utilizing only one or any combination of the CACMI instruments could also be conducted. In

addition, the ACMS and RMS could be adapted to non-maternity care management evaluation by developing criterion-indicators specific for the management of any health condition or complication.

Scoring and interpretation. All CACMI instruments are scored in summative fashion and produce individual scores to be utilized for statistical analysis. The scores on the ADBS, ACMS, RMS, and NOS are not combined to give a total score for care management. The rationale for this being that while every subject would have only one ADBS score and onr NOS score, not every subject would have the same number of ACMS or RMS scores. It would be possible for one subject to have no complications and/or referrals managed during her antepartum course, while another subject may have any number of complications and referrals managed. Under these circumstances, combined scores would have no rational meaning.

This research study was designed to answer the question: Will maternity clients receive more effective and efficient care managed within CNM management systems compared to clients who do not receive care managed within CNM management systems? The scores on all CACMI instruments are interpreted as the higher the score, the greater the degree of effective and efficient care management received by the maternity client.

Reliability. Intrarater reliability to evaluate equivalence was determined using the Pearson product moment correlation coefficient (Starpoli & Waltz, 1978). After each instrument was developed, the investigator selected and reviewed the outpatient medical records of 15 delivered maternity clients by convenience sampling techniques. The ADBS, ACMS, RMS, and NOS were completed for each subject according to the directions for use specified for each instrument. Approximately two weeks later, the investigator randomly selected, by code numbers, 10 of the 15 records to be rerated. The client records were again reviewed and the instruments were completed for each record according to each instrument's instructions. The reliability coefficient of the ADBS, RMS, and NOS was 1, and the reliability coefficient of the ACMS was .97.

Validity. The ADBS, ACMS, RMS, and NOS were evaluated by obstetrical experts who judged each scale to have content validity. One certified nurse-midwife and one board certified obstetrician/gynecologist judged the content validity of the instrument. The judges were given four packets which contained information specific to each of the four instruments. Each instrument information packet contained (a) the purpose of the measure; (b) the type of measure; (c) the major objective for the measure; (d) a description of how the instrument was developed (e) a

blueprint for content areas and the item numbers on the instruments which represent these areas; (f) directions for administration and scoring of the instrument and interpretation of results; (g) a copy of the instrument; and (h) a list of references. An instrument evaluation form was also enclosed. The individual was asked to review the enclosed information, then complete the evaluation form. The extent of the experts' agreement as to the relevance of each item to the content area the item represented on each scale was determined using the Content Validity Index (CVI) (Waltz, Strickland, Lenz, 1984). One is the highest attainable CVI. The CVI is interpreted as the higher the CVI, the greater the degree of agreement between the experts. The CVI of the ADBS was .93, and the CVI of the ACMS, RMS, and NOS was 1.

The Antepartum Data Base Scale (ADBS)

Purpose and major objective of the instrument. The purpose of the ADBS is to measure the degree to which certain standards of antepartum surveillance activities were performed by a care management system during the course of outpatient care. The purpose of these surveillance activities is to monitor various indicators of the level of wellness of the maternal-fetal unit. The major objective of the ADBS is: Given an outpatient antepartum record to review, the advanced obstetric nursing/medical professional

will rate the degree to which specified standards of outpatient antepartum surveillance activities were performed by the care management system during the course of a client's antepartum period.

Instrument development. Comprehensive assessment, the first step in the care management process, is the foundation upon which all other components of the care management process are based (Donabedian, 1966,1968; Johns, 1980; Neuman, 1982; Varney, 1987; Yura & Walsh, 1988). Aspects of the comprehensive assessment component of the care management process related to obtaining subjective and objective data were used to develop content and subcontent areas for this scale.

Standards of antepartum care to be employed as monitors of the level of wellness of the maternal-fetal unit, during the course of outpatient antepartum care, were reviewed and summarized (American College of Obstetricians and Gynecologists, 1989; Cunningham, MacDonald & Gant, 1989; Dunnihoo, 1989; Frigoletto & Little, 1988; Gibbs, 1987). These indicators of maternal-fetal wellness (well-being) form a fundamental pool of subjective and objective information upon which the care management process is based. It is from this pool of information or data base that impressions and diagnoses regarding the level of maternal/fetal wellness are derived. Thus, the quality and

quantity of the subjective and objective client data base have potential to affect the effectiveness and efficiency of the care management process and may impact the level of client wellness (Donabedian, 1968).

In general, antepartum surveillance could be organized into two major categories, maternal health status and fetal health status. Maternal health status is monitored by surveillance activities that assess maternal indicators of adaptation to pregnancy and maternal conditions which may have developed prior to or during the current pregnancy. Both of these maternal health factors have potential to affect the maternal and/or fetal-newborn health status. Activities that assess fetal health status monitor indicators of fetal growth and adaptation to the intrauterine environment. These two major categories were used to develop content and subcontent areas of this scale. The investigator utilized the standards of care cited in the literature as criteria to comprise the subcontent areas and to develop the items for the Antepartum Data Base Scale (American College of Obstetricians and Gynecologists, 1989; Cunningham, MacDonald & Gant, 1989; Dunnihoo, 1989; Frigoletto & Little, 1988; Gibbs, 1987).

Administration. The scale is intended to be used in conjunction with agency-specific clinic protocols which may at times supersede care standards cited in the reference

literature. In this study, the investigator, a certified nurse-midwife, reviewed a predetermined number of outpatient antepartum records of initially low-risk clients. These clients initiated antepartum care in county health centers. The investigator reviewed the individual client record to determine the degree to which outpatient standards of care represented by items cited in the instrument were performed by the care management system during the course of the client's antepartum period. The investigator then rated the degree to which these standards of care were performed by the care management system. A separate scale was completed for each antepartum record reviewed.

Scoring. Scoring of the 34-item instrument was done in summative fashion. The choice options for the respondent to indicate the various levels that standards of care were met are (a) not met and (b) met. The choice options are rated 1-2 with 2 (met) being rated the highest. No reverse scoring was necessary. The highest possible score was 68 and the lowest was 34.

Interpretation. The scores were interpreted as the higher the score, the greater the degree to which standards of antepartum surveillance activities were performed, the more effective and efficient the management of maternity care. The scores obtained from the instrument were used to statistically analyze hypotheses 1 and 3.

Reliability. Intrarater reliability to evaluate equivalence was determined during the study using the Pearson product moment correlation coefficient (Starpoli & Waltz, 1978). Approximately two weeks after reviewing 50 client records and completing the ADBSs from Center A, the investigator randomly selected, by code numbers, 10 of the 50 client records to be re-rated. These 10 client records were re-reviewed and the instruments completed for each record according to instrument instructions. The reliability coefficient was 1.

Validity. As previously stated, the instrument was judged to have content validity. The Content Validity Index (CVI) was used to quantify the extent of agreement between the experts (Waltz, Strickland & Lenz, 1984). The CVI was .93.

Antepartum Complication Management Scale (ACMS)

Purpose and major objective of the instrument. The purpose of the ACMS is to measure the degree to which the components of the care management process were implemented by a care management system in the outpatient management of a variety of actual/potential antepartum complications. The major objective of the ACMS is: Given an outpatient antepartum record which indicates the presence of an actual/potential antepartum complication, the advanced

obstetric nursing/medical professional will rate the degree to which the components of the care management process were implemented by the care management system in the management of that specific complication. Components of the care management process would be rated after the complication management documented in the antepartum record has been compared to standards cited in criterion-indicators developed for the recognition and management of that specific complication.

Instrument development. The components of the care management process previously described were used to develop the content areas of this scale (Donabedian, 1968; Johns, 1980; Neuman, 1982; Varney, 1987; Yura & Walsh, 1988). Subcontent areas identified in these components and other related health care management aspects (Dunnihoo, 1989; Varney, 1987) were utilized by the investigator to develop items for the ACMS.

Administration. The scale is intended to be used in conjunction with specific criterion-indicators derived from intra- and interagency policies and protocols and other professional references (American College of Obstetricians and Gynecologists, 1989; Cunningham, MacDonald & Gant, 1989; Dunnihoo, 1989; Pauerstein, 1987). The criterion-indicators for the recognition and management of antepartum complications provide objective comparison

criteria. The professional utilizes these criteria to evaluate the degree of implementation of the care management process by a care management system in the management of a specific antepartum complication (Donabedian, 1966,1968).

In this study, the investigator, a certified nurse-midwife, reviewed antepartum clinic records of clients who initiated care in county health centers. The investigator reviewed the client records for subjective and objective indicators of actual/potential antepartum complications based on the criterion-indicators cited above. Once an actual/potential complication was identified, the investigator utilized the ACMS to rate aspects of the care management process implemented by the care management system to manage the specific complication. The investigator compared the aspects of the management process documented in the client record to standards presented in the criterion-indicators previously cited. This comparison was done prior to the investigator rating the specific aspect(s) of the care management process represented by items in the scale.

Each outpatient record was reviewed for subjective and objective data which indicated any or all of the following actual/potential antepartum complications. The complications included (a) potential genetic abnormalities, (b) abnormal cervical cytology, (c) glucose intolerance,

(d) preterm labor, (e) anemia, (f) intrauterine fetal growth retardation, (g) postdates pregnancy, (h) sexually transmitted diseases, (i) pregnancy induced hypertension, (j) abnormal weight gain patterns, (k) abnormal vaginal bleeding, (l) size-dates discrepancy, (m) urinary tract infections, (n) Rh negative/isoimmunization, (o) compromised fetus, (p) high risk conditions identified on ultrasound, and (q) other abnormal maternal conditions.

A separate ACMS was completed for each complication identified in the client record. All ACMSs were completed in one client's record before another client's record was reviewed. The ACMS was completed by the investigator without the assistance of any other person.

Scoring. The 14-item instrument was scored in summative fashion. The various choice options for the respondent to indicate the different levels of the characteristic related to the item being rated are (a) not met, (b) partially met, and (c) met. The respondent is instructed to select the specific choice options in the following manner: a) met -- if all key elements cited in the criterion indicators for that aspect of care management are documented in the client record; b) partially met -- if some of the key elements cited in the criterion indicators for that aspect of care management are documented; and c) not met -- if no key elements cited in the criterion

indicators for that aspect of care management are documented.

The choice options are rated 1 to 3 with 3 (met) being the highest. No reverse scoring is necessary. The highest possible total score is 42 and the lowest is 1. A total score of 1 was given if one of the following conditions existed (a) subjective and objective data in the client record indicated the existence of an actual/potential complication, but the care management system did not document recognition and management or (b) the management system documented recognition and/or management of a complication, but the existence of such a complication was not supported by the subjective and objective data in the client record.

Interpretation. The scores are interpreted as the higher the score, the greater the degree antepartum complications were effectively and efficiently managed. The scores obtained from the instrument were used to statistically analyze hypotheses 1 and 3.

Reliability. Intrarater reliability to evaluate equivalence was tested during the study using the Pearson product moment correlation coefficient (Starpoli & Waltz, 1978). Approximately two weeks after reviewing 50 client records and completing the ACMSs, the investigator randomly selected, by code numbers, 10 of the 50 client records from

Center A. The 10 records were re-reviewed and the ACMS instruments were completed according to the instrument instructions. The reliability coefficient was .94.

Validity. As previously stated, the instrument was judged to have content validity. The Content Validity Index (CVI) was used to quantify the extent of agreement between the experts (Waltz, Strickland & Lenz, 1984). The CVI was 1.

Referral Management Scale (RMS)

Purpose and major objective of the instrument. The purpose of the RMS is to measure the degree to which an interagency referral of a client with an actual/potential antepartum complication was effectively and efficiently managed by the care management system. The major objective of the RMS is: Given an outpatient antepartum record of a client who received an interagency referral for the evaluation, diagnosis, and/or treatment of an actual/potential antepartum complication, the advanced obstetric nursing/medical professional will rate the degree to which the referral process was effectively and efficiently managed by the care management system.

Instrument development. During the process of care management, a client may have an actual/potential condition or complication which requires evaluation, diagnosis, and/or

treatment beyond the capability of the care management system in a particular health care site (Brooks & Madison, 1976; Donabedian, 1968; Johns, 1980; Lawrence & Dorsey, 1976; Varney, 1987; Yura & Walsh, 1988). When this situation occurs, interagency referrals may be incorporated into the care management. Referrals should be planned and implemented so that effort, expense, and/or waste of system resources, human and material, are minimized and appropriate care management is maximized (Donabedian, 1966,1968,1982; Katz & Rosenzweig, 1970; Yura & Walsh, 1988). When referrals are managed in this efficient and effective manner, the potential for accomplishment of care management goals is increased. In addition, the extent to which interagency referrals are efficiently and effectively managed may reflect the ability of the care management system to assist the client to access and negotiate the health care system, thus, have potential to impact the level of client wellness.

Aspects related to the care management process which contribute to efficient and effective referral management were reviewed and summarized (Brooks & Madison, 1976; Donabedian, 1966,1968,1982; Johns, 1980; Lawrence & Dorsey, 1976; Varney, 1987; Yura & Walsh, 1988). These aspects related to (a) the degree to which the referral made by the care management system was justified, based on the accurate

assessment (recognition) of the client's condition/ complication; (b) the degree to which the referral process was initiated and completed within an appropriate time frame for the client's condition/complication; (c) the degree to which the care management system planned the referral to minimize the effort, expense, and/or waste of the client, health care provider(s), and health care system resources expended; and (d) the degree to which the client obtained the appropriate evaluation, diagnostic measures, and/or treatment, including disposition for appropriate follow-up care. These aspects of referral management were used to develop the content and subcontent areas for this scale.

Administration. The scale is intended to be used in conjunction with criterion-indicators developed for the recognition and management of specific antepartum complications. These criterion-indicators are derived from intra- and interagency policies and protocols and other professional references (American College of Obstetricians and Gynecologists, 1989; Cunningham, MacDonald & Gant, 1989; Dunnihoo, 1989). These criterion-indicators are the same ones used with the ACMS, and provide objective comparison criteria for the professional to utilize when evaluating the degree of implementation of the referral management process by a care management system in the management of a specific antepartum complication (Donabedian, 1966,1968).

In this study, the investigator, a certified nurse-midwife, reviewed antepartum clinic records of initially low risk clients who began care in county health centers. The investigator reviewed the client records for subjective and objective indicators of actual/potential antepartum complications. These were the same antepartum complications listed in the ACMS section previously cited above. When an interagency referral was made by the care management system in the management of an actual/potential complication, the investigator utilized the RMS to rate aspects of the referral management process implemented by the care management system. The investigator compared the aspects of the referral management process documented in the client record to standards presented in the criterion-indicators previously cited. This comparison was done prior to the investigator rating the specific aspect(s) of the referral management process represented by items in the scale.

A separate RMS was completed for each referral documented in the client record. All RMSs were completed in one client's record before another client's record was reviewed. The RMS was completed by the investigator without the assistance of any other person.

Scoring. This 8-item instrument was scored in summative fashion. The various choice options for the

respondent to indicate the different levels of the characteristic related to the item being rated are (a) not met, (b) partially met, and (c) met. The respondent is instructed to select the specific choice options of met, partially met, and not met in the same manner used for the ACMS scale.

The choice options, not met, partially met, and met, are rated 1 to 3 with 3 (met) being the highest. No reverse scoring was necessary. The highest possible total score was 24 and the lowest was 1. A total score of 1 was given when the subjective and objective data in the client record did not justify the need for interagency referral according to the standards cited in the criterion-indicators.

Interpretation. The scores were interpreted as the higher the score, the greater the degree of effective and efficient referral management. The scores obtained from the instrument were used to statistically analyze hypotheses 1 and 3.

Reliability. Intrarater reliability to evaluate equivalence was tested during the study using the Pearson product moment correlation coefficient (Starpoli & Waltz, 1978). Approximately two weeks after reviewing 50 client records and completing the RMSs, the investigator randomly selected, by code numbers, 10 of the 50 client records from Center A. The records were re-reviewed and the instruments

completed according to instrument instructions. The reliability coefficient was .98.

Validity. As previously stated, the instrument was judged to have content validity. The Content Validity Index (CVI) was used to quantify the extent of agreement between the experts (Waltz, Strickland & Lenz, 1984). The CVI was 1.

Newborn Outcome Scale (NOS)

Purpose and major objective of the instrument. The purpose of the NOS is to measure newborn health factors which have potential to grossly indicate newborn wellness. The major objective of the NOS is: Given a delivered client's outpatient antepartum record which contains delivery and newborn health data, the advanced obstetric nursing/medical professional, will abstract newborn health data from the record and then rate the health status of the newborn.

Instrument development. Pregnancy outcomes are frequently reported in the literature in terms of maternal and/or fetal-newborn health status, mortality and morbidity. Newborn health factors which have been associated with various levels of newborn wellness were abstracted from the literature (Cunningham, MacDonald & Gant, 1989; Dunnihoo, 1989; Fanaroff & Martin, 1983;

Institute of Medicine, 1988). These newborn health factors indicative of gross potential for newborn wellness are (a) the condition of newborn at birth; (b) the gestational age in weeks at time of birth; (c) the birthweight; (d) the appropriateness of birthweight for gestational age; and (e) the newborn health status at birth or in the neonatal period. These health factors were conceptualized as gross indicators of the objective accomplishment of outpatient antepartum care, that pregnancy results in a living, healthy, term, appropriately grown newborn (Cunningham, MacDonald & Gant, 1989; Institute of Medicine, 1988). The newborn health factors cited above were utilized by the investigator to comprise content and subcontent areas as well as items for the instrument.

Administration. In this study, the investigator, a certified nurse-midwife, reviewed delivered clients' health center records which contain limited delivery and newborn data. The investigator reviewed the client records, including a completed maternity discharge summary form, and abstracted delivery and newborn data from the record. The abstracted data was recorded on the NOS rating form. The investigator then rated the health status of the newborn by circling the number above the description of the newborn health status which best represented that of the newborn documented in the client record.

A separate NOS was completed for each client record. All NOSs were completed in one client's record before another client's record was reviewed. The NOS was completed by the investigator without the assistance of any other person.

Scoring. This 5-item, 3-point scale was scored in in summative fashion. The various choice options were rated 1-3 with 3 being the highest. No reverse scoring was done. The highest possible score was 15 and the lowest was 1. A total score of 1 was given if the newborn was stillborn, thus, received a score of 1 on the first item. If that occured, no other items were rated. If the reviewer was unable to determine the newborn health status from the record, item 5 received a score of 2.

Interpretation. The scores were interpreted as the higher the score, the higher the potential for newborn wellness and the better the newborn outcome of pregnancy. The scores obtained from the instrument were used to statistically analyze hypotheses 1 and 3.

Reliability. Intrarater reliability to evaluate equivalence was tested during the study using the Pearson product moment correlation coefficient (Starpoli & Waltz, 1978). Approximately two weeks after reviewing 50 client records and completing the NOSs, the investigator randomly selected, by code number, 10 of the 50 client records from

Center A. The records were re-reviewed and the instruments completed according to instrument instructions. The reliability coefficient was 1.

Validity. As previously stated, the instrument was judged to have content validity. The Content Validity Index (CVI) was used to quantify the extent of agreement between the experts (Waltz, Strickland & Lens, 1984). The CVI was 1.

Demographic Data Form

Data regarding the number of missed appointments, length of time elapsed between missed appointments and the client's return to clinic were collected on this form. These data are interpreted as the fewer the number of missed appointments and the shorter the length of time elapsed between appointments, the greater the client participation in the care management system. These data were used to test hypothesis 1. Extraneous and demographic variables were also collected on the demographic data form.

Data Collection

After completion of interagency agreements, the CNM system began to provide care management to maternity clients in Center B on August 1, 1988 and in Center A on October 1, 1988. The Non-CNM system in Center A and B

continued to provide care management in the same manner as prior to implementation of the CNM system.

Since program initiation, clients who requested maternity care were given the choice of appointments to either system after screening for contraindications to CNM and health center care. After the initial appointment, clients were given the option to continue in the particular system.

Data collection with which to measure the effects of the CNM system implementation began after the investigator received written approval from the county health department's research/projects review committee (see Appendix G). Data collection arbitrarily began in Center A. After data collection in Center A was completed, the investigator began data collection in Center B.

The managers/designees of Centers A and B and the investigator obtained a list of names and record numbers of maternity clients from the CNM and Non-CNM system appointment books and log books. Other health center record systems were also used as necessary. Utilizing the criteria for inclusion in the study, the center managers/designees and the investigator reviewed the client record to evaluate whether inclusion criteria were met. A list which included the names and health unit record numbers was made of those subjects meeting the inclusion criteria.

The client record was also reviewed for completeness. If the Discharge Summary was incomplete, the investigator, manager, or designee attempted to complete it from other center records. If the Discharge Summary was unable to be completed, the subject was deleted from the study. The investigator included the first 25 subjects in each group who met inclusion criteria and who had information to complete the Discharge Summary. A review by the investigator of 435 records yielded the 100 sample subjects.

In Center A and B, the investigator was assigned one room with a desk by the center manager which was used consistently throughout the record audit process in that center. The records were obtained and reviewed by the investigator in no particular order or grouping.

The subject's record was audited by the investigator who is a certified nurse-midwife. Each of the instruments and the demographic data form was completed before proceeding to the next subject's record. Data collection was conducted on weekdays during the hours of health center operation. No subject records left the premises. Data collected did not leave the possession of the investigator. Data collection instruments were coded with a number assigned to the specific subject. Completed instruments were secured in a locked file cabinet at the investigator's private residence. The subject's record was returned to the

appropriate place to be refiled after data collection was completed. Collection of these data began September 10, 1990 and was completed within a 3 week time frame.

Monthly statistical reports from Centers A & B for 1989 and 1990 were obtained. These reports record the number of antepartum visits conducted at each health center for these timeframes. The reports also contain the number of antepartum visits conducted by CNM and Non-CNM systems for that health center. Information from these reports was later abstracted and statistically analyzed.

Pilot Study

A pilot study was conducted in Center A to test and refine the instrumentation, sample selection, and data collection procedures. After obtaining written approval from the county health department, the pilot study was conducted. Problems were identified in the study methodology, and adjustments were implemented.

The problems encountered with sample selection included an inability to randomly select a sample from each care management system and extreme difficulty in identifying subjects and locating subject records for audit. Problems encountered with instrumentation included (a) certain sections of instruments were repetitive of data in other instruments; (b) the semantic

differential scale approach used to rate the scale items was too vague and not specific enough to accurately rate the items; and (c) only gross assessments of pregnancy and fetal outcomes were possible due to missing information in the subjects' records.

Corrective actions were taken in regard to sample selection. A meeting was attended by key health department and CNM personnel to identify a more feasible method of sample selection. This meeting resulted in the deletion of random selection as initially proposed. A systematic, non-probability sampling technique was piloted by the health department personnel with the goal of selecting 65 subjects for each group. The health department personnel were not able to identify a sufficient number of subjects in the Non-CNM groups utilizing this method. There was no corresponding problem in identifying sufficient numbers of CNM system participants. In order to resolve problems related to obtaining adequate Non-CNM sample size, three additional meetings with health department management personnel were held. This resulted in extension of time frames which allowed additional time for Non-CNM clients to deliver who might be eligible to participate in the study. The goal was to identify at least 25 clients who met the inclusion criteria and had completed discharge summaries in the Non-CNM group from each center.

The investigator made adjustments in the content and rating scales of the instruments and developed three additional instruments to measure the dependent variable. The health department personnel made a commitment to ensure that the records of all selected subjects would have completed Discharge Summaries.

Treatment of Data

All of the data analyzed in this study were derived from the CACMI instruments, the monthly health center statistical reports, and the Demographic Data Form. Tables are employed to reflect the demographic data. Frequency tabulations, as well as percentages, are demonstrated in tables. Measures of central tendency and variability are used to describe appropriate demographic and extraneous data.

Hypothesis 1 and 2 were analyzed with the one-way analysis of variance, including the use of an appropriate post Hoc test if the null hypothesis was rejected (Roscoe, 1975; Waltz, Strickland, & Lenz, 1984). Hypothesis 3 was analyzed by multiple regression techniques (Roscoe, 1975; Waltz, Strickland, & Lenz, 1974). The .05 significance level was used for data analysis in this study as recommended by Kerlinger (1973). Further description of information related to data analysis of the study hypotheses

is contained in Fig. 6. For the purposes of statistical analysis, the investigator assumed the level of data analyzed in Hypothesis 1 and 3 to be of equal intervals (Kerlinger, 1973).

Hypothesis	Variable	Level of Data	# of Groups	Instrument	Statistical Analysis
H_1	1. Performance of antepartum surveliance activities.	1. Interval*	4	1. ADBS	1. One-way ANOVA
	2. Antepartum complication management	2. Interval*	4	2. ACMS	2. One-way ANOVA
	3. Management of interagency referrals.	3. Interval*	4	3. RMS	3. One-way ANOVA
	4. Potential for newborn wellness.	4. Interval*	4	4. NOS	4. One-way ANOVA
	5. Amount of client participation in care system.	5. Interval	4	5. Measured on demographic data form	5. One-way ANOVA
H_2	Number of antepartum visits conducted.	Ratio	4	Abstracted from health center statistical reports	One-way ANOVA
H_3	Relationship between newborn outcome and aspects of antepartum care management.	Interval*	4	1. NOS 2. ADBS 3. ACMS 4. RMS	Multiple Regression

*Data were assumed to be of equal interval (Kerlinger, 1973).

Figure 6. Data analysis of study hypotheses.

CHAPTER 4

ANALYSIS OF DATA

This quasi-experimental, comparison-controlled evaluation study was designed to answer the question: Will maternity clients receive more effective and efficient antepartum care when care is managed within CNM management systems than clients who do not receive care managed within CNM management systems? A description of the sample and the findings are presented.

Description of the Sample

Four hundred thirty-five outpatient records of maternity clients who received antepartum care managed within CNM and Non-CNM management systems from both Health Centers A and B were reviewed by the investigator between September 10, 1990 and October 12, 1990. A total sample size of 100 was obtained. The investigator began the convenience sampling in Center A. The antepartum record of the first 25 CNM and the first 25 Non-CNM management system clients from Center A meeting inclusion criteria were reviewed, and the demographic data forms and the Cook Antepartum Care Management Inventory instruments were completed according to directions. When data collection at

Center A was completed, the investigator began the convenience sampling of client records in Center B. The antepartum records of the first 25 CNM and the first 25 Non-CNM management system clients meeting inclusion criteria from Center B were then reviewed, and the demographic data forms and the Cook Antepartum Care Management Inventory instruments were completed according to directions.

Demographic data obtained from each of the subject's antepartum record included: (a) age; (b) marital status; (c) ethnicity; (d) educational level; (e) occupation; (f) gravidity; (g) previous pregnancy outcomes; (h) estimated gestational age (EGA) at the initial antepartum visit; (i) number of antepartum clinic visits; (j) number of self-referrals to the high risk facility (hospital); (k) number of missed appointments; (l) interval in weeks from missed appointment to return to clinic; (m) birth information including estimated gestational age at birth, birth site, birth attendant, type of delivery, and intra-partum complications; (n) other newborn data including condition at birth, birthweight, appropriateness of weight to gestational age, and newborn wellness status; (o) number and type of antepartum complications identified and/or managed; and (p) number and type of interagency referrals. This demographic information is presented in the following paragraphs.

The age of the sample subjects ranged from 15-44 years of age with a median age of 23. Sixty-one (61%) of the subjects were married while 30 (30%) were single and 9 (9%) were separated. The predominant ethnic origin of the sample was hispanic (47%) followed by caucasian (27%), black (25%), and American Indian (1%). Forty-one subjects (41%) had completed high school or its equivalent while 6 (6%) had completed high school and some years of college. Forty-two subjects (42%) had not completed high school, and the educational level of 11 subjects (11%) was not documented in the client records. Some of the subjects (18%) were employed outside the home; whereas, other subjects' occupational/employment status was documented as student (8%), housewife (50%), and unemployed (20%) with four subjects' status not documented (4%). In Table 1, the demographic characteristics of age, marital status, ethnicity, educational level, and occupational/employment status is further described according to health center and management system.

The gravidity of the subjects of the total sample ranged from 1-7 pregnancies. Approximately two-thirds (68%) of the subjects were either primigravidas (35%) or secundi-gravidas (33%), while approximately one-third were multi-gravidas (32%). Of the 100 sample subjects, 55 subjects

Table 1

Description of Age, Marital Status, Ethnicity, Educational Level, and Occupational Status by Health Center and Management System

Variable	CENTER A		CENTER B		TOTAL
	CNM (n=25)	Non-CNM (n=25)	CNM (n=25)	Non-CNM (n=25)	SAMPLE (n=100)
	f(%)	f(%)	f(%)	f(%)	f(%)
Ages (years)					
15 - 18	5(20)	1(4)	11(44)	4(16)	21(21)
19 - 25	14(56)	16(64)	11(44)	15(60)	56(56)
26 - 34	6(24)	6(24)	3(12)	4(16)	19(19)
35 - 44	0(0)	2(8)	0(0)	2(8)	4(4)
Marital Status					
Single	8(32)	11(44)	7(28)	4(16)	30(30)
Married	14(56)	11(44)	16(64)	20(80)	61(61)
Separate	3(12)	3(12)	2(8)	1(4)	9(9)
Ethnicity					
White	9(36)	4(16)	9(36)	5(20)	27(27)
Black	10(40)	13(52)	1(4)	1(4)	25(25)
Hispanic	6(24)	8(32)	15(60)	18(72)	47(47)
Am. Indian	0(0)	0(0)	0(0)	1(4)	1(1)
Education					
≤6 yrs	1(4)	0(0)	2(8)	2(8)	5(5)
≥7 - ≤11 yrs	8(32)	5(20)	11(44)	13(52)	37(37)
≥12 yrs/GED	15(60)	14(56)	10(40)	2(8)	41(41)
College/No-degree	1(4)	4(16)	1(4)	0(0)	6(6)
Unknown	0(0)	1(4)	1(4)	8(32)	11(11)
Occupation					
Housewife	12(48)	13(52)	13(52)	17(68)	50(50)
Student	1(4)	2(8)	2(8)	3(12)	8(8)
Employed	4(16)	4(16)	4(16)	1(4)	18(18)
Unemployed	7(28)	4(16)	4(16)	3(12)	20(20)
Unknown	1(4)	2(8)	2(8)	1(4)	4(4)

(55%) had previously experienced one or more term pregnancies, 9 subjects (9%) had previously experienced a preterm delivery, 17 subjects (17%) had experienced one miscarriage/abortion, and 4 subjects (4%) had experienced two miscarriages/abortions. The majority of the sample (58%) had one or more living children from a previous pregnancy. The gravidity and previous pregnancy outcomes of the sample are further described by health center and management system in Table 2.

The estimated gestational age (EGA) in weeks at the time of initiation of antepartum care ranged from 6-27 weeks of gestation for the sample with a median gestational age of 15 weeks. The median number of total clinic visits for the sample subjects was 10 and ranged from 5-20 clinic visits. According to documentation in the subjects' records, 13 subjects (13%) referred themselves one time and 3 subjects (3%) referred themselves two times to the high risk facility (hospital) for evaluation and treatment of an illness or potential antepartum complication. Information further describing the EGA at the first antepartum clinic visit, the number of antepartum clinic visits, and number of self-referrals to the high risk facility is presented in Table 3.

The majority of sample subjects (57%) were compliant with their appointed clinic visits. Twenty-nine subjects

Table 2

Description of Gravidity and Previous Pregnancy Outcomes
by Health Center and Management System

Variable	CENTER A CNM (n=25) f(%)	CENTER A NON-CNM (n=25) f(%)	CENTER B CNM (n=25) f(%)	CENTER B NON-CNM (n=25) f(%)	TOTAL SAMPLE (N=100) f(%)
Gravidity					
1	10(40)	6(24)	12(48)	7(28)	35(35)
2	6(24)	10(40)	10(40)	7(28)	33(33)
3	4(16)	5(20)	1(4)	6(24)	16(16)
≥ 4 - ≤ 7	5(20)	4(16)	2(8)	5(20)	16(16)
Previous Outcomes:					
Term Delivery					
0	14(56)	10(40)	13(52)	8(32)	45(45)
1	7(28)	9(36)	10(40)	7(28)	33(33)
≥ 2 - ≤ 4	4(16)	6(24)	2(8)	7(28)	14(14)
Preterm Delivery					
0	22(88)	23(92)	24(96)	22(88)	91(91)
1	3(12)	2(8)	1(4)	3(12)	9(9)
Abortion					
0	17(68)	17(68)	22(88)	23(92)	79(79)
1	6(24)	7(28)	3(12)	1(4)	17(17)
2	2(8)	1(4)	0(0)	1(4)	4(4)
Live Children					
0	13(52)	10(40)	12(48)	7(28)	42(42)
1	7(28)	9(36)	11(44)	8(32)	35(35)
2	3(12)	4(16)	1(4)	7(28)	15(15)
≥ 3 - ≤ 5	2(8)	2(8)	1(4)	3(12)	8(32)

Table 3

Description of Estimated Gestational Age at Initiation of Care, Number of Clinic Visits, and Number of Self-Referrals by Health Center and Management System

	CENTER A		CENTER B		TOTAL
Variable	CNM (n=25)	NON-CNM (n=25)	CNM (n=25)	NON-CNM (n=25)	SAMPLE (N=100)
EGA at first visit (weeks)					
Lowest EGA	6	7	9	6	6
Highest EGA	25	23	27	25	27
Median EGA	17	15	16	14	15
Mean EGA	16.68	14.76	17.16	13.92	15.63
No. of visits					
Lowest	5	5	6	6	5
Highest	15	15	15	20	20
Median	11	9	11	11	10
Mean	10.44	9.48	10.44	11.44	10.45
Client self-referrals to hospital	f(%)	f(%)	f(%)	f(%)	f(%)
None	18(72)	22(88)	21(84)	23(92)	84(84)
One	5(20)	3(12)	3(12)	2(8)	13(13)
Two	2(8)	0(0)	1(4)	0(0)	3(3)

(29%) missed one clinic visit, eleven subjects (11%) missed two clinic visits, and three subjects (3%) missed three clinic visits. The number of weeks from the time the subjects missed the appointments until they returned to clinic ranged from 1-8 weeks with a mean time interval of 2.14 weeks. The gestational ages of subjects at the time of the missed appointments ranged from 11-41 weeks EGA. The

mean gestational age at the time of the missed appointment was 30.19 weeks gestation. The number of missed appointments, interval in weeks from the missed appointment to the subjects' return to clinic, and EGA at the time of the missed appointment according to health center and management system is further described in Table 4.

The total number of actual/potential antepartum complications identified by the management system and/or the investigator was 299. The type and frequency of complications by health center and management system is presented in Table 5. The number of complications for the total sample subjects varied from 0-7. All sample subjects experienced at least one complication except for two subjects in Health Center A, CNM management system, who experienced no complications.

The number of interagency referrals per subject varied from 0-4. A total of 130 interagency referrals were made for the sample. In Health Center A, there were 29 referrals in the CNM management system and 29 in the Non-CNM system. In Health Center B, there were 31 referrals in the CNM management system and 41 in the Non-CNM system. A description of the frequency of interagency referrals by associated actual/potential antepartum complication, health center, and management system is presented in Table 6.

Table 4

Description of the Number of Missed Appointments, Interval in Weeks from the Missed Appointment to the Subjects' Return to Clinic, and Estimated Gestational Age (EGA) at the Time of Missed Appointments According to Health Center and Management System

Variable	HEALTH CENTER A CNM (n=25) f(%)	HEALTH CENTER A NON-CNM (n=25) f(%)	HEALTH CENTER B CNM (n=25) f(%)	HEALTH CENTER B NON-CNM (n=25) f(%)	SAMPLE TOTAL (N=100) f(%)
Number of missed appointments					
None	16(64)	5(20)	22(88)	14(56)	57(57)
1	9(36)	13(52)	0(0)	7(28)	29(29)
2	0(0)	5(20)	3(12)	3(12)	11(11)
3	0(0)	2(8)	0(0)	1(4)	3(3)
Interval of missed appointment to return to clinic (wks)					
Lowest interval	1	1	1	1	1
Highest interval	6	8	3	8	8
Median	2	2	1	1	2
Mean	2.11	2.32	1.66	2.0	2.14
EGA at the time of missed appointment					
Lowest EGA (wks)	21	11	25	18	11
Highest EGA (wks)	40	40	41	38	41
Median	32.5	29	27.5	35	31
Mean	31.11	28.08	32.16	32	30.19

Table 5

Frequency of Actual/Potential Antepartum Complications by Health Center and Management System

ACTUAL/POTENTIAL COMPLICATION	HEALTH CENTER A CNM (n=61) f(%)	HEALTH CENTER A NON-CNM (n=81) f(%)	HEALTH CENTER B CNM (n=75) f(%)	HEALTH CENTER B NON-CNM (n=82) f(%)	SAMPLE TOTAL (N=299) f(%)
Size-dates discrepancy	9(14.75)	12(14.82)	8(10.67)	14(17.0)	43(14.38)
Sex. trans. diseases	9(14.75)	13(16.06)	9(10.98)	9(10.98)	40(13.38)
Abnormal weight gain pattern	5(8.20)	10(12.35)	8(10.67)	1(1.22)	24(8.02)
Glucose intolerance	4(6.56)	7(8.64)	5(6.67)	5(6.20)	21(7.0)
Other abnormal maternal conditions	2(3.27)	2(2.48)	7(9.33)	9(10.97)	20(6.89)
Urinary tract infection	4(6.56)	4(4.94)	2(2.67)	9(10.98)	19(6.35)
Preterm labor	5(8.20)	1(1.23)	4(5.33)	8(9.75)	18(6.02)
Anemia	3(4.92)	5(6.17)	7(9.33)	2(2.44)	17(5.68)
Intrauterine growth retardation	7(11.48)	4(4.94)	4(5.33)	4(4.87)	19(6.35)
Compromised fetus	3(4.92)	5(6.17)	5(6.67)	4(4.87)	17(5.69)
Postdates pregnancy	3(4.92)	3(3.70)	3(4)	5(6.10)	14(4.68)
Genetic abnormality	0(0)	5(6.17)	3(4)	4(4.87)	12(4.01)
Pregnancy-induced hypertension	4(6.56)	3(3.70)	1(1.33)	4(4.87)	12(4.01)
Abnormal cervical cytology	0(0)	2(2.48)	6(8)	2(2.44)	10(3.34)
Isoimmunization	1(1.64)	2(2.47)	2(2.67)	2(2.44)	7(2.34)
Abnormal ultrasound	1(1.64)	2(2.48)	1(1.33)	0(0)	4(1.33)
Vaginal bleeding	1(1.64)	1(1.23)	0(0)	0(0)	2(0.67)

Table 6

Frequency of Interagency Referral Described by Associated Antepartum Complication, Health Center, and Management System

Actual/Potential Antepartum Complication	HEALTH CENTER A CNM f (n=29)	HEALTH CENTER A Non-CNM f (n=30)	HEALTH CENTER B CNM f (n=31)	HEALTH CENTER B Non-CNM f (n=41)	TOTAL SAMPLE f (n=131)
Size-dates discrepancy	9	13	8	15	45
Intrauterine growth retardation	9	4	5	4	22
Compromised fetus	3	4	4	4	15
Genetic abnormality	0	4	3	5	12
Postdates pregnancy	2	2	3	5	12
Other abnormal maternal physical conditions	1	0	3	5	9
Preterm labor	2	0	1	1	4
High risk condition on ultrasound	1	1	1	0	3
Urinary tract infection	2	0	0	1	3
Glucose intolerance	0	0	1	0	1
Isoimmunization	0	1	0	0	1
Pregnancy-induced hypertension	0	1	1	0	2
Anemia	0	0	0	1	1
Sexually transmitted disease	0	0	1	0	1

The gestational age in weeks at delivery (calculated from the first day of the last menstrual period and/or ultrasound findings documented in the antepartum record) varied from 24-42 weeks. The mean weeks of gestation at delivery for the sample was 39.03. The newborn birthweights varied from 652 gm to 4990 gm with a mean birthweight of 3284 gm (Sd 597 gm). The median birthweight was 3289 gm. In Table 7, a description of birthweight and weeks gestation at delivery according to health center and management system is presented.

Table 7

Description of Birthweight and Weeks Gestation at Delivery According to Health Center and Management System

Variable	HEALTH CENTER A CNM (n=25)	HEALTH CENTER A NON-CNM (n=25)	HEALTH CENTER B CNM (n=25)	HEALTH CENTER B NON-CNM (n=25)	TOTAL SAMPLE (N=100)
Birthweight (gm)					
Lowest	1984	652	2041	2438	652
Highest	4111	4990	4366	4309	4990
Mean	3239	3231.92	3355.56	3309	3284
Median	3289	3317	3170	3260	3289
Gestation at delivery (weeks)					
Lowest	36	24	34	37	24
Highest	41	42	42	42	42
Mean	39.04	38.48	39.28	39.28	39.03

The majority of the newborns (52%) were born in the traditional labor and delivery suite at the hospital. The birth center at the hospital, staffed by CNMs, was the delivery site of 42 subjects (42%). The delivery site of 6 subjects (6%) was not documented in the record. The birth attendants documented in 50 subjects' records (50%) were physicians, while CNMs were identified as birth attendants in 42 records (42%), three births (3%) were attended by both physicians and CNMs. Birth attendant was not documented in five (5%) subjects' records. The type of delivery documented in most subjects' records was via the vaginal route (97%) with six of those births (6%) assisted by the use of forceps. Cesarean delivery was documented in two records (2%) and type of delivery was not documented in one record (1%). Ninety-two percent of the subjects had no documented intrapartum complications. Dystocia, fetal distress, pregnancy induced hypertension, preterm labor and delivery, and a combination of the above were documented in the subjects' records as intrapartum complications. Delivery information according to health center and management system is further described in Table 8.

In the sample, there were no stillbirths (0%). Although 100 (100%) of the infants were born alive, one (1%) early neonatal death secondary to extreme prematurity did occur. Eighty-eight infants (88%) were born between 36-43

Table 8

Delivery Information Described According to Health Center and Management System

Delivery Information	HEALTH CENTER A CNM (n=25) f(%)	HEALTH CENTER A NON-CNM (n=25) f(%)	HEALTH CENTER B CNM (n=25) f(%)	HEALTH CENTER B NON-CNM (n=25) f(%)	TOTAL SAMPLE (n=100) f(%)
Delivery site					
Traditional suite	3(12)	23(92)	6(24)	20(80)	52(52)
Birth center	22(88)	2(18)	16(64)	2(8)	42(42)
Undetermined	0(0)	0(0)	3(12)	3(12)	6(6)
Birth attendant					
Physician (MD)	3(12)	23(92)	5(20)	19(76)	50(50)
CNM	19(76)	2(8)	17(66)	4(16)	42(42)
CNM/MD	3(12)	0(0)	0(0)	0(0)	3(3)
Undetermined	0(0)	0(0)	3(12)	2(8)	5(5)
Type of delivery					
Spontaneous vaginal	23(92)	24(96)	24(96)	20(80)	91(91)
Forceps	2(8)	0(0)	0(0)	4(16)	6(6)
Cesarean-section	0(0)	1(4)	1(4)	0(0)	2(2)
Undetermined	0(0)	0(0)	0(0)	1(4)	1(1)
Intrapartum complication*					
None	25(100)	23(92)	23(92)	21(84)	92(92)
Dystocia	0(0)	0(0)	0(0)	2(8)	2(2)
Fetal distress	0(0)	0(0)	1(4)	2(8)	3(3)
Pregnancy-induced hypertension	0(0)	1(4)	1(4)	1(4)	3(3)
Preterm labor	0(0)	1(4)	1(4)	0(0)	2(2)
Chorioamnionitis	0(0)	0(0)	0(0)	1(4)	1(1)
Newborn outcome					
Term/living	23(92)	22(88)	22(88)	23(92)	90(90)
Preterm/living	2(8)	2(8)	3(12)	2(8)	9(9)
Preterm/neonatal death	0(0)	1(4)	0(0)	0(0)	1(1)

*Some subjects experienced more than one complication.

weeks gestation, four infants (4%) were born at less than 36 weeks gestation, and eight infants (8%) were born at 43 or more weeks gestation. Most infants (84%) weighed over 2500 gm but less than 4000 gm at birth, while five infants (5%) weighed less than 2500 gm and eleven infants (11%) weighed over 4000 gm at birth. When birthweight was compared to the number of weeks gestation at birth, the majority of the newborns (82%) could be described as having appropriate weight for gestational age (AGA). Only two newborns (2%) were small for gestational age (SGA), and sixteen (16%) newborns were categorized as large for gestational age (LGA). According to documentation available in the subjects' health center records describing newborn wellness status, three newborns (3%) were described as seriously ill and/or requiring admission to the Neonatal Intensive Care Unit. In nine records (9%), a minor illness was documented or newborn wellness at birth was not documented. Eighty-eight (88%) of the newborns were described as "healthy" in the health center records. In Table 9, newborn outcomes are summarized according to health center and management system.

Table 9

Newborn Outcomes Described by Health Center and Management System

Newborn Outcome	HEALTH CENTER A CNM (n=25) f(%)	HEALTH CENTER A NON-CNM (n=25) f(%)	HEALTH CENTER B CNM (n=25) f(%)	HEALTH CENTER B NON-CNM (n=25) f(%)	SAMPLE TOTAL (N=100) f(%)
Newborn condition at birth/neonatal period					
Stillborn	0(0)	0(0)	0(0)	0(0)	0(0)
Neonatal death	0(0)	1(4)	0(0)	0(0)	1(1)
Living	25(100)	24(96)	25(100)	25(100)	99(99)
Gestational age (EGA) at birth					
>20-<36 weeks	1(4)	2(8)	1(4)	0(0)	3(3)
≥43 weeks	2(8)	2(8)	2(8)	2(8)	8(8)
≥36-<43 weeks	23(92)	21(84)	22(88)	23(92)	89(89)
Birthweight					
≤2500 gm	1(4)	2(8)	1(4)	1(4)	5(5)
≥4000 gm	1(4)	3(12)	4(16)	3(12)	11(11)
>2500 gm-<4000 gm	23(92)	20(80)	20(80)	21(84)	84(84)
Appropriateness of weight for EGA					
Small for gestational age	1(4)	0(0)	0(0)	1(4)	2(2)
Large for gestational age	1(4)	5(20)	5(20)	5(20)	16(16)
Appropriate for gestational age	23(92)	20(80)	20(90)	19(76)	82(82)
Newborn wellness status					
Ill/NICU care	0(0)	1(4)	0(0)	2(8)	3(3)
Minor illness/ undetermined	1(4)	4(16)	1(4)	3(12)	9(9)
Healthy	24(96)	20(80)	24(96)	20(80)	88(88)

Findings

In this section, a summary of the data obtained is presented for each hypothesis.

Hypothesis One

The first hypothesis for this study was: Maternity clients will receive more effective and efficient care when care is managed within CNM care management systems than when care is managed within Non-CNM care management systems, according to the following variables:

1. Scores on the Antepartum Data Base Scale (ADBS)
2. Scores on the Antepartum Complication Management Scale (ACMS)
3. Scores on the Referral Management Scale (RMS)
4. Scores on the Newborn Outcome Scale (NOS)
5. The number of missed clinic appointments in each system
6. The length of time elapsed between missed appointments and the client's return to clinic

The findings for each of these subhypotheses are presented separately.

Subhypothesis 1.1 -- ADBS. Scores on the ADBS could range from 34-68. Scores of study subjects ranged from 59-68, with a mean of 67.6 and a standard deviation of 9.93 for the total sample (N=100). The mean, standard deviation, lowest and highest scores according to health center and management system are presented in Table 10.

Table 10

The Mean, Standard Deviation, Lowest and Highest Scores of the ADBS According to Health Center and Management System.

Center/System	n	Mean	Standard Deviation	Lowest Score	Highest Score
Center A					
CNM	25	67.60	.9129	65	68
Non-CNM	25	63.68	1.7963	60	67
Center B					
CNM	25	67.12	1.0924	65	68
Non-CNM	25	64.72	2.3544	59	67
Total	100	65.78	2.3032	59	68

A statistically significant difference, as determined by one-way analysis of variance exists between the means of the care management systems (F = 32.8545; df = 3,96; p <.0001) (Table 11). Tukey's Honestly Significant Difference (Tukey's-HSD) post hoc test was used to compare the

Table 11

ANOVA Summary Table for Antepartum Data Base Scale

Source of Variation	df	Sum of Squares	Mean Squares	F	Prob.
Between Groups	3	266.0400	88.6800	32.8545	<.0001
Error	96	259.1200	2.6992		
Total	99	525.1600			

difference between the means for Center A, CNM and Non-CNM systems (groups) and Center B, CNM and Non-CNM systems.

The ADBS mean scores of Centers A and B CNM care management systems were significantly higher than the mean scores of Centers A and B Non-CNM care management systems ($p \leq .05$). There were no other significant differences between pairs of group means (Table 12). The eleven standards which represent the largest ratings discrepancy between the groups are presented in Appendix H.

Table 12

Differences Between the Group Means Obtained on the ADBS as Determined by Tukey's-HSD Procedure

Mean	Group	Center A Non-CNM	Center B Non-CNM	Center B CNM	Center A CNM
63.68	Center A Non-CNM	NS*	NS	**	**
64.72	Center B Non-CNM	NS	NS	**	**
67.12	Center B CNM	**	**	NS	NS
67.60	Center A CNM	**	**	NS	NS

*NS -- pairs of groups not significantly different at $p > .05$

** -- pairs of groups significantly different at $p \leq .05$

Subhypothesis 1.2 -- ACMS. Scores on the 14-item ACMS could range from 1-42. Scores of the study subjects ranged from 1-42, with a mean of 35.2074 and a standard deviation of 11.8068 for the total sample (N=100). The mean, standard deviation, and lowest and highest scores of the ACMSs are presented according to health center and care management system in Table 13.

Table 13

The Mean, Standard Deviation, Lowest and Highest Scores of the ACMSs According to Health Center and Management System

Center/ System	n	ACMS f	Mean	Standard Deviation	Lowest Score	Highest Score
Center A						
CNM	25	61	41.5574	.8470	39	42
Non-CNM	25	81	28.4691	14.1281	1	42
Center B						
CNM	25	75	41.1600	4.7592	1	42
Non-CNM	25	82	31.6951	13.1691	1	42
Total	100	299	35.2074	11.8068	1	42

A statistically significant difference exists, as determined by one-way analysis of variance, between the means of the care management systems (F = 30.3864; df = 3,295; p <.0001) (Table 14). Tukey's-HSD post hoc test was used to determine significant differences between the group means (Table 15). The frequency and percentage of ACMS standards rated as met are presented in Appendix I.

Table 14

ANOVA Summary Table for Antepartum Complication Management Scale

Source of Variation	df	Sum of Squares	Mean Squares	F	Prob.
Between Groups	3	9806.4637	3268.8212	30.3864	<.0001
Error	295	31734.6801	107.5752		
Total	298	41541.1438			

Table 15

Differences Between the Group Means Obtained on the ACMS as Determined by Tukey's-HSD Procedure

Mean Scores	Group	Center A Non-CNM	Center B Non-CNM	Center B CNM	Center A CNM
28.47	Center A Non-CNM	NS*	NS	**	**
31.70	Center B Non-CNM	NS	NS	**	**
41.16	Center B CNM	**	**	NS	NS
41.56	Center A CNM	**	**	NS	NS

*NS -- pairs of groups not significantly different at $p > .05$

** -- pairs of groups significantly different at $p \leq .05$

The ACMS mean scores of Center A and B CNM care management systems were significantly higher than the mean scores in Center A and B Non-CNM care management systems. There were no other significant differences between pairs of group means ($p > .05$).

Subhypothesis 1.3 -- RMS. Scores on the 8-item RMS could range from 1-24. Scores of the study subjects ranged from 1-24, with a mean of 21.1615 and a standard deviation of 5.4684 for the total sample (N=100). The means, standard deviations, and lowest and highest scores of the RMSs according to the health center and management system are presented in Table 16. The frequency and percentage of RMS standards rated as met are presented in Appendix J.

Table 16

The Means, Standard Deviations, Lowest and Highest Scores of the RMSs According to Health Center and Management System

Center/ System	n	RMS f	Mean	Standard Deviation	Lowest Score	Highest Score
Center A						
CNM	25	29	23.7241	.9218	20	24
Non-CNM	25	29	20.8966	4.3371	1	24
Center B						
CNM	25	31	23.7097	.6925	22	24
Non-CNM	25	41	17.6098	7.7165	1	24
Total	100	130	21.1615	5.4684	1	24

A statistically significant difference exists between group means (F = 12.9748; df = 3,126; p <.0001), as determined by the one-way analysis of variance (Table 17).

Table 17

ANOVA Summary Table for Referral Management Scale

Source of Variance	df	Sum of Squares	Mean Squares	F	Prob.
Between Groups	3	910.9817	303.6606	12.9748	<.0001
Error	126	2946.6260	23.3859		
Total	129	3857.6077			

The RMS mean scores of Center A and B CNM care management systems and Center A Non-CNM system are significantly higher than Center B Non-CNM system, as determined by Tukey's-HSD procedure ($p \leq .05$) (Table 18). The RMS mean scores of

Centers A and B CNM care management systems are higher than Center B Non-CNM system but did not reach statistical significance ($p > .05$).

Table 18

Differences Between Group Means Obtained on the RMS as Determined by Tukey's-HSD Procedure

Mean Scores	Group	Center B Non-CNM	Center A Non-CNM	Center B CNM	Center A CNM
17.6098	Center B Non-CNM	NS*	**	**	**
20.8966	Center A Non-CNM	**	NS	NS	NS
23.7097	Center B CNM	**	NS	NS	NS
23.7241	Center A CNM	**	NS	NS	NS

NS* -- pairs of groups not significantly different at $p > .05$
** -- pairs of groups significantly different at $p \leq .05$

Subhypothesis 1.4 -- NOS. Scores on the 5-item NOS could range from 1-15. Scores of the study subjects ranged from 8-15, with a mean of 14.29 and a standard deviation of 1.2894 for the total sample (N=100). The mean, standard deviation, and lowest to highest score of the NOSs according to health center and care management system are presented in Table 19. No significant difference exists between the means of the care management systems on the NOS ($F = 1.1501$; $df = 3,96$; $p > .05$), as determined by one-way analysis of variance (Table 20).

Table 19

Mean, Standard Deviation, and Lowest to Highest Score on the NOSs According to Health Center and Management System

Center/System	n	Mean	Standard Deviation	Lowest Score	Highest Score
Center A					
CNM	25	14.64	.9074	11	14
Non-CNM	25	14.00	1.6833	8	15
Center B					
CNM	25	14.36	1.1860	10	15
Non-CNM	25	14.16	1.2477	11	15
Total	100	14.29	1.2894	8	15

Table 20

ANOVA Summary Table for Newborn Outcome Scale

Source of Variance	df	Sum of Squares	Mean Squares	F	Prob.
Between Groups	3	5.7100	1.9033	1.1501	.3330
Error	96	158.8800	1.6550		
Total	99	164.5900			

Subhypothesis 1.5 -- Number of missed clinic appointments. The number of clinic appointments missed by each sample subject was abstracted from documentation in the individual subject's health center records. The number of missed appointments for the total sample (N=100) ranged from 0-3. The means, standard deviations, and lowest and highest

number of missed clinic appointments according to health center and management system are presented in Table 21.

Table 21

The Means, Standard Deviations, Lowest and Highest Numbers of Missed Clinic Appointments According to Health Center and Managment System

Center/ System	n	Mean	Standard Deviation	Lowest Number	Highest Number
Center A CNM	25	.3600	.4899	.0000	1
Non-CNM	25	1.1600	.8505	.0000	3
Center B CNM	25	.2400	.6633	.0000	2
Non-CNM	25	.6400	.8602	.0000	3
TOTAL	100	.6000	.8040	.0000	3

A statistically significant difference exists between group means ($F = 7.8134$; $df = 3,96$; $p < .0001$), as determined by the one-way analysis of variance (Table 22).

Table 22

ANOVA Summary Table for Number of Missed Appointments

Source of variance	df	Sum of Squares	Mean Squares	F	Prob.
Between groups	3	12.56	4.1867	7.8134	<.0001
Error	96	51.44	.5358		
Total	99	64.00			

Tukey's-HSD post hoc test was used to determine significant differences between the group means (Table 23). Center A

and B CNM care management system clients missed significantly less clinic appointments than Center A Non-CNM system clients ($p \leq .05$). There were no other statistically significant differences between pairs of group means, although Center A and B CNM system mean scores were lower than Center B Non-CNM system mean scores.

Table 23

Differences Between Group Means Obtained on the Number of Missed Clinic Appointments by Tukey's-HSD Procedure

Mean Scores	Group	Center B CNM	Center A CNM	Center B Non-CNM	Center A Non-CNM
.2400	Center B CNM	NS*	NS	NS	**
.3600	Center A CNM	NS	NS	NS	**
.6400	Center B Non-CNM	NS	NS	NS	NS
1.1600	Center A Non-CNM	**	**	NS	NS

NS* -- pairs of group means not significantly different at $p > .05$

** -- pairs of group means significantly different at $p \leq .05$

Subhypothesis 1.6 -- Length of time elapsed between missed appointment and client's return to clinic. The interval in weeks from the missed appointment to the client's return to clinic was abstracted from the health center records of those subjects who missed clinic

appointments. The mean interval of absence from clinic, standard deviation, and the minimum to maximum number of weeks of absence are described according to health center and management system in Table 24.

Table 24

The Mean Interval of Absence From Clinic, Standard Deviation, and Minimum and Maximum Number of Weeks of Absence From Clinic

Group	n	Time Elapsed (weeks)	Mean	Minimum Time Elapsed (weeks)	Maximum Time Elapsed (weeks)
Center A					
CNM	9	9	2.111	1	6
Non-CNM	18	31	2.3226	1	8
Center B					
CNM	3	6	1.6667	1	3
Non-CNM	11	16	2.0000	1	8

There was no significant difference between the group means of the care management systems in the length of time elapsed between missed clinic appointments and the client's return to clinic (F = .3280; df = 3,58; p = .8051), as determined by using the one-way analysis of variance (Table 25).

Hypothesis two.

The second hypothesis for this study was: The CNM care management systems will provide more antepartum visits than the Non-CNM care management systems. The total number of

Table 25

ANOVA Summary Table for Length of Time Elapsed

Source of Variance	Sum of Squares	df	Mean Squares	F	Prob.
Between groups	2.6971	3	.8990	.3280	.8057
Error	158.9964	58	2.7413		
Total	161.6935				

initial and established antepartum visits conducted by Center A and B from January 1, 1989 through June 30, 1990 was abstracted from health center statistical records. During that 18 month time frame, Center A conducted a total of 5,354 antepartum physical examinations or assessments (visits), while Center B conducted 9,596 visits. A summary of visits conducted by health center and management system is presented in Table 26.

Table 26

Antepartum Visits Conducted by Health Center and Management System

January 1, 1989-June 30, 1990	CNM	Non-CNM	Total Visits
Center A	3,318	2,036	5,354
Center B	6,073	3,523	9,596
Total Visits	9,391	5,559	14,950

A statistically significant difference exists between group means (F = 85.4521; df = 3,68; p <.0001), as

determined by the use of one-way analysis of variance (Table 27). Tukey's-HSD post hoc test was used to determine the differences between the group means (Table 28).

Table 27

ANOVA Summary Table for Number of Antepartum Visits Conducted

Source of Variance	df	Sum of Squares	Mean Squares	F	Prob.
Between groups	3	476202.9444	158734.3148	85.4521	<.0001
Error	68	126315.6667	1857.5833		
Total	71	602518.6111			

Table 28

Difference Between the Group Means Obtained on the Antepartum Visits Conducted as Determined by Tukey's-HSD Procedure

Mean Visits	Group	Center A Non-CNM	Center A CNM	Center B Non-CNM	Center B CNM
113.1111	Center A Non-CNM	NS*	**	**	**
184.3333	Center A CNM	**	NS	NS	**
195.7222	Center B Non-CNM	**	NS	NS	**
337.3889	Center B CNM	**	**	**	NS

NS* -- pairs of groups not significantly different at $p > .05$

** -- pairs of groups significantly different at $p \leq .05$

The mean number of antepartum visits conducted by Center A and B CNM systems and Center B Non-CNM system were significantly higher than Center A Non-CNM care management system. Center B CNM system conducted significantly more visits than Center A CNM and Center B Non-CNM systems.

Hypothesis three.

The third hypothesis for this study was: There will be a positive relationship in both the CNM and Non-CNM care management systems between the scores on the Newborn Outcome Scale (NOS) and the following variables:

1. Scores on the Antepartum Data Base Scale (ADBS)
2. Scores on the Antepartum Complication Management Scale (ACMS)
3. Scores on the Referral Management Scale (RMS)

There was no significant positive relationship between scores on the NOS and scores on the ADBS, ACMS, and the RMS when multiple regression analysis was utilized to treat the data (F = 2.12245; df = 3; p = .1046) (Table 29).

Table 29

Analysis of Regression Summary Table

Sources	df	Sum of Squares	Mean Squares	F	Prob.
Regression	3	12.05485	4.01828	2.12245	.1046
Residual	74	140.09900	1.89323		
Totals	77	152.15385			

Summary of Findings

Four hundred thirty-five outpatient records of maternity clients who received care managed within CNM and Non-CNM management systems from Health Centers A and B were reviewed by the investigator to determine eligibility for inclusion in this study. A total sample size of 100 was obtained with 25 subjects in each of the four study groups.

The outpatient maternity records of the 100 sample subjects were reviewed by the investigator. Information was abstracted onto the Demographic Data Form, and the Instruments in the Cook Antepartum Care Management Inventory (ADBS, ACMS, RMS, and NOS) were completed according to instrument instructions. These procedures were done to measure the degree to which certain aspects of the antepartum care management process were implemented by the primary health professionals in a particular care management system and the gross potential for newborn wellness.

The resultant scores and visit compliance data, in addition to the number of antepartum visits conducted which were abstracted from health center statistical reports, were used by the investigator to evaluate the degree to which maternity (antepartum) care was effectively and efficiently managed. The findings of the study are summarized below.

Hypothesis one

Maternity clients received significantly more effective and efficient care when care was managed within certified nurse-midwifery (CNM) care management systems than when care was managed within non-certified nurse-midwifery (Non-CNM) care management systems, according to the following variables except where stated:

1. Standards of antepartum surveillance activities to monitor maternal/fetal status were performed to a higher degree when maternity care was managed by both CNM management systems than when care was managed within Non-CNM care management systems. These findings were highly statistically significant ($p < .0001$).

2. Antepartum complications were managed more effectively and efficiently within both CNM care management systems than when complications were managed within Non-CNM management systems. These findings were highly statistically significant ($p < .0001$).

3. Interagency referrals for evaluation of actual/potential antepartum complications were managed significantly more effectively and efficiently within Center A and B CNM care management systems than within Center B Non-CNM management system. These findings were statistically significant ($p < .0001$). There were no statistically significant differences in the management of

interagency referrals between Center A and B CNM systems and Center A Non-CNM system ($p > .05$).

4. There were no statistically significant differences ($p > .05$) in the pregnancy outcomes as measured by the gross potential for newborn wellness for maternity clients who received care managed within CNM care management systems than when care was managed within Non-CNM care management systems.

5. The clients in Center A and B CNM care management systems missed significantly fewer clinic appointments than clients in Center A Non-CNM system. These findings were highly statistically significant ($p < .0001$). There were no statistically significant differences in the number of missed client appointments in Center A and B CNM systems and Center B Non-CNM systems.

6. There was no statistically significant difference ($p > .05$) in the length of time elapsed between clients' missed appointments and their return to clinic between CNM and Non-CNM system clients.

Hypothesis two

CNM care management systems provided significantly more antepartum clinic visits ($p < .0001$) than Non-CNM systems. Center B CNM system conducted significantly more visits than Center A and B Non-CNM systems and Center A CNM system. Center A CNM system conducted significantly more visits than

Center A Non-CNM system ($p < .0001$), but not significantly more visits than Center B Non-CNM system ($p \geq .05$). (Health Center B provided more total antepartum visits than Center A.)

Hypothesis three

No significant relationship could be demonstrated ($p > .05$) between the newborn wellness status and the degree of antepartum surveillance activities performed, the management of antepartum complications or the management of interagency referrals. There was a high level of newborn wellness in both CNM and Non-CNM management systems.

CHAPTER 5

SUMMARY OF STUDY

This study was a four-group, comparison-controlled, quasi-experimental, and evaluative design. The study was designed to answer the question: Will maternity clients receive more effective and efficient antepartum care when care is managed within certified nurse-midwifery management systems than clients who do not receive care managed within certified nurse-midwifery management systems?

Summary

The purpose of this study was to evaluate the major objective of an interagency pilot program funded by a block grant from the U.S. Department of Maternal and Child Health to the Texas State Health Department. The major steps in program evaluation proposed by Tyler (1969) were adapted and utilized to plan, organize, and conduct this study.

The major objective cited in the grant proposal was established as the objective to be evaluated. The objective of the program was to demonstrate the management (provision and coordination) of effective and efficient maternity care through the implementation of an interagency certified nurse-midwifery (CNM) care management system. The aim of

this cooperative effort was reduction of local health care system barriers to maternity clients.

The program objective was classified and the objectives were defined in measurable terms by the investigator through the process of development of the Problem of Study and the research hypotheses. The use of pilot program health center statistical records and individual health center maternity client records were identified by the investigator as situations in which program objective achievement could be measured.

Development and selection of measurement techniques were accomplished through investigator-developed instruments and obtainment of health center statistical records which were used to collect and measure data for hypotheses testing. The Demographic Data Form and the Cook Antepartum Care Management Inventory (CACMI) were the investigator-developed instruments. The monthly statistical summaries of the number of antepartum visits conducted at the program health centers were obtained from the health centers.

Four hundred thirty-five maternity client health center records were reviewed by the investigator at the two health centers; 100 records (25 in each study group) which met the inclusion criteria were retained for the sample. Utilizing predetermined criterion indicators, the investigator

reviewed the maternity client records and rated the degree to which standards of care contained in the Antepartum Data Base Scale, Antepartum Complication Management Scale, and Referral Management Scale were implemented by the care management system during the care management process. The investigator abstracted information about the pregnancy outcomes from the client records onto the Newborn Outcome Scale. The Demographic Data Form was used by the investigator to abstract data regarding the various extraneous and demographic variables in addition to the number of missed appointments and the clients' return to clinic. All chart audits were conducted at the program health centers by the investigator who is a certified nurse-midwife not affiliated with any of the program agencies. The number of antepartum visits conducted by each CNM and Non-CNM system during specified timeframes were abstracted from monthly health center statistical reports.

Comparison of measurement outcomes with the measurement objectives was accomplished through statistical analysis of the hypotheses. Descriptive statistics and tables were used to describe the demographic variables. Hypotheses 1 and 2 were analyzed with the one-way analysis of variance, including use of an appropriate post Hoc test if the null hypothesis was rejected. Hypothesis 3 was analyzed by multiple regression techniques. The .05 significance level

was used for data analysis in this study. For purposes of statistical analysis, the investigator assumed the level of data analyzed in Hypotheses 1 and 3 to be of equal intervals.

Analysis revealed maternity clients received significantly more effective and efficient care when care was managed within CNM care management systems than when care was managed within Non-CNM care management systems, according to (a) performance of antepartum surveillance activities, (b) management of antepartum complications, (c) management of interagency referrals, (d) client compliance to antepartum clinic appointments, and (e) in the provision of antepartum visits. No significant difference was found as measured by the length of time elapsed between clients' missed appointments and their return to clinic between CNM and Non-CNM system clients. The pregnancy outcomes, as measured by the gross potential for newborn wellness, were not significantly different for maternity clients who received CNM and Non-CNM managed care. Also, there was no significant correlation between the newborn wellness status and the degree of antepartum surveillance activities performed, the management of antepartum complications, or the management of interagency referrals.

After completion of the study, a written report of the evaluation study was submitted to the program agencies. The

report contained the findings of the study which describe the successful accomplishment of the major program objective. The study findings were utilized by the agencies in the comprehensive evaluation report which was in turn submitted to the Texas State Department of Health. The data would be used by the administrative decision-makers in consideration of funding program continuance.

Discussion

In general, the pregnancy outcomes as measured by the gross potential for newborn wellness could be characterized as good for both CNM and Non-CNM management systems. Similar pregnancy outcomes among the study groups may in part be associated with the fact that the groups are very homogeneous. The average sample subjects for all groups initiated care between 14-17 weeks gestation and attended approximately 10 antepartum clinic visits. In addition, all sample subjects were initially categorized as at low-risk for poor pregnancy outcomes. These findings support the evolving acknowledgement (Institute of Medicine, 1988; Merkatz & Thompson, 1990) that the worth of antepartum care should not be judged solely on the basis of its effect on newborn/infant outcomes. Instead, it has been recommended that evaluation of antepartal care be considered by a broader array of measures. While pregnancy outcomes may be

the ultimate product or measure of antepartum care, it may not be the most relevant or sensitive measure of effective and efficient care management (Donabedian, 1966,1968; Institute of Medicine, 1988; Merkatz & Thompson, 1990).

The majority of the findings of this study demonstrate that maternity clients received more effective and efficient care when care was managed within CNM management systems than clients who received care within Non-CNM management systems in the same interagency health care system. More effective and efficient care has been identified as a specific goal aimed at the reduction of barriers to comprehensive health care for pregnant women (Institute of Medicine, 1988). The reduction of system barriers demonstrated in this study through more effective and efficient care resulted in (a) increased system capacity by significantly increased numbers of antenatal visits; (b) improved continuity of care; and (c) increased effective and efficient utilization of client, health care manager(s), and other interagency health system resources.

Improved continuity of care and increased effective and efficient utilization of resources by the CNM management systems was accomplished by (a) more consistent performance of antepartum surveillance activities which could aid in the early identification of actual/potential complications; (b) more consistent, accurate, and appropriate recognition and

management of actual/potential complications; (c) more consistent management of interagency referrals; and (d) more client compliance with visit attendance, treatment regimens, and interagency referrals. Especially worthy of note in these areas is the consistently higher degree to which the CNM systems, according to documentation in the client record, demonstrated (a) communication with clients regarding eliciting complaints during each visit; (b) assessment of psychosocial factors; (c) planning and implementation of instructions and/or precautions regarding the specific complications; (d) planning and implementation of the obtainment of additional data to facilitate evaluation, diagnosis, and treatment of the various complications and the referral process when indicated; and (e) evaluation of the results of and client compliance to treatments and referrals with appropriate subsequent care as indicated by those results. These study findings support the descriptions reported by others (Diers, 1982; Lehrman, 1981; Thompson, et al., 1989) that the nurse-midwifery process of care includes but is not limited to care that is safe, satisfying, respectful, client centered, health promoting, and responsive to client needs. These characteristics of care management have been associated with effective and efficient care management (Donabedian, 1966,1968,1982; Frigolletto & Little, 1988; Selwyn, 1990).

The more consistent effective and efficient management of interagency referrals by the CNM systems could possibly be attributed to the fact that the CNM care management systems represent a less fragmented system of care (Katz & Rosenzwieg, 1970). The CNMs managed care within interagency approved policies and protocols. These interagency protocols authorized the CNMs to cross the organizational boundaries of each of the three agencies in order to access the most appropriate system resources for the client according to client need. The Non-CNMs also managed care within intra- and interagency approved protocols. However, the Non-CNM protocols restricted the authority of the Non-CNMs to the comprehensive services in the high risk (hospital) facilities. This frequently resulted in multiple client visits to the high risk facility before the client condition was appropriately or completely evaluated. For example, there were two clients with dermatologic conditions. The Non-CNM client was sent to the triage nurse who sent the client to the OB-Observation Unit where the physician made a referral to the Dermatology clinic in another hospital district facility located across town. The CNM client was referred directly to the Dermatology clinic where the problem was evaluated and treated on one visit.

The CNMs themselves actually practiced within each of the agency settings. This would result in the CNMs

potentially being more familiar with system idiosyncrasies. This familiarity could possibly have influenced the planning and implementation of more effective and efficient care strategies (Fletcher & MacPherson, 1986; Katz & Rosenzweig, 1970). The ability of the CNM systems to act as linking pins between the various interagency subsystems could help ensure more effective and efficient integration and coordination of resources which could facilitate the accomplishment of health care and health system goals.

The cost effectiveness of health care which has been managed in an effective and efficient manner has been recognized (Donabedian, 1982; Fletcher & MacPherson, 1986; IOM, 1988). Although cost-factor analysis was not performed, the care managed within the CNM systems in this study is presumed to have been more cost-effective than care managed within the Non-CNM systems. This assertion is made because of the many instances in which CNM care was found to be managed more effectively and efficiently than Non-CNM care. These findings support others who have documented the cost-effectiveness of CNM managed maternity care (Bell & Mills, 1989; Bennetts & Lubic, 1982; Browne & Isaacs, 1976; Cherry & Foster, 1982; Lubic, 1975,1981; Metropolitan Life Insurance Company, 1958; Reid & Morris, 1979; Scupholme & Kamon, 1987; Scupholme, McLeod, & Robertson, 1986; Stewart & Clark, 1982).

Conclusions and Implications

Conclusions

Effective and efficient maternity care as defined in this study is the degree to which comprehensive antepartum health services are effectively and efficiently managed. Comprehensive antepartum health services are effectively managed when the application of the care management process by the care management system results in the adequate and appropriate provision and coordination of health services according to the client's health status and needs (Donabedian, 1966,1968,1982; Institute of Medicine, 1988; Katz & Rosenzweig, 1970; Weidenbach, 1964; Yura & Walsh, 1988). Comprehensive antepartum health services are efficiently managed when the application of the care management process by the care management system results in assisting the client to access the health care system services with a minimum of effort, expense, or waste of client, health care provider(s), and other health care system resources (Donabedian, 1966,1968,1982; Institute of Medicine, 1988; Katz & Rosenzweig, 1970; Weidenbach, 1964; Yura & Walsh, 1988). The goal of effective and efficient maternity care is to assist the maternity client to access the health services needed to attain, regain, and maintain maximum levels of wellness for herself and her unborn/newborn infant (Institute of Medicine, 1988; Weidenbach, 1964).

More effective and efficient maternity care as operationalized for this study has been demonstrated in care managed within CNM care management systems than in care managed within Non-CNM care management systems. The major program objective of this grant, to demonstrate the management of more effective and efficient maternity care through the implementation of an interagency certified nurse-midwifery care management system, has been attained.

Implications for Nursing Practice

The reduction of health care system barriers to comprehensive health care for maternity clients demonstrated in this study:

1. Provides a new dimension in the current body of evidence which validates the recommendation that expanded role nursing groups (CNMs) be utilized as a primary health care provider system for maternity clients.

2. Provides data which may be utilized by health care system planners, organizers, and decision-makers to justify funding expanded role nursing (CNMs) education and systems of care.

3. Demonstrates a methodological approach which may be a more sensitive and relevant measure of effective and efficient (quality) prenatal care management than pregnancy

outcomes or the number of prenatal visits the client attended.

4. Demonstrates a methodological approach which has potential to quantify qualitative differences in care management strategies between expanded role nurse (CNM, nurse practitioners) and physician primary care management systems and which may be replicated in a variety of clinical practice settings.

Recommendations for Further Study

Based on the findings of this study, the following recommendations for study are offered:

1. A replication study should be undertaken with (a) larger sample size; (b) more ethnically and socioeconomically diverse sample subjects; (c) management comparisons of physicians to other physicians, CNMs to other CNMs, and physicians and CNMs; and (d) in different health care system settings.

2. A study should be undertaken to evaluate intrapartum and postpartum management replicating the measurement methodology utilized in this study. Standards and criterion indicators would need to be developed for intrapartum and/or postpartum care management.

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APPENDICES

APPENDIX A

Abstract of Funding Proposal Submitted by Agencies

Abstract of Funding Proposal
Submitted by Agencies

The vast majority of indigent women in Harris County deliver at Jefferson Davis Hospital (JDH). Of the approximately 15,000 women who deliver in this institution, 30% receive late or no prenatal care. Prenatal care given is generally from one of three institutions, the Harris County Hospital District (HCHD), the City Health Department, and the Harris County Health Department (HCoHD). Deliveries are performed solely by the District. This fragmented and episodic approach to care is a well recognized barrier to prenatal care in Houston.

Baylor College of Medicine, Harris County Health Department, and Harris County Hospital District would like to pilot the first interagency program in Harris County for indigent women to improve continuity of care and obstetrical outcome. The program will be accomplished by a staff of Baylor College of Medicine Certified Nurse Midwives who will provide prenatal care at county clinics. These same midwives will staff the Birth Center at JDH thus being available as the health care provider for the deliveries and postpartum period.

One clinic to be targeted is Lava Rock in Pasadena, which is a county clinic. Waiting time for an initial visit in county clinics is currently two to four weeks. However, at the Lava Rock clinic, 50% of the total new patients (30) presenting are turned away each week due to inadequate numbers of providers. Furthermore, County Clinics do not ordinarily admit patients without prior prenatal care beyond 24 weeks gestation. However, if CNMs were utilized, it might be possible to admit patients to the clinic at any time during their gestation. It is anticipated that each CNM would see 14 new patients per week and 84 revisits per week, giving a total of 9,408 visits per year with two CNMs. By achieving the following objectives, we feel it is possible to reduce the incidence of low birth weight babies.

Objectives:

1. Demonstrate the effectiveness of three agencies, the Harris County Health Department, the Harris County Hospital District, and Baylor College of Medicine to coordinate and provide together effective prenatal, intrapartal, and postpartum care.
2. Reduce waiting time for new patients.
3. Increase number of return prenatal visits per patient.

Evaluation: Nurse-midwives will utilize their current data collection system developed by the Midwifery Section. A hard copy of the data to be collected is attached. A nurse researcher will collect data from matched clinics by reviewing prenatal and intrapartal charts. A comparison will be made of birth outcomes in the project clinic with birth outcomes of matched county clinics using such measures as birth weight, apgars, incidence of operative deliveries, weeks gestation prenatal care started.

Additionally, waiting times for prenatal care, and number of visits per patient will be collected.

Projected cost for this project is $78,000. This includes two nurse-midwives and education materials.

If this project is successful, future funding will be sought from the agencies involved. This project will serve as a stepping stone for possible Robert Wood Johnson funding.

APPENDIX B

Antepartum Data Base Scale

Antepartum Data Base Scale

Directions:

1. Enter client code on scoring form: _____

2. The statements listed below relate to usual standards to be performed during the course of a client's out-patient antepartum care. Review the client's antepartum record to determine if the standard of care cited in the statement of each item was met by the care management system (MDs, CNMs, RNs, other clinic staff). Then place a check mark in the appropriate box to the right of the statement to indicate whether the standard was met or not met as indicated by documentation in the client's record. Then proceed to the next item statement and repeat the process.

3. An abbreviated ADBS Scoring Form (see attached) may be utilized to rate the scale items in order to facilitate the rating process. The rater is cautioned to frequently review the complete item statements on the ADBS Scale to ensure accurate interpretation of the abbreviated standards.

Antepartum Data Base Scale

Client Code: _____

Standard statements:	Not Met	Met
1. The maternal blood type and Rh factor was obtained at initiation of care and results documented in the record.		
2. Maternal antibody screen was drawn on initial visit.		
3. The maternal hemoglobin (Hgb) and hematocrit (Hct) were obtained at initiation of care.		
4. The maternal hgb and hct was repeated at least once in subsequent trimester(s) unless care began in third trimester.		
5. Serologic testing for syphilis was performed at initiation of care.		
6. Serologic testing for syphilis was repeated in the third trimester unless care began in the third trimester.		
7. Hepatitis B screening was performed according to clinical site guidelines.		
8. A test was performed to screen for hemoglobinopathy as indicated by client ethnicity and clinical site guidelines.		

Standard statements:	Not Met	Not
9. The client was offered MSAFP screening at the appropriate gestational age, according to clinic site guidelines.		
10. Provisions were made for MSAFP screenings unless the client refused screening or began care after the appropriate gestational age.		
11. HIV screening was performed according to clinical site guidelines.		
12. The maternal blood pressure was documented on each visit.		
13. There was documentation of evaluation of edema on each visit.		
14. The maternal weight was recorded at each clinic visit.		
15. There was evidence a Pap smear was obtained at the initiation of antepartum care.		
16. A gonorrhea culture (G.C.) was obtained at initiation of care.		
17. A G.C. culture was repeated in the third trimester unless care began in the third trimester.		

Standard statements:	Not Met	Met
18. When other sexually transmitted diseases (STDs) were suspected by history and/or physical examination, the appropriate diagnostic test(s) was done, according to clinical site guidelines.		
19. Clinical site guidelines were followed in routine screening for chlamydia.		
20. A glucose screen for potential glucose intolerance in pregnancy was performed at an appropriate gestational age according to client medical, obstetrical, and family history, laboratory and physical findings, and clinical site guidelines.		
21. The client's urine was checked for glucose each clinic visit.		
22. The client's urine was checked for protein each clinic visit.		
23. A urinalysis and/or urine culture(s) was performed as indicated by presence or absence of client symptoms, past and/or current medical/obstetrical history, and/or clinical site guidelines. (Check "Met" if test not indicated.)		

Standard statements:	Not Met	Met
24. A complete history was obtained at initiation of care.		
25. A complete physical examination was performed at initiation of care.		
26. At each visit, an attempt to identify the presence or absence of potential/actual physiologic problems by review of systems and/or problems or illness experienced since the last visit.		
27. There was documentation in the record that there was an attempt to identify psycho-social stressors the client may have been experiencing during the prenatal course.		
28. The estimated gestational age was calculated and documented correctly at each visit from the data in the client record, i.e. from LMP, ultrasound, both.		
29. Evaluation of uterine size and growth was documented by measurement of fundal height in centimeters, abdominal palpation, and/or bimanual exam (as appropriate to gestational age) at each visit.		

Standard statements:	Not Met	Met
30. There was documentation that fetal heart tones were evaluated each visit after 10 weeks EGA.		
31. There was documentation that fetal movement was evaluated by maternal history and/or actual palpation by the examiner at each visit after 16-20 weeks EGA.		
32. There was documentation of fetal presentation after 36 weeks of gestation, unless delivery occurred at less than 36 weeks of gestation.		
33. There was documentation of genetic evaluation being offered to the client with risk factor(s) associated with genetic abnormalities, if there was a maternal request for genetic counseling, and/or according to clinical site guidelines. (Check "Met" if evaluation not indicated.)		
34. The client's return appointment was in accord with clinical site guidelines and/or client condition.		

ADBS Scoring Form

Subject code: _____

Standard		Not Met	Met	Comments
1. Blood type & Rh factor	1.			
2. Antibody screen	2.			
3. Initial Hgb/Hct	3.			
4. Repeat Hgb/Hct	4.			
5. Initial serology	5.			
6. Repeat serology	6.			
7. Hepatitis screen	7.			
8. Hemoglobinopathy screen	8.			
9. MSAFP offered	9			
10. MSAFP provided	10.			
11. HIV screen	11.			
12. B/P each visit	12.			
13. Edema eval. ea. visit	13.			
14. Weighed ea. visit	14.			
15. Initial pap smear	15.			
16. Initial GC culture	16.			
17. Repeat GC culture	17.			
18. STD diag. test(s)	18.			
19. Chlamydia screen	19.			
20. Glucose screen	20.			
21. Urine glucose ea. visit	21.			
22. Urine prot. ea. visit	22.			
23. U/A - C&S, as indicated	23.			
24. Initial history	24.			
25. Initial physical	25.			
26. ROS each visit	26.			
27. Psych/Social stressors	27.			
28. EGA each visit	28.			
29. Eval. ut. size ea. visit	29.			
30. FHTs each visit	30.			
31. FM eval. each visit	31.			
32. Fetal pres. >36 weeks	32.			
33. Genetic eval. offered	33.			
34. RTC appt. appropriate	34.			

APPENDIX C

Antepartum Complication Management Scale

Antepartum Complication Management Scale

General Instructions:

1. Review the subjective and objective data in a client's outpatient antepartum record for criterion indicators which signify the existence of the actual/potential complications cited on the attached list.
2. Circle the actual/potential complication(s) identified from the review of the client's record on the attached list of complications.
3. Complete a separate Antepartum Complication Management Scale for each actual/potential complication identified during the review of the client record.
4. If no complication(s) was identified on review of the client's record, circle "no complication(s) identified" on the attached list of complications.

Client Code _____

LIST OF ACTUAL/POTENTIAL COMPLICATIONS*

I. Potential genetic abnormality
II. Abnormal cervical cytology
III. Glucose intolerance
IV. Preterm labor
V. Anemia
VI. Intrauterine fetal growth retardation
VII. Postdates pregnancy
VIII. Sexually transmitted diseases
IX. Pregnancy induced hypertension
X. Abnromal weight gain patterns
XI. Abnormal vaginal bleeding
XII. Size/dates discrepancy
XIII. Urinary tract infection
XIV. Rh negative/isoimmunization
XV. Compromised fetus
XVI. High risk conditions identified on ultrasound
XVII. Other abnormal maternal conditions

*The criteria used as criterion indicators for the recognition of the above complications and criterion indicators of standards of care management planning, implementation, and evaluation have been summarized and derived from intra- and interagency approved protocols and other reference literature (American College of Obstetricians and Gynecologists, 1989; Cunningham, MacDonald, & Gant, 1989; Dunnihoo, 1989). These criterion indicators are attached for the rater's use.

Antepartum Complication Management Scale

Specific directions:

1. Enter the client code number on the rating form.
2. Specify the actual/potential complication identified by your review of the client record on the rating form.
3. Compare the complication management documented in the client's antepartum record to criterion indicators for the recognition and management of the specific condition/complication (see attached).
4. Read the item statement on the rating form which relates a component of the management process representative of effective and efficient care management.
5. Using the scale to the right of each statement (care standard), rate the degree to which that standard of care management was implemented by the care manager(s) in the management of the specific condition/complication. Indicate your rating by placing a check in the column below the word(s) which best describes the degree to which that standard of care management was met.

   The rating choices are Met, Partially Met (Part. Met), and Not Met. Check "Met" if all the key element(s) of the standard of care management for the

specific condition/complication were implemented to some degree by the care manager(s). Check "Partially Met" if some key elements of the care management standard were not implemented by the care manager(s) as applied to the specific condition/complication being managed. Check "Not Met" if none of the key elements of the care management standard was implemented by the care manager(s) as applied to the specific condition/complication being managed. The statement is rated from 1-3 to indicate the degree to which that standard of the care management process was implemented with 3 (Met) being the highest. (See rating form for examples.)

NOTE: If a statement is given a rating of 1 or 2, write the rationale for the rating in the comments section below the specific item scale. (See rating form for example.)

6. Proceed to the next item statement and repeat steps 2-4 until all item statements have been rated.

   Exception: If either item statement number 1 or 2 receives a rating of 1 (Not Met), do not complete items 3-13. Do write your rationale for the rating in the comments section below the scale of the particular item.

7. An abbreviated ACMS Scoring Form (see attached) may be utilized to rate scale items to facilitate the rating process. The rater is cautioned to frequently review the complete item statement on the ACMS Scale to ensure accurate interpretation of the abbreviated standards.

Rating Examples

Standard statement:	Not Met	Part. Met	Met
There was documentation in the client record that the actual/potential complication was accurately recognized by the care manager(s). Comments: (Example: Hemoglobin of 8.0 gm documented and anemia recognized)			X
Example: Plans for instructions and/or pre-cautions regarding the specific client condition/complication were appropriate. Comments: Client had documented partial placenta previa on ultrasound report and was given no precautions related to her condition or to vaginal bleeding.	X		
Example: Planned treatment regimens were implemented. Comments: Client with anemia with planned hematologic workup, iron supplement and referral for nutritional counseling and WIC. No evidence of referral to nutritionist and WIC program was done. Lab results and prescription for iron were documented in record.		X	

ANTEPARTUM COMPLICATION MANAGMENT SCALE

Client code: _____ Complication:

Standard statements:	Not Met	Part. Met	Met
1. There was documentation in the client record that the actual/potential complication was accurately recognized by the care management system. Comments:			
2. The actual/potential complication identified by the care management system was supported by the subjective and/or objective data documented in the client record. Comments:			
3. Plans for obtaining additional definitive subjective and objective data needed to further assess or define the client condition and clarify subsequent care management requirements were appropriate to the client condition, i.e. consultations, lab, referrals. (Mark "Met" if additional data was not indicated. Mark "Not Met" if additional data was obtained but not indicated. Comments:			
4. Plans for treatment regimens, i.e. prescriptions, over the counter medications, counseling, other treatments, remedies, referrals and/or consultations were in accord with the standards appropriate to client condition as represented in the client record. Comments:			

Standard statements:	Not Met	Part. Met	Met
5. Plans for instructions and/or precautions regarding the specific client condition/complication were in accord with standards of care. Comments:			
6. Plans for client dispositions, i.e. return to clinic appointments, referrals, were in accord with standards related to the client's condition and/or specific complication as represented in the client record. Comments:			
7. Plans for obtaining additional definitive data were implemented within a timeframe consistent with standards related to the client condition/complication. (Mark "Met" if additional data was not ordered. Mark "Not Met" if ordered but not indicated.) Comments:			
8. Planned treatment regimens were implemented. Comments:			
9. Treatment regimens were implemented within a timeframe consistent with standards of care related to the client's condition/complication. Comments:			
10. Instructions and/or precautions regarding client condition/complication were documented as being given to the client. Comments:			

Standard statements:	Not Met	Part. Met	Met
11. Client disposition(s) was implemented including evidence that the referral process was implemented when ordered, return appointments documented, lab studies ordered, etc. Comments:			
12. There was documentation that the results of additional data were evaluated on subsequent visit(s) or chart review, i.e. ultrasound reports, consultations, referrals, lab studies, etc. Comments:			
13. Client compliance to implemented management plan(s) was evaluated on subsequent clinic visits, i.e. took medications, went for ultrasound, kept other appointments, etc. Comments:			
14. Subsequent care management plans and client dispositions, appointments, follow-up tests, referrals, etc., made by the care management system were in accord with the results of the previously implemented plan of management. Comments:			

ACMS Scoring Form

Client code: _____

Complication: _____

Standard	Not Met	Part. Met	Met
1. Accurate recognition of complication			
2. Data support presence of complication			
3. Plans for additional data base			
4. Plans for treatment regimens			
5. Plans for instructions and/or precautions regarding specific complication			
6. Plans for client disposition(s)			
7. Plans for additional data base implemented within timeframes			
8. Treatment regimens implemented			
9. Tx regimens imp. - timeframes within timeframes			
10. Instructions/precautions documented as given			
11. Dispostion(s) implemented			
12. Results of additional data eval.			
13. Client compliance to management plan(s) evaluated			
14. Subsequent care and followup in accord with results of previous management plan(s)			

Item: Comments:

CRITERION INDICATORS FOR THE RECOGNITION AND MANAGEMENT OF ACTUAL/POTENTIAL ANTEPARTUM COMPLICATIONS

The following criterion-indicators represent key elements/data which correspond to the standards of care management (1-14) specified on the Antepartum Complication Management Scale. These indicators are intended to provide the health professional criteria by which to rate the degree to which each care management standard was implemented by the care manager(s) in the management of specific antepartum complications. The indicators are also intended to provide the health professional criteria by which to rate the degree of implementation of care management standards 1-5 on the Referral Management Scale.

I. Potential Genetic Abnormalities

Standard 1: The care manager will document accurate recognition of any of the following client conditions/history as risk factors with potential for genetic abnormalities in the fetus. Risk factors include:

A. All clients with:

1. Advanced maternal age -- AMA 35 years old or older at time of delivery (refer as early as 8 weeks - may desire chorionic villus procedure; 16-21 weeks for amniocentesis).

2. History of genetic problems or birth defects (eg., neurofibromatosis, congenital deafness, dwarfism, cleft lip/palate, etc.)

3. Two or more spontaneous pregnancy losses (not including voluntary termination of pregnancy).

4. Multiple stillborns (encouraged to bring autopsy reports or any medical records.)

5. Previous unexplained perinatal/neonatal infant deaths.

6. Excessive alcohol intake (>12 oz. beer, 5 oz. wine, 1 oz. liquor per day).

7. Low and elevated MSAFP (confirm abnormal with genetics).

8. Chromosome abnormality (i.e. balanced translocation).

9. Maternal request for genetic counseling.

10. Identification on ultrasound of fetal abnormality (this pregnancy).

B. Previous pregnancy or family history:

1. Chromosome abnormality (i.e. Down Syndrome Trisomies 13, 18 balanced or unbalanced translocation).

2. Neural tube defect (i.e. Spina Bifida, anencephaly, encephalocele).

3. Hydrocephalus or microcephaly.

4. Mental retardation (bring information where seen, if chromosome studies done).

5. Congenital heart defects (name of heart problem; where seen).

6. Hemophilia.

7. Neurofibromatosis.

8. Cleft lip and/or palate.

9. Muscular dystrophy.

10. Polycystic kidney or renal agenesis.

11. Cystic fibrosis.

12. Metabolic disease (i.e. PKU, Gaucher, Galactosemia, etc.).

C. Couples at risk:
(Both parents need to be tested for carrier status)

1. Hemoglobinopathies (i.e. sickle cell disease; SC disease; Thalassemia; and Mediterranean ancestry) (not sickle cell trait).

2. Tay Sach Disease (Jewish ancestry; French Canadian).

D. Patients with the following should not be referred unless there is another indication listed above.

1. Spina bifida occulta (Get MSAFP).

2. Sickle cell trait or other hemoglobinopathy carrier state (refer only if both parents are carriers - order hemoglobinelectrophoresis.

3. Low alcohol intake (less than 12 oz. beer, 5 oz. wine, 1 oz. hard liquor per day).

4. Rubella vaccine during pregnancy.

5. Oral contraceptive use in pregnancy.

6. Alka seltzer or other aspirin containing medications.

7. Street drugs: cocaine, marijuana, Ts, blues, crystal, etc.

8. Toxoplasmosis exposure (check with OB doctor).

9. Advanced paternal age

Standard 2: Documentation in the client record of the risk factor(s) as listed above would support the recognition of potential genetic abnormality(ies) in the fetus.

Standard 3: Additional data that might be indicated could be:

1. Validation of estimated gestational age.

2. Additional history or health records for clarification.

(There may be no additional data indicated).

Standard 4: Plan for treatment regimens:

A. Offer genetic evaluation (referral) to all clients as indicated in Standard 1.

B. Evidence referral appointment made and paperwork done.

Standard 5: Client should be informed of risk status and ramifications, nature of genetic evaluation, importance of keeping appointments to time restraints in genetic evaluation.

Standard 6: Dispositions

1. Return appointment as appropriate to gestational age.

2. Referral for genetic evaluation.

   a. As early as 8 weeks EGA for chorionic sampling.

   b. At 16-21 weeks EGA for amniocentesis.

Standards 7,8,9,10, and 11: Implementation of the management plan cited in Standards 3,4,5, and 6 is to be rated according to care manager(s) documentation in the client record.

Standard 12,13, and 14: Evaluation of the results of management plan implementation and indicated follow-up care is to be rated according to care manager(s) documentation in the client record.

II. Abnormal Cervical Cytology

Standard 1: The care manager(s) will document accurate recognition of a Class II,III,IV, or V pap smear according to the classification of pap smear results:

Class	I	Normal
	II	Atypical cells inflammation; dysplasia mild or moderate
	III	Atypical, suspicious of tumor; dysplasia mild, moderate, severe
	IV	Probable malignancy, carcinoma in situ
	V	Definite malignancy, invasive CA

Standard 2: The objective data that must be present to support the indentification of abnormal cervical cytology: A Class II,III,IV, or V pap smear report.

Standards 3,4,5, and 6:

A. The following are key elements (indicators) in the management planning for abnormal cervical cytology:
Class II -- Abnormal pap with mild dysplasia; Rule out (r/o) vaginitis with wet prep, other techniques. If vaginitis present, treat and repeat pap 4 weeks after treatment, and 6 weeks postpartum.

Class II -- Abnormal pap with mild dysplasia without vaginitis: Consult with M.D. or high risk facility, repeat pap according to pathologist recommendation. Refer to Dysplasia Clinic after 2nd pap with mild dysplasia.

Class II & III -- Abnormal pap with moderate or severe dysplasia with/without vaginitis. Consult and refer to Dysplasia Clinic. Keep in caseload pending findings. Timeframe: 2-4 weeks.

Class IV & V -- Abnormal pap with any degree dysplasia that indicates carcinoma in situ: refer to M.D./high risk facility. Timeframe: 3-7 days.

Note: 1. If repeat pap shows dysplasia with atypical cell changes, refer to M.D./High Risk Facility. Time Frame: 1-2 weeks.

2. Client counseling/instruction should indicated client being informed of condition, any treatment(s) and follow-up.

B. Evidence that the management plan included key indicators of the standard management are to be rated according to documentation by care manager(s) in the client record.

Standards 7,8,9,10, and 11: Implementation of the key elements of the management plan(s) cited above will be rated according to documentation in the client record.

Standards 12,13, and 14: Evidence of evaluation of the key elements of the management plan(s) cited above and implementation are to be rated according to documentation in the client record.

III. Glucose Intolerance

Standard 1: The care manager(s) will document accurate recognition of glucose intolerance in the client record.

Standard 2: The following are key data which indicate glucose intolerance:

a. Abnormal glucose screen = a plasma glucose level of 135 mg/dl one hour after a 50 gm oral glucose load.

b. Gestational diabetes =
   1. A plasma glucose level of 200 mg/dl after a 1-hour glucose screen.
   2. An abnormal fasting blood glucose on two separate occasions.
   3. Two or more abnormal values on a 3-hour GTT.

Standards 3,4,5, and 6: Key elements of the management plan are as follows:

1.0 Administer the 50 gm 1-hour oral glucose screening test to the following maternity patients:

1.1 High risk patients at the initial visit, 24-28 weeks and 32 weeks.

HIGH RISK CRITERIA

A. Family history of diabetes (i.e. parents, grandparents, siblings)

B. History of glucose intolerance in previous pregnancies

C. Obesity - weight of more than 200 pounds or excessive weight gain during pregnancy

D. Poor obstetric history including the following conditions for which patient should be referred:

1. Habitual spontaneous abortions (i.e. $\geq$ 3).

2. Previous large baby (>4,500 gm) or suspected large for gestational age (LGA) baby in the present pregnancy.

3. Unexplained stillbirths, neonatal death or premature delivery.

4. Congenital anomalies.

5. Polyhydramnios (past or present).

6. History of recurrent monilial vaginitis.

1.2 Low risk patients (i.e. do not meet any of the high risk criteria) at 24-28 weeks gestation

1.3 Any maternity patient who has +1 glycosuria on 2 consecutive visits.

1.4 Any maternity patient who has +2 glycosuria or greater at any visit. (The screening test may be administered at the same clinic visit.)

Note: If the patient has had one normal glucose screen (<135 mg/dl) and has no other signs and symptoms of hyperglycemia, there is no need to repeat the test for recurrent glycosuria until 24-28 weeks. Refer the patient to the nutritionist for dietary counseling and observe her at subsequent visits for signs of diabetes (i.e. inappropriate weight gain, weight loss, ketonuria, etc).

2.0 Inform the patient that she will be notified by phone or letter if the test is abnormal.

2.1 Get the patient's current telephone number and address.

2.2 If the patient is in transit, arrange for her to call the clinic nurse for the test results.

3.0 If the blood glucose is >135 mg/dl but <200 mg/dl:

3.1 Contact the patient within 24 hours of receiving the laboratory results.

3.2 Inform the patient of the need to administer the 3-hour Glucose Tolerance Test (GTT).

3.3 Arrange for the nutritionist to instruct the patient regarding the 3-day dietary requirements prior to having the GTT done.

3.4 Schedule the 100 gm 3-hour GTT to be performed within <u>one week</u> of receiving the laboratory results.

4.0 If the glucose is >200 mg/dl on the 50 gm 1-hour glucose test:

4.1 Contact the patient immediately.

4.2 Refer the patient to High Risk Facility referral cites; Refer the patient to the screening nurse or to the Emergency Triage if it is after 3:00 p.m. or birth center. (Alert hospital personnel of the patient's expected arrival time. <u>Do not</u> perform the GTT.)

5.0 Prior to the GTT, the patient should receive the handout with appropriate instructions regarding CHO loading.

Normal values for the 3-hour GTT are:

Fasting	95	
1-hour	180	(glucose oxidase method)
2-hour	155	
3-hour	140	

5.1 If the FBS alone is elevated, reinstruct the patient on fasting and redraw the FBS. The entire GTT need not be repeated. Refer to Diabetic Clinic if the 2nd FBS is abnormal.

5.2 If 2 or more of the values are met or exceeded, refer to Diabetic Clinic or screening nurse/Emergency Triage depending on the amount of elevation(s).

5.3 If ketones are present, refer to High Risk Facility as emergent/urgent referral. (Phone consultation with M.D. at High Risk Facility may be indicated.)

Standards 7,8,9,10,11,12,13, and 14: Implementation and evaluation of the results of the key elements of the management plan cited above will be rated according to documentation in the client record.

IV. Preterm Labor

Standard 1: The care manager(s) will document accurate recognition of the client at potential risk for preterm labor and the client exhibiting signs and symptoms of preterm labor (PTL).

Standard 2:

A. The following are key data that places the client at risk for developing preterm labor:

(Client was at Risk if she had one major risk factor or two or more minor risk factors.)

Major Risk Factors

a. Previous preterm labor/delivery

b. Preterm labor current pregnancy

c. Uterine anomaly/surgery

d. Uterine irritability

e. Cone biopsy

f. Incompetent cervix/cerclage

g. Cervical dilation/effacement <32 weeks

h. DES exposure in utero

i. Multiple gestation current pregnancy

j. Polyhydramnios

k. Abdominal surgery current pregnancy

l. Unusual physical/mental stress

m. Age <18 or >35

n. >2 second trimester abortions/miscarriages

Minor Risk Factors

a. One second trimester abortion/miscarriage

b. >3 first trimester abortions/miscarriages

c. Bleeding after 12 weeks

d. Severe kidney and urinary tract infections

e. Excessive cigarette smoking

f. Febrile illness current pregnancy

B. The following are signs and symptoms that may be elicited from the client which could indicate the existence of PTL:

a. Uterine contractions

b. Dull, low backache

c. Menstrual-like cramps

d. Pelvic pressure

e. Pressure in low back, abdomen, or thighs

f. Intestinal cramps

g. Change in vaginal discharge

h. Feeling that something is not right

i. Cervical changes - effacement and/or dilatation

Standards 3,4,5, and 6: Key elements of the management plan include:

A. Serial vaginal exams with weekly clinic visits may be indicated for those with history of uterine irritability, preterm birth, or other significant risk factors, and screening by history for signs & symptoms of PTL.

B. In patients between 20-35 weeks gestation, if the following criteria are met, refer to High Risk Facility/Triage area:

a. Documented uterine contractions, approximately every 5 minutes.

b. Cervical effacement 80% or dilatation 2 cm or documented cervical change.

C. Patient without cervical changes with uterine irritability may be evaluated in the Birth Center/Triage to R/O preterm labor:

D. Current illness, especially UTI, fever, should be screened for and treated as indicated.

E. Refer patients for evaluation, ongoing follow-up, genetic counseling, or ultrasound in accordance with the High Risk Maternity Patient Referral Guidelines.

F. Client teaching/counseling should include:

1. Written/video information.

2. Instructions on client monitoring of uterine contractions at home after 20 weeks EGA.

3. Instructions to seek CNM/medical attention if signs and symptoms of preterm labor are experienced.

4. Anticipatory guidance should PTL occur.

5. Signs and symptoms of PTL

Standards 7,8,9,10,11,12,13, and 14: Implementation and evaluation of the results of the key elements of the

management plan cited above will be rated according to documentation in the client record.

V. Anemia

Standard 1: The care manager(s) will document accurate recognition of anemia/borderline anemia by documentation in the client record.

Standard 2: Key data supportive of the diagnosis of anemia are hemoglobin (Hgb) <10 gm, hematocrit (Hct) <30%, especially before 32 weeks EGA. Borderline anemia exists if Hgb <11 gm, Hct <34%.

Standards 3,4,5, and 6: Key elements of the management plan include:

A. Rule out poor compliance to iron and vitamins, bleeding, pica, persistent infection (i.e. UTI), inadequate nutrition. If any of these are present, treat appropriately and repeat Hct after 4 weeks.

B. If there is no improvement in 4 weeks and patient is compliant:

1. Perform hematology work-up including:

   a. CBC with differential and peripheral smear

   b. Reticulocyte count

   c. Stool for ova and parasites as indicated

   d. Hgb electrophoresis as indicated

   e. Ferritin level

   f. RBC folate level as indicated

2. Nutritional reassessment and counseling

3. Consult if indicated by lab results

C. If Hct <27% at 32-36 weeks: counseling and above work-up

D. If Hct <27% at 36 weeks: counseling, work-up, and consult with M.D. after labwork is back. (May include referral to High Risk Facility.)

E. Medications:

1. Approved prenatal vitamins

2. Ferrous sulfate 325 mg 1-3 tabs po qd.

3. Ferrogradumet 525 1 tab po qd or bid (not for therapeutic dose)

4. Vitamin C 50 mg po tid with Fe

5. Folic acid 1 mg po qd (if not present in prenatal vitamins)

F. Referral for WIC program and nutritionist.

Standards 7,8,9,10,11,12,13, and 14: Implementation and evaluation of the results of the key elements of the management plan cited above will be rated according to documentation in the client record.

VI. Intrauterine Growth Retardation

Standard 1: The care manager(s) will document accurate recognition of the presence of intrauterine growth retardation (IUGR) in the client record.

Standard 2:

A. The following are key data which indicate the suspected presence of IUGR:

1. Fundal height is 4 cm or more less than EGA,

2. A failure of uterine growth as measured by fundal height on two consecutive visits, or

3. A failure of uterine growth of less than 2 cm in 4 weeks.

B. IUGR defined as: <10% percentile fetal weight) by ultrasound.

Standards 3,4,5, and 6: The key elements of the management plan include:

A. Suspected IUGR

1. Reconfirmation of EDC.

2. Assessment for risk factors for IUGR, i.e. heavy smoker, previous IUGR or SGA infant, poor weight gain, drug or alcohol usage, PIH, infection, etc.

3. Obtain baseline ultrasound within 3-7 days.

4. Correlate BPD, HC, AC, and FL to growth charts. Review recommendation of ultrasonographer.

5. Re-scan in 2-4 weeks to assess growth.

6. NST may be appropriate after 32 weeks.

B. IUGR diagnosed by ultrasound -- Refer to IUGR clinic in 3-7 days.

C. Referral to Evaluation Center, Birth Center, Triage, or Screening Nurse may be indicated rather than satellite ultrasound center, depending on client responses and data in record, especially complaints of decreased fetal movement. (May be considered urgent or emergent.)

D. Client counseling/instructions may include information about suspected IUGR, importance of fetal activity, follow-up care and referrals, depending on situation.

Standards 7,8,9,10,11,12,13,and 14: Implementation and evaluation of the key elements of the management plan cited above will be rated according to documentation in the client record.

VII. Postdates Pregnancy

Standard 1: The care manager(s) will document accurate recognition of the client with postdates pregnancy.

Standard 2: The following are key data which indicate postdates pregnancy for a low risk facility: An estimated

gestational age of ≥41 weeks from the LMP or estimated from early examination, ultrasound, or by best method available as documented in the client record.

Standards 3,4,5, and 6: Key elements in the management plan include:

A. At beginning of 41st week (i.e. at 41-1/7 weeks, may send to the Evaluation Center for scan and CST. Then weekly CST and evaluation by physician at High Risk Facility.

B. May continue to follow in clinic if CSTs are negative and patient can provide documentation of such.

C. Kick sheet with instructions may be given to client to assess fetal movement.

D. May suggest castor oil 2 tbsp. to be followed x 1, two hours later with 2 tbsp., if no contractions.

E. CNMs may refer patients to CNM caseload at High Risk facility for their 42-week visit for evaluation and follow-up or CNM/MD/RN may refer patient same day or following day to High Risk Facility, screening nurse or Evaluation Center, if seen in clinic ≥42 weeks EGA. (The most efficient referral site for postdates evaluation when seen ≥42 weeks is the Evaluation Center.)

Standards 7,8,9,10,11,12,13, and 14: Implementation and evaluation of the results cited above will be rated according to documentation in the client record.

VIII. Sexually Transmitted Diseases

Standard 1: The care manager(s) will document accurate recognition of the risk factors associated with and signs and symptoms of sexually transmitted diseases -- HIV, Hepatitis B, gonorrhea, syphilis, chlamydia, herpes, and other vaginal/cervical infections.

Standard 2: The following are key data which indicate the potential presence of sexually transmitted diseases:

1. Human Immunodeficiency Virus (HIV)

A. High risk patients for HIV

1. Intravenous use of drugs for non-medical purposes.

2. Born in countries where heterosexual transmission is prevalent.

3. Have engaged in prostitution.

4. Have sexual partners who are:

a. IV drug abusers

b. Bisexual

c. Hemophiliacs

d. From countries where heterosexual transmission is thought to play a major role.

e. Showing signs of HIV infection.

5. Have had a major blood or blood product transfusion (5 units of blood or more) or three or more transfusions since 1980.

6. Have symptoms of HIV infection

B. A positive HIV antibody screen (confirmed) indicates exposure to the virus.

2. Hepatitis B Infection

A. High risk patients for hepatitis B

1. Asian, Pacific Island, or Alaskan Eskimo descent, whether immigrant or U.S. born.

2. Haitian or Sub-Saharan African born

3. Previous history of hepatitis.

4. Acute or chronic liver disease.

5. Work or treatment in a hemodialysis unit.

6. Blood transfusions on repeated occasions.

7. Rejection as a blood donor.

8. Household contact with a HBV carrier or hemodialysis patient.

9. Frequent occupational exposure to blood in medico-dental settings.

10. Percutaneous use of illicit drugs.

11. Multiple episodes of venereal disease.

12. Prostitution.

13. Work or residence in an institution for the mentally retarded.

B. A positive Hepatitis B Surface Antigen (HBsAg), without signs and symptoms of hepatitis, probably indicates carrier status.

3. Positive gonorrhea culture.

4. Positive serologic test for syphilis.

5. Positive test for chlamydia.

6. Positive wet prep for trichomonas, monilia, mixed vaginitis, Gardnerella.

7. Positive herpes culture.

8. Suspicious lesions - vulvar, cervical, vaginal - indicates potential for numbers 4,5, or 7.

9. Abnormal vaginal discharge indicates potential for numbers 3,5, or 6.

Standards 3,4,5, and 6: The following include key elements in the management plans for:

1. HIV - suspected/confirmed

A. High risk patients with the HIV risk factors cited above should be screened at initial visit or as soon as possible.

B. The counseling of high risk patients must include the following:

1. An explanation of the confidential nature of the test.

2. Information about the test.

3. Prevention recommendations.

4. Return appointment for antibody test results.

C. If the patient has a reactive HIV antibody screen test, refer for High Risk Facility care with 1-10 days (screening nurse/phone consult). Test results are conveyed to the patient in person.

1. Counsel regarding the risk of AIDS and the risk of perinatal and sexual transmission of HIV.

2. Refer sexual partners for counseling and testing.

3. Advise patient against donating blood, organs, or sperm and discourage from using IV drugs and sharing of needles and syringes.

4. Document "infection precautions" (body fluid) in medical records.

2. Hepatitis B screening should be done at initial prenatal visit or as soon as possible thereafter.

Clients with the following history should be screened:

A. Screening consists of drawing Hepatitis B Surface Antigen (HBsAG). If the client gives a history within the last six months of being diagnosed with Hepatitis B, hepatitis symptoms, or exposure to the virus, then draw HBsAg and Hepatitis B Core Antibody (HBcAb).

B. No further intervention is indicated if screening bloodwork is negative.

C. If HBsAg or HBcAB is positive, contact the client to come in for further bloodwork, counsel her about

Hepatitis B, note results on POPRAS and transfer to caseload at High Risk Facility within 3-10 days.

Additional referral data: HBsAg (surface antigen)

HBsAb (surface antibody)

HBcAb (core antibody)

HBeAg ("e" antigen)

HBeAb ("e" antibody)

D. If the patient has a positive HBsAg and is symptomatic, refer to High Risk Facility for follow-up care. This may be an emergent, urgent, or within one week depending on client condition documented in the record.

E. If patient is a Hepatitis B carrier, counseling should include information on carrier status to protect newborn, other children, sexual partner, including precautions on transmission to public, i.e. food handling, blood donation, etc.

3. Positive serologic test for syphilis

A. RPR is performed initially on all patients and repeated at 36 weeks.

B. If RPR is positive:

1. Confirm syphilis with FTA-ABS/ or MHA-TP

a. Negative MHA-TP

1. Look for other causes of positive RPR (Draw anatiter; R/O lupus).

2. Consult with M.D. - May need High Risk Facility consult/referral.

3. Do <u>not</u> treat for syphilis.

b. Positive MHA-TP

*Contact Reactive Coordinator City Health Department regarding staging and F/U and contact tracing.

Poor/no Hx of treatment	+ Hx of syphilis and + treatment
(1) Rx as indicated below	(1) Follow RPR q mo. if titer low (1:2, 1:4)
(2) Schedule baseline ultrasound scan and consult M.D.	(2) Scan and consult
(3) Repeat RPRs every month	(3) Follow RPR every month during pregnancy
	(4) Rx if RPR titer has 3-4 fold increase 1:4-$\geq$1:16 or 1:2-$\geq$1:8

Treatment:

1. Benzathine penicillin-G: 2.4 million units total, half in each buttock.

2. For patients allergic to penicillin: Oral Erythromycin steareate, ethyl succinate, 500 mg po qid x 15 days.

3. Unreliable history of treatment, or poor follow-up, especially if the patient is >36 weeks gestation, indicates repeat treatment and consultation with M.D./High Risk Facility.

4. Reliable history of treatment, with low titers indicates low-risk for active infection.

5. Advise the patient to have partner go for treatment and follow-up. The patient should use barrier method or abstain until partner is treated.

6. If any question of adequate treatment or moderate titer (1:8 or higher), repeat treatment.

4. Positive Gonorrhea Culture

A. Treat with:

1. Probenecid (Benemid) 1 gm po, followed in 30 minutes by Aqueous procaine penicillin (PCN) 4.8 million units IM in two divided doses, OR

2. Amoxicillin 3.0 gm po with Probenecid 1 gm po, OR

3. Ampicillin 3.5 gm po with Probenecid 1 gm po, OR

4. In case of a PCN allergy, Erythromycin 500 mg qid x 10 days.

5. For PCN resistant strain, Spectinomycin 2 gm IM

B. Follow-up cultures in 7 days and 14 days after treatment (rectal cultures should be obtained for all women and pharyngeal as indicated).

C. May treat for chlamydia with Erythromycin 500 mg qid x 10 days.

D. Advise condoms until both patient and partner test negative.

E. Refer partner for treatment.

F. Refer patient to VD clinic.

G. Give patient documentation of treatment - dose and time.

5. Treatment for GC contact:

A. May treat in clinic (see protocols for positive GC culture).

B. Refer to VD Clinic.

6. Positive Chlamydia Test:

A. Treat patient with Erythromycin 500 mg qid x 7-10 days.

B. Refer partner to health department for treatment.

C. Refer patient to High Risk Facility if allergic to Erythromycin.

D. Reculture after treatment.

7. Abnormal Vaginal Discharge:

A. Perform wet prep (KOH, NS)

B. GC culture if indicated

C. Chlamydia culture if indicated

D. Pap smear if indicated

E. Treatment for specific organism - see below

(1) Monilial Vagnitis

1. Monistat dual pack or Femstat 1 supp. at hs x 3 days with 1 appl. topical ointment x 7 days.

2. Gynelotrimin 1 tab q hs x 7 days.

3. Nystatin vaginal tabs 1 bid x 4 days.

4. Teaching regarding hygiene and clothing.

(2) Gardnerella Vaginitis

1. Flagyl 500 mg bid x 7 days (may be given after 20 weeks of pregnancy).

2. Ampicillin 500 mg qid x 7 days.

3. pH adjusters aci-gel, Trimosen.

Note: Refer partner to health department for treatment, or give treatment to both patient and partner.

(3) Trichomonas

1. Flagyl 250 mg po tid x 7 days, or 2 gm po in one dose (p 20 weeks gestation).

2. Gynelotrimin 100 mg q hs x 7 days.

3. pH adjusters aci-gel, Trimosen

Note: Refer partner to health department for treatment, or give treatment to both patient and partner.

(4) Mixed Vaginitis

1. Regimens for each specific organism may be combined.

F. Patient teaching for all vaginal infections:

1. Condoms or abstinence from sexual intercourse is advised throughout therapy. Abstinence is advised if the infection is severe and/or recurrent.

2. Counseling concerning hygiene and preventive measures.

3. No douches.

8. Genital Herpes

A. Culture all suspicious lesions:

1. Initial outbreaks referred to High Risk Facility/M.D.

2. If culture is positive, continue weekly cultures until negative x 2.

B. If history of genital herpes or current sexual partner with positive history: cervical culture positive, continue weekly cultures until negative x 2.

C. Counsel patient on anticipated management of delivery, prevention of transmission.

IX. Pregnancy-Induced Hypertension

Standard 1: The care manager(s) will document accurate recognition of the presence of conditions which indicate the potential and/or actual development of pregnancy-induced hypertension (PIH).

Standard 2: The key data indicative of PIH include:

A. Signs and symptoms of potentially developing PIH:

1. Sudden excessive weight gain $\geq$2-3 lb. in one week.

2. Edema of ≥+1 pretibial, complaints of facial and hand edema.

3. Transient blood pressure elevation ≥140/90 or ≥ an increase of 30 mm systolic/kmm diastolic which decreases by 10-15 min. rest in left lateral decubitus position.

4. Client complaints of headache, blurred vision, other visual disturbances, epigastric pain.

5. Proteinuria +1 - +2 on voided specimen.

B. Signs and symptoms indicative of PIH/preeclampsia:

1. Blood pressure ≥140/190 or increase of 30 mm systolic or 15 mm diastolic that does not decrease after rest in left lateral decubitus position.

2. Proteinuria ≥+2 on clean catch midstream.

3. Generalized edema with unexplained weight gain of over 2 lbs. in one week.

4. Severe continuous headache, visual disturbances, blurred vision, epigastric pain, nausea and vomiting (after 24 weeks).

5. Hyper-reflexia and clonus.

6. Pulmonary edema and cyanosis.

Standards 3,4,5, and 6: The key elements of the management plan include:

A. Potential developing PIH:

1. When one of the signs and symptoms is present, all signs and symptoms should be reviewed to rule out actual PIH/preeclampsia.

2. Elevated blood pressures should be repeated to validate real persistent elevations.

3. Preventive counseling:

a. Preventive health measures (i.e. rest in left lateral decubitus position and exercise, increased protein diet and increased fluids.

b. Review danger signs and symptoms with patient.

4. Increased frequency of clinic visits as indicated.

B. Upon diagnosis of PIH/preeclampsia refer to high risk facility for evaluation, testing and further disposition.

1. Emergency referral to Triage or Birth Center when severe preeclampsia is present: (immediate)

a. Preeclampsia (severe) (refer if one or more of these present).

1. B/P above 140/90.

2. Proteinuria 3+.

3. Severe continuous headache.

4. Visual disturbances, blurred vision.

5. Epigastric pain, nausea and vomiting (after 24 weeks).

6. Hyper-reflexia and clonus.

7. Pulmonary edema and cyanosis.

2. Urgent referral to Triage, Birth Center, or Screening Nurse (same day or following day) when nonsevere preeclampsia is present:

a. Preeclampsia (refer if two or more of these present).

1. B/P 140/90 on two or more readings at least 6 hours apart or increase of 30 mm systolic or increase of 15 mm diastolic.

2. Proteinuria, 1+. (Collect midstream urine.)

3. Generalized edema with unexplained weight gain greater than 2 lb./wk.

3. The patient and family member (when present) are counseled regarding dangers of preeclampsia, importance of referral, transportation to referral site.

C. A patient with persistent blood pressure 140/90 or increased 30 mm systolic or 15 mm diastolic regardless of any other signs and symptoms should be referred to the High Risk Facility for evaluation and monitoring of her blood pressure and fetal assessment, i.e. NST, ultrasound, etc. (Same day or within 24 hours, as indicated.)

Standards 7,8,9,10,11,12,13, and 14: The degree of implementation and evaluation of the results of the key elements of the management plan cited above will be rated according to documentation in the client record.

X. Abnormal Weight Gain Patterns

Standard 1: The care manager(s) will document accurate recognition of abnormal weight gain patterns.

Standard 2. The key data indicative of abnormal weight gain are:

A. Excessive weight gain.

1. Three lbs. or greater in one week.

2. Total weight gain >40 lbs.

B. Inadequate weight gain.

1. Less than 2 lbs. in 4 weeks in the 2nd and/or 3rd trimesters.

2. Weight loss or no weight gain for 2 consecutive visits.

3. Less than 15 lbs. total weight gain.

Standards 3,4,5, and 6: The key elements of the management plan are:

A. Excessive weight gain.

1. Rule out preeclampsia.

2. Perform diet counseling.

3. Recommend mild form of exercise.

4. For persistent, excessive weight gain refractory to counseling, refer/consult nutritionist, high risk referral may be indicated.

B. Inadequate weight gain.

1. Perform dietary counseling.

2. Consider referral to nutritionist.

3. Rule out infection, ETOH consumption, drugs, smoking, social problems, IUGR, increased activity, diabetes, especially if inadequate weight gain persists.

4. Consider protein drink supplement.

5. WIC referral.

Standards 7,8,9,10,11,12,13, and 14: Implementation of and evaluation of results of the management plan will be rated according to documentation in the client record.

XI. Abnormal Vaginal Bleeding

Standard 1: The care manager(s) will document accurate recognition of the condition of abnormal vaginal bleeding.

Standard 2: The key data indicative of abnormal vaginal bleeding include:

A. History of spotting pinkish-brownish discharge from vagina -- no complaints of bleeding like menses.

B. History of bright red bleeding ≥1/2 cup, soaked perineal pad - with or without pain - no bleeding present on clinic visit.

C. Presence of active bright red bleeding (supracervical) with or without pain at clinic visit; ≥1/2 cup or soaked perineal pad.

Standards 3,4,5, and 6: The key elements of the management plan include:

A. History of spotting (suspected cervicitis).

1. Describe specific account of bleeding.

2. Rule out cervicitis/vaginitis and treat accordingly.

3. Counseling - Review danger signs and instruct patient in self-referral to High Risk Facility if bleeding increases.

B. History of bright red bleeding (no active bleeding at clinic visit):

1. Ultrasound referral for placental localization may be indicated according to history.

2. Patient instruction to seek care at High Risk Facility for emergency evaluation if bleeding recurs.

3. May need to increase frequency of visits.

C. Active bright red vaginal (supracervical) bleeding at time of clinic visit.

1. Take vital signs (B/P, pulse, FHTs).

2. Assess need for stabilization.

3. Arrange notification and emergency referral to appropriate High Risk Facility (according to gestational age).

Standards 7,8,9,10,11,12,13, and 14: Implementation of and evaluation of the results of the management plan cited above

will be rated according to documentation in the client record.

XII. Size/Dates Discrepancy

Standard 1: The care manager(s) will document accurate recognition of the presence of significant discrepancy between the size of the uterus in relation to the number of weeks of gestation. This could be size larger or smaller for dates.

Standard 2: The key data indicative of size/dates discrepancy:

A. Subjective data:

1. Unsure last menstrual period and/or date of conception.

2. Recent discontinued use of oral contraceptives prior to conception. Ultrasound should be obtained prior to the 20th week of gestation when at all possible.

3. History of infertility. Patients who have become pregnant using fertility drugs should be referred for ultrasound evaluation.

B. Objective data:

1. A fundal height of over 3 cm difference in size and dates; either larger or smaller is indicative of potential size/dates discrepancy.

2. Obesity - a prepregnant weight of $\geq$200 lbs.

Standards 3,4,5, and 6: Key elements of the management plan include:

A. Review and correlate FH, FHTs, quickening, coital history, menstrual history, and contraceptive history.

B. Order and refer ultrasound when indicated by data in Standard 2. (Timeframe 1-3 weeks.)

1. For optimal dating, an ultrasound may be obtained at 12-20 weeks.

2. To assess interval growth, obtain ultrasounds no closer than 2 weeks apart.

3. When ultrasound is ordered to assess a size/dates discrepancy, accept menstrual age if it is within the following margin of error:

a. Crown-rump length ± 5 days

b. At 12-20 weeks ± 1 week

c. At 20-30 weeks ± 1.5 weeks

d. At >30 weeks ± 2.3 weeks

e. At >36 weeks ± 2.6 weeks

4. Patients with any known high risk medical condition(s) should be referred directly to High Risk Obstetrical Clinic and not sent to the Clinic Ultrasound Centers for evaluation.

C. High risk conditions identified on ultrasound exam should be referred to the appropriate clinic at the High Risk Facility. They may include:

1. Polyhydramnios

2. Oligohydramnios

3. Fetal anomaly

4. Confirmed IUGR

5. Asymptomatic placenta previa >28 weeks EGA (Placenta previa found on early ultrasound should be repeated around 28 weeks to determine status of placental site.)

6. Any other high risk condition documented in ultrasound results. (Timeframe range from emergent to within 3-7 days depending on EGA and symptomatology.)

Standards 7,8,9,10,11,12,13, and 14: Implementation and evaluation of the results of the key elements of the management plan cited above will be rated according to documentation in the client record.

XIII. Urinary Tract Infections

Standard 1: The care manager(s) will document accurate recognition of risk factors which predispose the development of urinary tract infection (UTI) in pregnancy and indications of current UTI.

Standard 2: The key data indicative of client at high risk of UTI and signs and symptoms of UTI include:

A. Risk factors:

1. History of frequent or recent UTI.

2. Clients with AS or AC hemoglobin.

B. Signs and symptoms of UTI:

1. Dysuria, frequency, urgency.

2. Suprapubic pain.

3. Chills/fever ($\geq 100^{\circ}$).

4. Nausea/vomiting.

5. CVA tenderness.

6. Flank pain.

C. Laboratory findings:

1. Positive nitrites.

2. Positive urine culture and sensitivity >100,000/ml bacterial colonies (asymptomatic or symptomatic); 10,000-100,000/ml bacterial colonies (symptomatic).

3. Positive microscopic urine exam.

Standards 3,4,5, and 6: The key elements in the management plan are as follows:

A. Order UA and C & S:

1. Initially on all patients.

2. Every 4-6 weeks for patients with AS or AC hgb, or those with a history of kidney infection.

3. For patients with symptoms of UTI.

4. Dipstix urine each clinic visit.

B. Asymptomatic bacteriuria - (Isolation of bacteria in concentration of >10-5/100 ml):

1. Treat according to C & S, or with

2. Macrodantin 50 mg po qid x 5 days if C & S is not available.

C. For positive C & S or symptomatic UTI:

1. Supportive measures - force fluids, rest, good hygiene measures.

2. Medications (may treat before C & S is available):

a. Macrodantin 50 mg po qid x 10 days.

b. Ampicillin 500 mg qid x 10 days.

c. Keflex 250-500 mg qid x 10 days.

d. Pyridium 200 mg tabs 1 tid after meals or 100 mg tabs 2 tid after meals.

e. Erythromycin 250 mg qid x 10 days or 50 mg tabs 1 tid after meals or 100 mg tabs 2 tid after meals.

f. Consult M.D. for treatment with sulfa if needed or when resistant to protocol medications.

g. Velosef 500 mg bid x 10 days.

h. Amoxicillin 500 mg bid x 10 days.

D. Repeat UA and C & S after completion of therapy and when indicated.

E. Consider treating any colonization of group B - Beta Hemolytic Strep with Ampicillin 500 mg qid x 7 days.

F. Recurrent UTI:

1. Continue to treat with appropriate antibiotics. If positive culture x 3, consult/refer to High Risk Clinic.

2. Prophylactic treatment is recommended until delivery for patients with history of recurrent UTI.

a. Macrodantin 100 mg po qd with milk and crackers.

b. Gantrisin 500 mg po qid (avoid sulfa after 32 weeks).

H. Severe UTI/pyelonephritis: Refer - emergency to High Risk Facility -- Triage or Birth Center.

Standards 7,8,9,10,11,12,13, and 14: Implementation and evaluation of the results of the management plan cited above will be rated according to documentation in the client record.

XIV. Rh Negative Client

Standard 1: The care manager(s) will document accurate recognition of the condition of the Rh negative non-sensitized client.

Standard 2: The key data indicative of Rh negative non-sensitized condition include:

A. A lab report indicating the client is Rh negative.

B. A negative antibody screen (indirect coombs) for anti-D antibody -- Both at initiation of care and prior to the administration of Rhogam.

Standards 3,4,5, and 6: The key elements in the management plan are as follows:

A. Rh determination and indirect coombs on all patients.

B. If Rh negative:

1. Flag the chart.

2. Patient teaching regarding precautions, treatments, and significance.

C. Rhogam is to be given at 28 weeks if indirect coombs (IC) is negative, but may be given as late as 34 weeks. It should be repeated in 12-14 weeks if the client is not delivered.

D. If AP Rhogam is given: Do not repeat IC until after delivery.

E. If AP Rhogam is not given, repeat IC q 4 weeks after 28 weeks EGA.

F. If IC is positive with anti-D antibody, patient has been sensitized or has already received Rhogam.

Consult M.D./High Risk Facility -- Referral indicated if patient is sensitized within 3-7 days.

G. Consult pathology for any AP bleeding (to quantitate for additional Rhogam). Consult M.D./High Risk Facility if additional Rhogam is needed.

Standards 7,8,9,10,11,12,13, and 14: Implementation and evaluation of the results of the key elements of the management plan cited above will be rated according to documentation in the client record.

XV. Compromised Fetus

Standard 1: The care manager(s) will document accurate recognition of the presence of conditions which indicate the potentially compromised fetus.

Standard 2: The key data indicative of potential fetal compromise are:

A. Abnormal fetal heart tones, i.e. <120, >160, irregularity.

B. No fetal heart tones auscultated by fetoscope or doppler after 20 weeks EGA.

C. Maternal history of decreased fetal movement.

D. Rupture of membranes.

E. Evidence of amnionitis or sepsis.

Standards 3,4,5, and 6: The key elements of the management plan include:

A. Confirmation of one or more of the above data in Standard 2.

B. Patient should be referred as emergency referral to Triage Area or Birth Center at High Risk Facility.

C. If possible, a phone consult to referral site regarding client condition and approximate arrival time should be made.

D. Patient should be instructed about situation and importance of follow-up.

E. Validate transportation method for the patient.

Standards 7,8,9,10,11,12,13, and 14: Implementation and evaluation of the results of the management plan cited above will be rated according to documentation in the client record.

XVI. High Risk Conditions Identified on Ultrasound (see size/dates discrepancy)

APPENDIX D

Referral Management Scale

Referral Management Scale

Directions:

1. Enter the client code number on the rating form.
2. Specify the actual/potential client condition or complication and the reason for the interagency referral.
3. Compare the complication management documented in the client's antepartum record to standards of care cited in the criterion indicators for the recognition and management of actual/potential antepartum complications included in the ACMS Scale packet.
4. Read the item statement (care standard) on the rating form which relates to a component of the referral management process representative of effective and efficient referral management.
5. Using the scale to the right of each statement, rate the degree to which that component of the referral management process was implemented by the care management system in the management of the specific condition/complication. Indicate your rating by placing a check below the word(s) which best describes the degree to which that standard of the referral management process was implemented.

The rating choices are Met, Partially Met (Part. Met), and Not Met. Check "Met" if all the key element(s) of the standard of care management cited in the criterion indicators for the management of the specific condition/complication were implemented by the care manager(s). Check "Partially Met" if some key element(s) of the care management standard were not implemented by the care manager(s) as applied to the specific condition/complication being managed. Check "Not Met" if none of the key elements of the care management standard was implemented by the care manager(s) as applied to the specific condition/complication being managed. The statement is rated from 1-3 to indicate the degree to which that standard of the referral management process was implemented with 3 (Met) being the highest. (See examples below.)

NOTE: If a statement is given a rating of 1 or 2, write the rationale for the rating in the comments section below the specific item statement. (See example below.)

6. Proceed to the next item statement and repeat steps 2-4 until all item statements have been rated.

Exception: If item statement number 1 receives a rating of 1 (Not Met), do not complete items 2-6. Do

write your rationale for the rating in the comments section below the scale of the particular item.

7. An abbreviated RMS Scoring form (see attached) may be utilized to rate scale items to facilitate the rating process. The rater is cautioned to frequently review the complete item statement on the RMS SCale to ensure accurate interpretation of the abbreviated standards.

Example:

Standard statement:	Not Met	Part. Met	Met
The client was referred to the inter-agency site which was most capable of providing the specific evaluation, diagnostic measures, and/or treatment of the referral condition/complication with a minimum of effort, expense, or waste of client, health care provider(s), and other health care system resources.	X		
Comments: The client had a breast mass and was referred to the screening nurse at the high risk facility instead of the specific clinic which evaluates breast masses.			

REFERRAL MANAGEMENT SCALE RATING FORM

Client Code: _____

Reason for referral: _____

Standard statements:	Not Met	Part. Met	Met
1. The referral was justified according to the client's condition/complication represented in the antepartum record at the time of referral. Comments:			
2. The referral process was initiated within a timeframe consistent with standards of care related to the client's condition/complication represented in the antepartum record -- emergent, urgent, nonemergent/urgent. Comments:			
3. The client complied with the referral within a timeframe consistent with standards of care specific to the client condition/complication represented in the antepartum record. Comments:			
4. When indicated, the care management system obtained and/or planned the obtainment of a referral data base prior to or concurrently with the referral visit which could have facilitated the referral process, i.e. decrease the number of visits to the referral agency needed to obtain evaluation, diagnosis, and/or treatment of the condition/complication. (Mark "Met" if not indicated.) Comments:			

Standard statements:	Not Met	Part. Met	Met
5. The client was referred to the inter-agency site which was most capable of providing the specific evaluation, diagnostic measures, and/or treatment of the referral condition/complication with a minimum of effort, expense, or waste of client, health care provider(s), and other health care system resources. Comments:			
6. The client obtained the evaluation, diagnostic measures, and/or treatment for which the client was referred. Comments:			
7. The result(s) of the referral was evaluated by the care management system as evidenced by documentation in the antepartum record. Comments:			
8. Documented follow-up care by the care management system, post-referral, was consistent with the result of referral and/or client condition/complication according to data in the antepartum record. Comments:			

RMS Scoring Form

Client code: _____

Complication code: _____ Referred for: _____

Standard	Not Met	Part. Met	Met
1. Referral justified			
2. Referral initiated within timeframe			
3. Client complied within timeframe			
4. Planned/obtained referral data base to facilitate referral process			
5. Interagency referral site most capable of specific evaluation			
6. Client obtained evaluation, diagnostic measures, and/or treatment			
7. Results of referral evaluated			
8. Follow-up care consistent with results of referral and/or complication			

Item: Comments:

APPENDIX E

Newborn Outcome Scale

Newborn Outcome Scale

Enter client code: _____

Directions:

I. Review the completed maternal/newborn record and complete the information below:

1. Newborn date of birth: _____
2. Estimated date of delivery: _____ LMP _____ RTS
3. Estimated gestational age at delivery:
   _____ weeks _____ days
4. Birthweight of newborn: _____ gms _____ lbs. oz.
5. Use attached chart to determine if newborn is
   _____ SGA ____ LGA _____ AGA (check one)
6. Condition of newborn: (check one)
   _____ stillborn (dead at birth and ≥ 20 weeks EGA or ≥ 500 gm weight)
   _____ Neonatal death (liveborn, died < 28 days of life)
   _____ Living after 28 days of life
7. Information about newborn health status (specify healthy or ill -- if ill, indicate diagnosis, number of days in hospital, NICU care, etc.): _____
   _____

II. Circle the number above the description of the newborn health status which best represents that documented in the maternity record reviewed:

1. Condition of the newborn at birth and/or in the neonatal period (birth to 28 days of life)

1	2	3
Stillborn	Neonatal Death	Living

2. Gestational age in weeks at time of birth:

1	2	3
≥20-<38	≥ 43	≥38-<43

3. Birthweight of newborn:

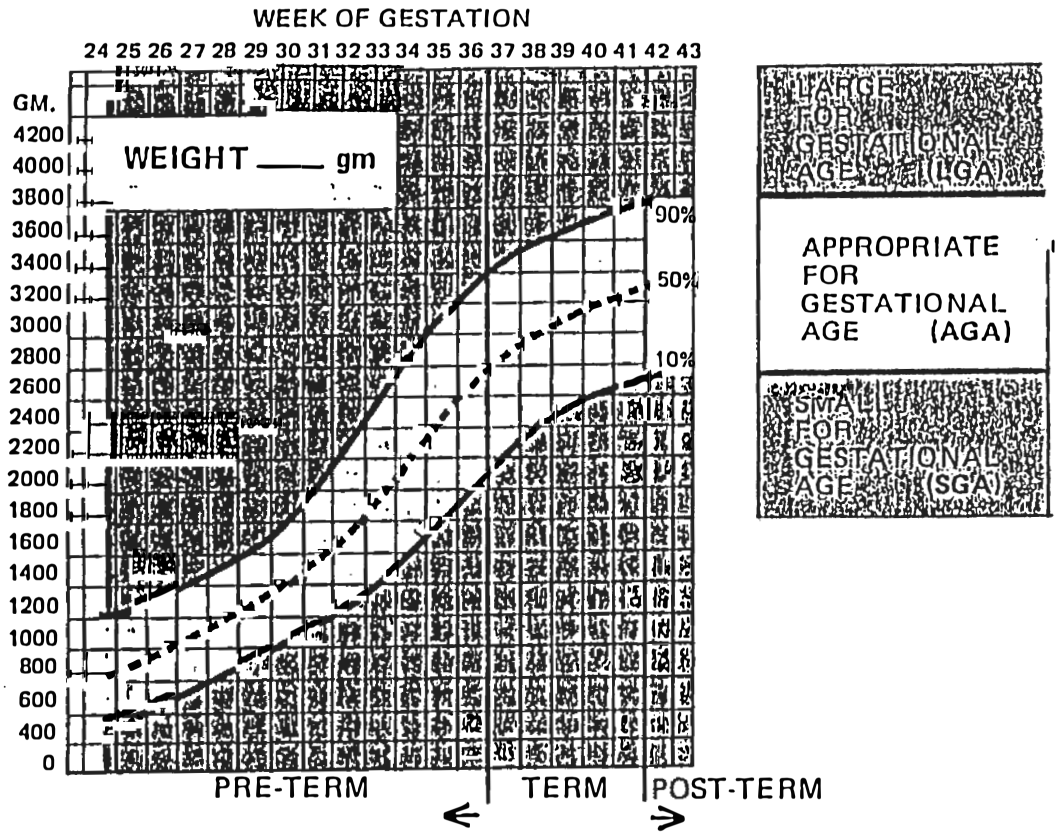
1	2	3
≤2500 gm	≥ 4000 gm	>2500-<4000 gm

4. Appropriateness of weight for gestational age:

1	2	3
SGA	LGA	AGA

5. Newborn wellness status:

1	2	3
Ill/NICU care	Minor illness/ undetermined wellness	Healthy



Adapted from Lubchenco LC, Hansman C, and Boyd E: Pediatr 37:403, 1966; Battaglia FC, and Lubchenco LC: J Pediatr 71:159, 1967.

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APPENDIX F

Demographic Data Form

Demographic Data Form

1. Client Code ---------- [_____]

2. Age in years ---------- [_____]

3. Marital status: [_____]

   1 = Single;
   2 = Married;
   3 = Separated;
   4 = Divorced;
   5 = Widowed

4. Ethnic Origin: [_____]

   1 = Caucasian;
   2 = Black;
   3 = Hispanic;
   4 = Asian;
   5 = Other (Specify _____)
   6 = Unknown

5. Educational Background: [_____]

   1 = < 6 yrs;
   2 = > 7 - < 12 yr);
   3 = GED; 12 yrs;
   4 = Vocational/Trade school;
   5 = College; Non degree;
   6 = College degree

6. Current occupation: [_____]

   1 = Unemployed;
   2 = Student;
   3 = Housewife;
   4 = Employed;
   5 = Other

7. Previous Pregnancy History:

   Gravida/Parity = [_ _ _ _ _]
   G T P A L

8. Clinic Attended: [_____]

   1 = Acres Home;
   2 = Pasadena

9. Primary Care Provider: [_____]

   1 = CNM;
   2 = Primary Nurse;
   3 = MD/RN

10. EGA at 1st clinic visit in weeks ----- [_____]

11. Total number of clinic visits -------- [_____]

12. Number of self referrals to hospital -- [_____]

13. Number of clinic appointments not kept by the client ---------- [_____]

14. If the client missed an appointment(s), specify:

    (a) the interval in weeks between the date of the missed appointment and the date the client returned to clinic; [_____]

    (b) the weeks of gestation at the time of the missed appointment [_____]

15. Birth place: [_____]

    1 = Labor Unit;
    2 = Birth center;
    3 = Other _____

16. Birth attendant: [_____]

    1 = MD (Resident/MS);
    2 = CNM;
    3 = CNM/MD;
    4 = Other _____
    5 = Unknown

17. Type of Delivery: [_____]

1 = Vaginal;
2 = Forcep;
3 = Primary C/Section;
4 = VBAC

18. Reason for Operative Delivery: [_____]

0 = N/A;
1 = Dystocia;
2 = Fetal Distress;
3 = Placenta Previa;
4 = Abruptio placenta;
5 = PIH;
6 = Malpresentation;
7 = Combination of above (Specify)
8 = Other: _____

19. Delivery outcome: [_____]

1 = Term/Liveborn;
2 = Term/Stillborn;
3 = Term/Neonatal Death;
4 = Premature/Liveborn;
5 = Premature/Stillborn;
6 = Premature/Neonatal Death;
7 = Postterm/Liveborn;
8 = Postterm/Stillborn;
9 = Postterm/Neonatal Death
10 = Other _____

APPENDIX G

Agency Approvals

THOMAS HYSLOP, M.D., M.P.H.
DIRECTOR

HARRIS COUNTY HEALTH DEPARTMENT
SOX 25249
HOUSTON, TEXAS 77265

(713) 525-1341

July 24, 1990

Ms. Sally E. Cook, CNM, MS
406 Fairmont Drive
Bosier City, Louisiana 71111

Dear Ms. Cook:

Your application for access to Harris County Health Department records for completion of your research, Comparison of Nurse-Midwifery and Non-Nurse Midwifery Care Management Systems, has been approved by our Research/Projects Review Committee and by our Director, dated July 23, 1990. Please proceed with your data collection and analysis, coordinating through Ms. Mary Janice Williams (713) 620-6895. We are looking forward to reading your completed research findings.

Sincerely,

Dan D. Williamson, D.D.S.

Dan D. Williamson, D.D.S., Chairman
Research/Projects Review Committee

vj

TEXAS WOMAN'S UNIVERSITY
DENTON DALLAS HOUSTON
HUMAN SUBJECTS REVIEW COMMITTEE - HOUSTON CENTER

EXEMPT FROM HSRC REVIEW

If it is the decision of the research committee (for student research) or the department coordinator (for faculty research) that the proposed research is exempt from expedited or full review by the Human Subjects Review Committee (HSRC), please complete the following form. A copy of this properly signed form must be submitted to the chairman of the HSRC

Principal investigator: SALLY E. COOK

Title of the research: COMPARISON OF CERTIFIED NURSE-MIDWIFERY AND NON-CERTIFIED NURSE-MIDWIFERY CARE MANAGEMENT SYSTEMS

1. Give a brief description of the study (use continuation pages or attachments, if necessary). Describe the procedure that relates to the subjects' participation, i.e., what will the subjects do or what will be done to them.

Data collection involves audits of health center and client records with no investigator-client contact.

2. What are the potential risks to the human subjects involved in this research or investigation (use continuation pages if necessary) ?

None identified.

I certify that this research meets the requirements for being exempt from review by the HSRC as specified in the Human Subjects Program Guideline (March 1986, revised). Three committee members sign for proposal paper or thesis, and five members sign for the dissertation research.

Chairman, research committee, Date 7/12/90

committee member

committee member

committee member

committee member

or, in the case of faculty research

Department Coordinator, Date

Department

Date received by HSRC Chairman Initial

APPENDIX H

Standards Representing Largest Discrepancies Rated as Met on the ADBS According to Health Center and Management System

Standards Representing Largest Discrepancies Rated as Met on the ADBS According to Health Center and Management System

Standard	CENTER A CNM (n=25) Met f(%)	CENTER A Non-CN (n=25) Met f(%)	CENTER B CNM (n=25) Met f(%)	CENTER B Non-CNM (n=25) Met f(%)
6. Repeat serology	22 (88%)	24 (96%)	19 (76%)	23 (92%)
10. MSAFP provided	25 (100%)	20 (80%)	25 (100%)	21 (84%)
13. Edema eval. ea. visit	25 (100%)	5 (20%)	25 (100%)	11 (44%)
17. Repeat GC culture	23 (92%)	24 (96%)	17 (68%)	23 (92%)
18. STD diag. test(s)	23 (92%)	19 (76%)	25 (100%)	20 (80%)
20. Glucose screen	25 (100%)	24 (96%)	25 (100%)	21 (84%)
26. ROS eval. ea. visit	25 (100%)	0 (0%)	25 (100%)	19 (76%)
27. Psych/Social assess.	24 (96%)	8 (32%)	19 (76%)	4 (16%)
28. EGA calc. ea. visit	25 (100%)	20 (80%)	25 (100%)	24 (96%)
31. Fetal move. ea. visit	25 (100%)	21 (84%)	25 (100%)	24 (96%)
32. Fetal pres. $\geq$36 wks	25 (100%)	22 (92%)	25 (100%)	21 (84%)

APPENDIX I

The Frequency and Percent of ACMS Standards Rated as Met According to Health Center and Management System

The Frequency and Percentage of ACMS Standards Rated as Met According to Health Center and Management System

Standard	CENTER A CNM (n=61) Met f(%)	CENTER A Non-CNM (n=81) Met f(%)	CENTER B CNM (n=75) Met f(%)	CENTER B Non-CNM (n=82) Met f(%)	Total N=299 Met f(%)
1. Accurate recognition of complication	61 (100%)	50 (62%)	74 (99%)	58 (71%)	248 (81%)
2. Data support presence of complication	61 (100%)	62 (77%)	74 (99%)	69 (84%)	266 (89%)
3. Planned for additional data base	60 (98%)	38 (47%)	74 (99%)	52 (63%)	224 (75%)
4. Planned for treatment regimen	61 (100%)	47 (58%)	72 (96%)	51 (62%)	231 (77%)
5. Planned for instructions and/or precautions regarding specific complication	51 (84%)	23 (28%)	68 (91%)	34 (42%)	176 (59%)

Standard	CENTER A CNM (n=61) Met f(%)	CENTER A Non-CNM (n=81) Met f(%)	CENTER B CNM (n=75) Met f(%)	CENTER B Non-CNM (n=82) Met f(%)	Total N=299 Met f(%)
6. Planned for client disposition(s)	61 (100%)	51 (63%)	72 (96%)	52 (63%)	236 (79%)
7. Planned for additional data base implemented within timeframes	60 (98%)	42 (52%)	74 (99%)	47 (57%)	223 (75%)
8. Treatment regimens implemented	61 (100%)	42 (52%)	73 (97%)	56 (68%)	232 (78%)
9. Treatment regimens implemented in appropriate timeframe	58 (95%)	37 (46%)	73 (97%)	48 (59%)	216 (72%)
10. Instructions/precautions documented as given	52 (85%)	19 (24%)	68 (91%)	35 (43%)	174 (58%)

Standard	CENTER A CNM (n=61) Met f(%)	CENTER A Non-CNM (n=81) Met f(%)	CENTER B CNM (n=75) Met f(%)	CENTER B Non-CNM (n=82) Met f(%)	Total N=299 Met f(%)
11. Disposition(s) implemented	60 (98%)	49 (61%)	74 (99%)	53 (65%)	236 (79%)
12. Results of additional data evaluated	60 (98%)	34 (42%)	74 (99%)	46 (56%)	214 (72%)
13. Client compliance to management plans evaluated	60 (98%)	33 (41%)	73 (96%)	46 (56%)	212 (71%)
14. Subsequent care and followup in accordance with results of previous management plan(s)	61 (100%)	25 (31%)	72 (96%)	40 (49%)	198 (66%)

APPENDIX J

The Frequency and Percent of RMS Standards Rated as Met According to Health Center and Management System

The Frequency and Percentage of RMS Standards Rated as Met According to Health Center and Management System

Standard	CENTER A CNM (n=29) Met f(%)	CENTER A Non-CNM (n=30) Met f(%)	CENTER B CNM (n=31) Met f(%)	CENTER B Non-CNM (n=41) Met f(%)	Total (N=131) Met f(%)
1. Referral justified	29 (100%)	29 (97%)	30 (97%)	28 (68%)	116 (89%)
2. Referral initiated within appropriate timeframe	29 (100%)	26 (87%)	30 (97%)	22 (54%)	107 (82%)
3. Client complied within planned timeframe	26 (90%)	21 (70%)	25 (81%)	23 (56%)	95 (73%)
4. Planned/obtained referral data base to facilitate referral process	29 (100%)	26 (87%)	30 (97%)	24 (59%)	109 (83%)
5. Referral site most capable of evaluating client condition	29 (100%)	21 (70%)	29 (94%)	18 (44%)	97 (74%)

Standard	CENTER A CNM (n=29) Met f(%)	CENTER A Non-CNM (n=30) Met f(%)	CENTER B CNM (n=31) Met f(%)	CENTER B Non-CNM (n=41) Met f(%)	Total (N=131) Met f(%)
6. Client obtained evaluation, diagnostic measures, and/or treatment	27 (93%)	21 (70%)	29 (94%)	26 (63%)	103 (79%)
7. Results of referral evaluated	29 (100%)	15 (50%)	30 (97%)	25 (61%)	99 (76%)
8. Followup care consistent with results and/or complication	28 (97%)	16 (53%)	30 (97%)	25 (61%)	99 (76%)